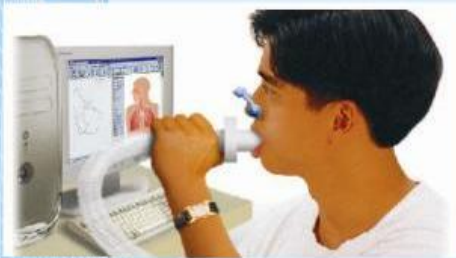


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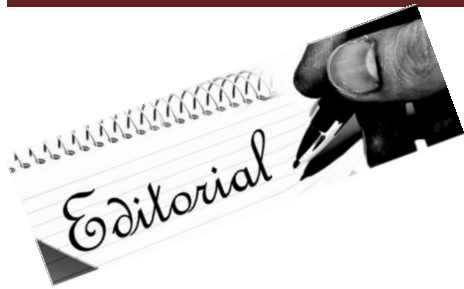
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- *On the Occasion of Second Issue*

Dear colleagues, I am very happy to put this second annual issue of our Physiology Journal in your hand. Editing Such journal is really enriching experience for me and has provided lots of opportunity to learn new things and also made me aware of existing scenario of research and infrastructure of Physiology in our country.

Thorough look at articles received by us points to certain fact that we lack in right kind of research aptitude and our research infrastructure is also not up to the mark in many physiology departments in the country. It may be fulfilling minimum requirement recommended by MCI but as you all know this minimum recommendation of MCI itself needs thorough overhauling to pace with the current innovations. Responsibility of specialty Medical journal should not be limited to discussion of research articles of subject concerned but also include promotion of education and research activity in their subject. So Journal should be a medium of change by actively participating into policy making through publishing related articles from learned members of society. With this in mind we invite our erudite members to provide article related to current scenario of Physiology education and research along with its pros and cons and constructive suggestions to improve the same.

In India the role of Physiologist is largely confined to Medical College teachings due to various reasons. I feel that with revisiting certain issues in postgraduate curriculum and accordingly the infrastructure we can open new avenues for our postgraduate students like (1) Appointment in Instrument industry (as part of research, manufacturing or marketing team) (2) Appointment in research institutes (as JRF,SRF or scientist) (3) Opportunity Work as professional by establishment of service lab for assessment of Physiological functions (i.e. Electrophysiology, Sleep lab, Cardiorespiratory lab etc).

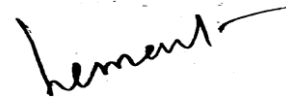
To improve infrastructure in physiology departments in all medical colleges of India, minimum requirement of instruments for physiology department should be urgently revised because it is tendency of all stake holders to stick to minimum requirement rather than asking for more and required. Accordingly, technical staff requirement, which is currently only one(1), should be increased in proportion to number of specialized labs available in the department. Medical colleges should be encouraged to do research appointments in the post of JRF and SRF over and above the faculty requirement set by MCI, so that postgraduate students of physiology are not forced to stay at home in absence of non availability of faculty position.

Myself and other members of editorial team Dr.Chinmay and Dr. Jasmin attended Annual workshop of Indian Association of Medical Journal Editors organized by WAME (World Association of Medical Editors) and COPE (Committee on Publication Ethics) held at AIIMs this year. President of WAME, COPE officials, PLOS officials and senior editors of BMJ and Annals of Medicine participated as faculty and guided all delegates. It appears that we have lot to do in the field of publication. Although we got the opportunity to learn research and publication guideline later, our postgraduate students must be armed with this knowledge before they get the degree. They must be taught during their postgraduate study how to select research question, research methodology, research design and selection of appropriate statistical tool for their research work. They should also be made aware of ethical issues related to research and also publication.

With this I sincerely thank our esteemed reviewers without whom this task is impossible and who devoted their time without expecting for anything in return.

I sincerely urge learned researchers to take criticism of our reviewers constructively and help ourselves to achieve standards set by IAMJE and so ICMJE for scientific publication. We have tried to rectify our last years mistakes in this issue.

Rather than inviting articles few months before publication, we have now decided to receive articles on continuous basis and will follow a procedure flow where whole process from receipt of article to decision on acceptance through peer review will be accomplished in maximum three months.



(Dr. H.B.MEHTA)

On behalf of our editorial team

A Comparative Study Of Effect Of Yoga And Drugs On Pulmonary Functions And Inflammation In Bronchial Asthma

Sanjeev Satpathy*, Aiswarya Kar **, Akshaya Mishra ***

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Abstract: Background: Bronchial asthma is one of the most common chronic diseases in the world. Pharmaceutical interventions like using inhalational bronchodilators and corticosteroids have grown like anything. These have a multisystem deleterious effect on body. Yogic exercise has been used to treat patient with asthma for over 50 years. The present study was an attempt to include yogic exercise into treatment modality of asthmatic patients and compare the Pulmonary Function Tests (PFTs) and inflammatory changes. Method: 71 patients with bronchial asthma taken and were randomized into two groups; Pranayama Group And Drug Group. Pranayama Group contained 37 subjects and DRUG GROUP contained 34. PFTs and Absolute Eosinophilic Count (AEC) were performed in all the subjects at baseline and after 6 weeks. The parameters were compared by using Paired t- test. Statistical analysis was done by using SPSS 16.0 software. Result: After 6 weeks, PRANAYAMA GROUP subjects showed a significant increase in percent predicted Forced Expiratory Volume in the first second (FEV1), Forced Vital Capacity (FVC) and FEV1/FVC% as compared to Drug Group. AEC showed significant decrease in eosinophil count in Pranayama Group as compared to Drug Group which showed insignificant increase. Conclusion: The yoga breathing exercise used adjunctively with standard drugs significantly improves pulmonary functions and inflammation in patients with Bronchial asthma.

Key Words: Bronchial asthma, Inflammation, Pranayama, Pulmonary functions

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Introduction: Bronchial asthma is one of the common chronic diseases in the world. It is estimated that 300 million people are affected worldwide¹. According to the GINA, a definition of Asthma is given as; "Asthma is a chronic inflammatory disorder of the airways in which many cells and cellular elements play a role. The chronic inflammation is associated with airway hyper-responsiveness that leads to recurrent episodes of wheezing, breathlessness, chest tightness and coughing, particularly at night or in the early morning. These episodes are usually associated with widespread, but variable airflow obstruction within the lung that is often reversible either spontaneously or with treatment"².

Asthma is a chronic inflammatory disease of the airways that is characterized by increased responsiveness of the tracheobronchial tree to allergens or irritants that cause acute bronchoconstriction³. Along with that it presents with varying degrees of airway inflammation in every patient with asthma. Airway inflammation is persistent even though symptoms are episodic^{4,5} This is due to release of mediators from activated mast cells, eosinophils, T lymphocytes, etc.

Pharmaceutical interventions are used more rampantly in the treatment of asthma. It is both costly and produces various unwanted side-effects in the patients. Breathing exercises if done regularly and properly can control asthma. Pranayama is an effective breathing technique that is commonly used. If done regularly under proper guidance, this simple measure will be effective.

The aim of this study was to witness the influence of Pranayama on subjects with chronic bronchial asthma on standard therapy when compared to those who are only on standard therapy. The objective of this study was to see the effect of Pranayama on pulmonary function and inflammation in chronic bronchial asthma.

Materials and Method: This study was conducted at Department of Physiology and Department of Pulmonary Medicine in VSS Medical College, Burla. The study was conducted after receiving approval from the Institutional Ethics Committee of VSSMC, Sambalpur University, Burla.

The study was a Randomised Controlled Trial with two different groups, consisting of adult patients with persistent, chronic asthma who have met the

inclusion and exclusion criteria for the same. Initially the patients were stabilized on drugs till no further symptomatic improvement occurred. The study subjects were allocated to two groups; the PRANAYAMA GROUP that included those who practiced Pranayama along with standard care and the DRUG GROUP who received only standard care.

Inclusion criteria included i) Cases of Bronchial asthma confirmed by the Physician/Chest Physician as mentioned in diagnostic criteria and ii) With symptoms of asthma persisting for at least 6 months despite optimum therapy. Exclusion criteria included I) History of smoking within the last 1 year, II) Acute infection or infections within the past 6 weeks and III) Patients with serious systemic illness – Hepatic, Renal, Cardiac or CNS diseases. IV) Patients with cardiovascular diseases including hypertension.

71 subjects with chronic bronchial asthma attending the OPD of Pulmonary Medicine, VSS MC, were taken. They were allotted into two groups: DRUG GROUP and PRANAYAMA GROUP, with 34 and 37 subjects respectively. All were males with no significant difference in mean age and BMI. Initially they were stabilized on drugs till no further symptomatic improvement occur. The DRUG GROUP continued the same medicine that they had been using and the PRANAYAMA GROUP were taught to perform one simple Pranayama, Bhastrka, daily, along with the normal medication. DRUG GROUP was taken as control.

The participants of both the groups underwent Spirometric test by help of SPIROLAB-II SPIROMETER, CIPLA, INDIA. The FEV1, FVC and FEV1/FVC% were measured. AEC was also found out by direct method by using Pilot fluid.

The PRANAYAMA GROUP performed the Bhastrika for 15 min daily for 6 weeks. The subjects inhaled and exhaled forcefully at a ratio of 1:1 for 15-20 min with a rest after every 1 min. After 6 weeks, Spirometric test and AEC were again done to find out the changes.

Significance was found out by using Paired t- Test. Statistical analysis was done by using SPSS 16.0 software. $p < 0.05$ was taken as significance.

Result: The findings of the two groups at baseline and after 6 weeks of treatment have been shown in the table and the comparison was shown in the graph. p was calculated by using Paired t-Test.

Fig 1: Change in FEV1 in the study groups between baseline and after 6 weeks

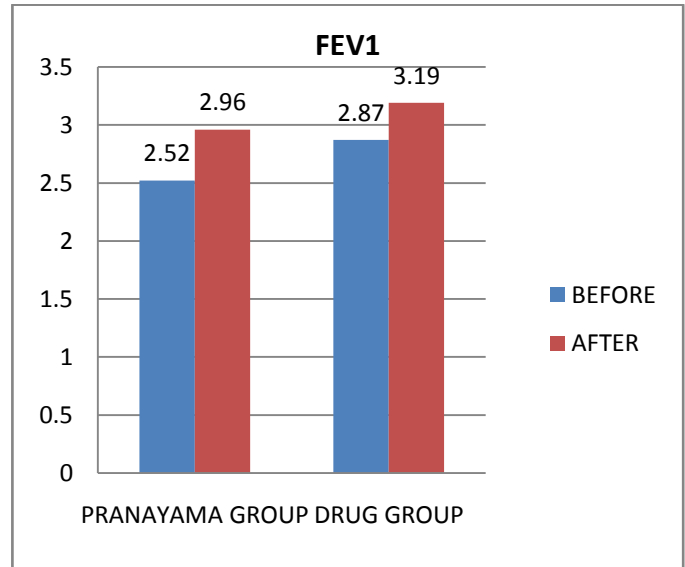
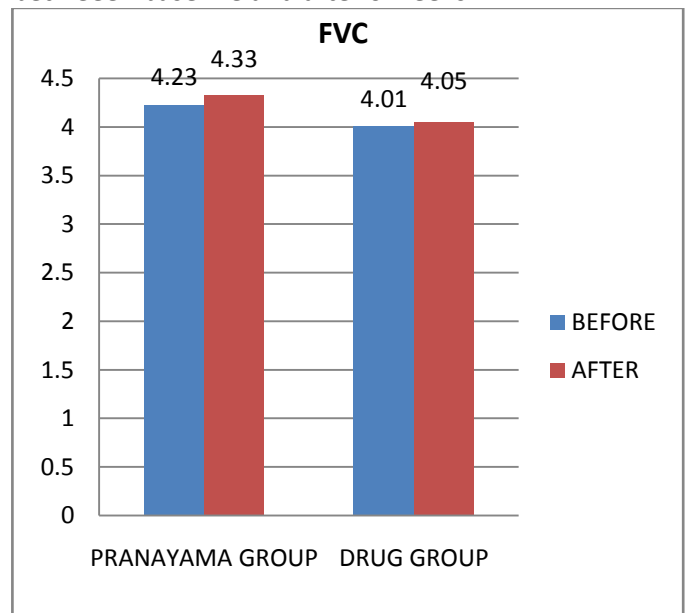


Fig 2: Change in FVC in the study groups between baseline and after 6 weeks



Discussion: Drug therapy alone cannot give long term control for bronchial asthma. Many of Complementary and Alternative medicine (CAM) are used to control asthma. Yoga is one important branch of CAM. Pranayama and asana bring about a correct balance between the sympathetic and

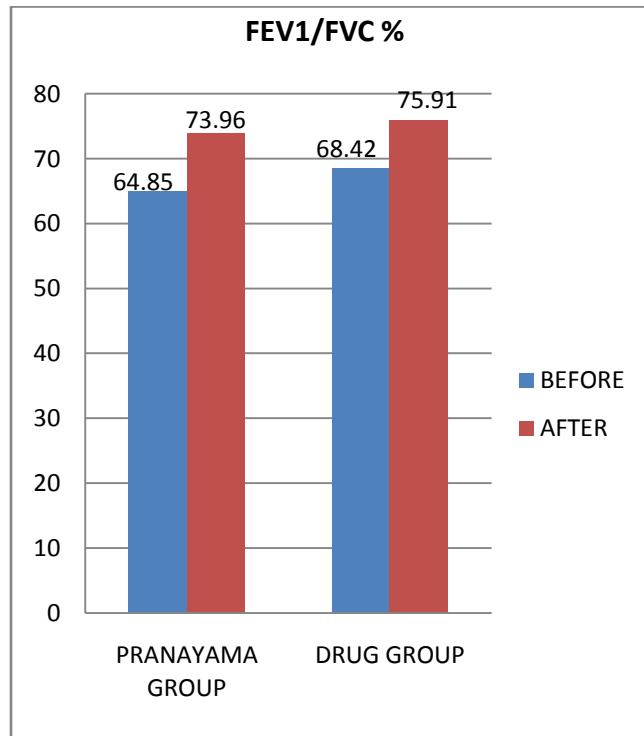
parasympathetic nervous system^{6,14}. Though yoga bring about a Parasympathetic dominance, Pranayama like Bhastrika has a slight Sympathetic stimulatory effect^{7,8}. It also cause airway smooth muscle relaxation, so long term use of this technique will mask the vagal imbalance that cause bronchoconstriction. The mechanism of pulmonary

function changes was mentioned in work of Nagarathna et al¹⁵ who had suggested that yoga techniques reduce psychological over activity and emotional instability, thus enhancing immunity.

Table 1: The findings of the two groups at baseline and after 6 weeks of treatment

	Parameter	Baseline	Post Intervention	Mean Difference	Std Dev	P
PRANAYAMA GROUP (n=37)	FEV1(Lit)	2.52	2.96	-0.44	0.13	0.001
	FVC(Lit)	4.23	4.33	-0.1	0.05	0.04
	FEV1/FVC(%)	64.85	73.96	-9.11	3.04	<0.001
	AEC	325.28	239.32	85.96	81.74	<0.001
DRUG GROUP (n=34)	FEV1(Lit)	2.87	3.19	-0.32	0.45	0.01
	FVC(Lit)	4.01	4.05	-0.04	0.01	0.001
	FEV1/FVC(%)	68.42	75.91	-7.49	10.66	<0.001
	AEC	311.82	334.62	-22.8	104.87	0.214

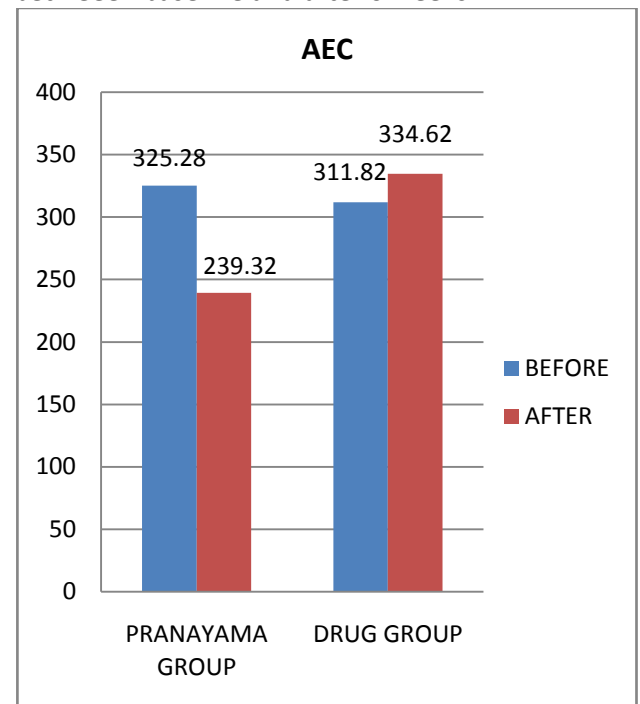
Fig 3: Change in FEV1/FVC % in the study groups between baseline and after 6 weeks



Before the study, all the subjects in both the groups were matched for age, sex and BMI. All the subjects were under routine treatment and had their parameters FEV1, FVC and FEV1/FVC% at baseline. The AEC was also measured. There was an improvement in Spirometric finding after 6 weeks.

FEV1 increased by 16.3% in PRANAYAMA GROUP in comparison to DRUG GROUP where the increase is 11.2%. My study matched with the study of Murthy et al⁹, Joshi et al¹⁰. In PRANAYAMA GROUP FVC increased by 2.2% and in DRUG GROUP, by 0.9%. Similar findings were also found by the studies of Murthy et al⁹, Joshi et al¹⁰, Kumar et al¹¹.

Fig 4: Change in AEC in the study groups between baseline and after 6 weeks



The FEV1/FVC in PRANAYAMA GROUP increased by 13.5% where as in DRUG GROUP, by 11.8%. This finding coincided with the study of Kumar et al ¹¹, Kalpana et al ¹².

The AEC was seen to be reduced significantly in PRANAYAMA GROUP by 22% where as in DRUG GROUP it was found to be increased by 6%. The study by Satyaprabha TN et al ¹³, Kalpana et al ¹².

Conclusion: The study clearly showed that 6 weeks of Pranayama produced improvement in spirometric findings i.e. FEV1, FVC and FEV1/FVC which was even better than using routine therapy alone. Reduction in inflammation is seen only in those doing Pranayama as AEC showed significant decrease after 6 weeks in PRANAYAMA GROUP than in DRUG GROUP. Inflammation in DRUG GROUP remained high as AEC is increased. Thus it is strongly recommended that these breathing exercises be used as an adjunctive therapy in the treatment in the amelioration of chronic bronchial asthma and bring a better control over the condition of patient.

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Co-Relation Of Serum Lipids And Glycosylated Haemoglobin With Changes In Retina In Type -2 Diabetes

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Abstract: Background: This study was done to study the correlation between serum lipids and glycosylated haemoglobin with changes in retina in type 2 diabetes mellitus. Method: 80 subjects were taken for this study from diabetic clinic of civil hospital Ahmedabad and 40 controls were taken from community. They were divided into 3 groups. A detailed history was taken and clinical examination was done and specific investigations were done to estimate HbA1c, blood glucose levels (fasting and post prandial), S.triglyceride, S.HDL, S. cholesterol, S.LDL. Fundus examination was carried out in all of them. Result: The incidence of diabetic retinopathy was high with increase in age & duration of diabetes. Mean glycosylated haemoglobin levels in diabetic subjects were more as compared to mean HbA1c levels in healthy non-diabetic control subjects. Diabetic patients with retinopathy had a higher mean HbA1c levels as compared to diabetic patients without retinopathy. Conclusion: High HbA1c and dyslipidaemia indicate chronicity of type-2 D.M. with poor glycaemic control these patients are more prone for diabetic retinopathy.

With age and duration of typr-2 D.M. risk increases for retinopathy.

Key Words: DM, Diabetic Retinopathy (DR), glycosylated haemoglobin (HbA1c).

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Introduction: Diabetes Mellitus is a heterogeneous group of metabolic disorder characterized by chronic hyperglycaemia with disturbance of carbohydrate, fat and protein metabolism resulting from defect in insulin secretion, insulin action or both.¹ Diabetes has emerged as a major healthcare problem in India. According to Diabetes Atlas published by the International Diabetes Federation (IDF), there were an estimated 40 million persons with diabetes in India in 2007 and this number is predicted to rise to almost 70 million people by 2025.

Type 2 diabetes is the most common form of diabetes. Patients with type 2 diabetes usually have insulin resistance and relative rather than absolute insulin deficiency. Type 2 diabetes frequently goes undiagnosed for many years and such patients are at increased risk of developing macro-vascular and micro-vascular complications¹. In this study Retinopathy was taken in to account as a specific micro-vascular complication of diabetes. It is estimated that diabetes affects 4 % of world's population, almost half of them have some degree of diabetic retinopathy at any given time². In India with epidemic increase in type 2 diabetes as reported by WHO³, diabetic retinopathy is fast becoming an important cause of

visual disability. However, this morbidity is largely preventable and treatable if managed with timely interventions.

Objectives:

- 1) To study HBA1C and the serum lipid profile in type 2 diabetes mellitus.
- 2) To study the changes in the retina associated with type 2 diabetes mellitus and grade it according to non-proliferative and proliferative DR.
- 3) To study if there is any correlation between serum lipids and HbA1c with changes in retina in type 2 diabetes.

Material and Method: The current study was done from June 2009 to June 2010. Total 80 subjects were taken from diabetic clinic at civil hospital Ahmedabad and 40 healthy volunteers were taken from community as control. All the patients who had duration of diabetes of 5 years or more were selected for this study and selected age was 40 years or more than 40 years. For the purpose of study they were divided into three groups as follows:

- Group-1 : 40 participants without diabetes
- Group-2 : 40 patients with diabetes but no clinically evident DR

- Group-3 : 40 patients with diabetes and associated DR

A detailed history, examination and significant investigations were done after taking consent from all the participants of the study.

Investigations were done using following Method

- Glycosylated Haemoglobin was estimated by Cation exchange resin method.
- Fasting blood sugar (FBS) and post prandial blood sugar (PPBS) was estimated by Glucose Oxidase-Peroxidase(GOD-POD) method, using Enzopak kit in fully auto-chemistry-analyser.
- S. Triglyceride was estimated by Glycerol 3 phosphate Oxidase N ethyl N sulfopropyl N anisidine method.
- S. HDL was estimated by PTA method using fully auto-chemistry-analyser.
- S. Cholesterol was estimated by Cholesterol Oxidase-Peroxidase end point method.
- S. LDL was calculated using Friedewald formula.
 $LDL = Total\ cholesterol - HDL - TG/5.$
- Fundoscopy was done after dilating the pupil using 1 % Homatropine by direct ophthalmoscope.

Results:In our study, 77.5% of patients in group-III i.e. those with retinopathy were ≥ 50 years of age, while those in group- II i.e. those without retinopathy,70% of patients were <50 year of age. In our study it is found that incidence of retinopathy was found increasing with increased age.

Fig 1: Age wise distribution of the patients who participated in the study.

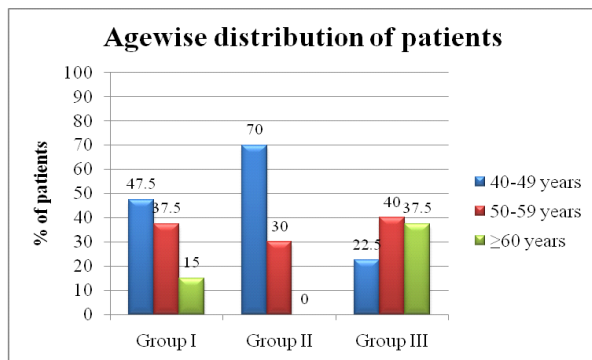
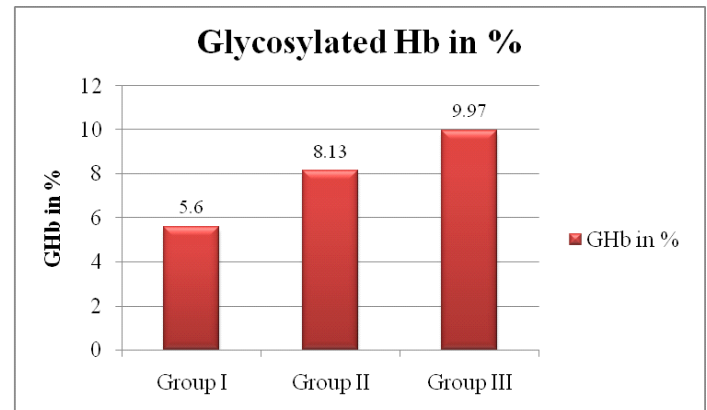


Table 2: Distribution of diabetic patients in group-II and III according to duration of diabetes.

Years of H/O DM	Group II		Group III	
	No.	%	No.	%
5-9	22	55	3	7.5
10-14	16	40	11	27.5
≥ 15	2	5	26	65
Total	40	100	40	100.0

Fig 2: Comparison of glycosylated haemoglobin among the three groups.(gm %)



In our study, we observed that HbA1c level in diabetes patients (group-II and group- III) was significantly higher as compared to control group.($p < 0.0001$).Also it was observed that patients with diabetic retinopathy (group-III) had significantly higher HbA1c level as compared to patients without diabetic retinopathy (group-II).

Table 2: Lipid profile of 120 participants of this study. (n = 40 in each group)

LIPID (mg %) (Mean \pm SD)	Group I	Group II	Group III
S. Triglyceride	107.3 \pm 18.16	165.8 \pm 15.4	198 \pm 21.5
S. HDL	41.92 \pm 6.07	39.52 \pm 3.78	34.4 \pm 3.75
S. Cholesterol	168 \pm 24.75	197.95 \pm 17.86	240.1 \pm 21.02
S. LDL	104.42 \pm 20.96	126.52 \pm 18.22	168 \pm 19.9

S.Triglyceride , S.LDL and S.Cholesterol were elevated and S.HDL was decreased in diabetic subjects as compared to control, whereas on

comparing group-II and group-III, S.TG, S.Cholesterol and S.LDL were more elevated in group- III i.e. those with retinopathy than that of group-II i.e. those without retinopathy.

Discussion:The current study was conducted to assess the S.lipid level & HbA_{1c} level & its correlation with retinopathy in diabetic subjects.

In our study, 77.5% of patients with retinopathy were ≥ 50 years of age, while only 22.5% patients were of < 50 years of age which suggested that increasing age was contributing factor for development of diabetic retinopathy. Manariat et al⁴ have also shown similar findings.

Our study also showed that incidence of diabetic retinopathy was increasing significantly with duration of DM ≥ 10 years & it was maximum after 15 years. Tapp et al in 2003 concluded that duration of diabetes was the risk factor of DR⁵. It was also proved by UK Prospective Diabetes Study Group⁶. In the CURES Eye study 41.8 % had diabetic retinopathy after 15 years of diabetes and severity of diabetic retinopathy proportionally increased with longer duration of diabetes. In addition it has been demonstrated that for every five years increase in duration of diabetes, the risk of diabetic retinopathy increases by 1.89 times⁷. Mitchel et al reported that about 8 % patients developed diabetic retinopathy for each year that duration of diabetes increased⁸. , a population based cohort study of diabetes had shown that in person with type 2 diabetes the prevalence of diabetic retinopathy ranged from 29 % in those with duration of diabetes < 5 years to 78 % in those with diabetes duration over 15 years⁹. As the duration of diabetes is a total reflection of blood glucose control and exposure to other risk factors, duration of diabetes is an important risk factor for incidence and development of retinopathy. The Wisconsin Epidemiological Study of Diabetic Retinopathy, a population based cohort study of diabetes had shown that in person with type 2 diabetes the prevalence of diabetic retinopathy ranged from 29 % in those with duration of diabetes < 5 years to 78 % in those with diabetes duration over 15 years⁹. Thus duration of diabetes has probably emerged out as the strongest risk factor toward the development of diabetic retinopathy.

In our study control group was found to have mean HbA_{1c} of 5.6 ± 0.37 gm%, diabetics without retinopathy had mean HbA_{1c} of 8.13 ± 0.54 gm% & diabetics with retinopathy had mean HbA_{1c} of 9.97 ± 1.26 gm%. It shows that HbA_{1c} value in group-III was significantly higher than HbA_{1c} in group-II which was again higher as compared to control group. Due to more intracellular glucose in diabetics there is enhanced HbA_{1c} due to non-enzymatic glycosylation of proteins leading to raised HbA_{1c} in diabetics. Raised HbA_{1c} indicates poor glycaemic control many scientists have shown that incidence of retinopathy is more with poor glycaemic control. Maberley DAL et al in 2007 also demonstrated that poor glycaemic control was associated with increased risk of retinopathy in diabetics¹⁰. Manariat et al⁴ and Tapp et al⁵ also proved that HbA_{1c} was risk factor of DR. In the CURES Eye Study a linear trend in the prevalence of retinopathy with increase in quartiles of HbA_{1c} (trend Chi square: 51.6, $p < 0.001$) from 8.1 % (HbA_{1c} level < 6.9 %) to 31.7 % (HbA_{1c} > 10.3 %) was observed. For every 2 % elevation of HbA_{1c}, the risk for diabetic retinopathy increased by a factor of 1.7⁷. Thus it was observed that long term glycaemic control plays an important role in delaying the onset and lowering down the progression of DR.

Currently four major biochemical pathways have been hypothesized to explain the mechanism of diabetic eye disease all starting initially from hyperglycaemia induced vascular injury. These mainly include (1) enhanced glucose flux through the polyol pathway. (2) Increased intracellular formation of advanced glycation end products (AGE) that affect the retinal blood flow, permeability and other micro-vascular parameters. (3) Activation of protein kinase C (PKC) isoforms and (4) stimulation of hexosamine pathway. Studies have suggested that these mechanisms seem to reflect a hyperglycaemia induced process initiated by superoxide overproduction by mitochondrial electron transport chain¹¹.

It was found in our study that S.triglyceride, S.cholesterol & S.LDL were significantly higher in diabetic patients as compared to control subjects. One of the determinants of diabetic hypertriglyceridemia is overproduction of VLDL

triglycerides, which is most likely due to increased flow of glucose & free fatty acid to the liver & defect in clearance of VLDL triglycerides. In poorly controlled diabetes there is impaired LDL catabolism which leads to elevated S.LDL level. HDL cholesterol level is decreased in diabetes due to replacement of cholesterol in the core of HDL by triglycerides from hypertriglyceridemia. Ignatius C. madukaet al¹² in 2007 concluded that there was statistically significant increase in value of S.triglyceride, total cholesterol, HDL cholesterol, LDL cholesterol when compared with the non-diabetic subjects.

It was also found in our study that there was significant rise in lipid profile in those with retinopathy as compared to those without retinopathy. Thus, this study suggests association of serum lipids with DR. Many studies supported this result our observations. Hecke MV et al¹³ in 2005 & Meleth AD et al¹⁴ in 2005 also proved dyslipidaemia as a risk factor for diabetic retinopathy. According to Hoorn Study which was a population based study including 2484 subjects who were 50 to 74 year old Caucasians, plasma total cholesterol, HDL cholesterol and S. triglyceride level showed association with retinal exudates¹⁵. It has also been shown that in type 2 diabetes subjects there was increase in lipid peroxidation in plasma and probably this process could be accelerated in patients with diabetic complications¹⁶.

Conclusion: Our study concludes:

- The incidence of diabetic retinopathy increases, as the age increases.
- The incidence of diabetic retinopathy increases with increase in duration of diabetes. Diabetic retinopathy is more common after 10 years of diabetes.
- Mean glycosylated haemoglobin levels in diabetic subjects are more.
- Diabetic patients with retinopathy have a higher mean HbA1c levels as compared to diabetic patients without retinopathy. Higher HbA1c levels suggest poor long term glycaemic control.
- Serum cholesterol, serum LDL & serum triglyceride are elevated in diabetic patients. Diabetic patients also have low serum HDL level.

- Both high HbA1c and dyslipidaemia indicate chronicity of type-2 D.M. with poor glycaemic control. Such patients are more prone to develop diabetic retinopathy. So regular fundoscopy is recommended in patients of D.M., especially in those who are having high HbA1c and dyslipidaemia.

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Prevalence & Determinants Of Isolated Systolic Hypertension In Young Healthy Adults

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Abstract: Background: ISH is the most common type of hypertension in people over 60 years of age and increase in SBP being the principal characteristic in this population. Interestingly, data from a number of studies suggest that ISH is also prevalent in adolescents and young adults but findings from previous studies examining this question are inconclusive, so the aim of our study is to know prevalence and determinants of ISH in young healthy individuals. Method: We performed a cross section study on 400 young individuals between 18 to 30 years in western Rajasthan. The participants were then subjected to a set of questionnaire which included socio-demography determinants (age, sex, occupation and annual household income), personal habits (dietary habits, smoking, alcohol consumption), past history and family history of hypertension. They were then subjected to the measurement of height, weight, pulse rate, blood pressure, fasting blood sugar and serum cholesterol level. Result: In our study 9.25% were hypertensive (systolic, diastolic or both systolic and diastolic) and from this ISH were 4.25%, IDH were 1.5%, SDH were 3.5%, systolic hypertension in 7.75% and diastolic hypertension in 5%. Conclusion: ISH have quite high prevalence in young adults and is more common than SDH. Female gender, rural inhabitants, non-vegetarian diet, low socio-economic status, family history of hypertension, smoking, alcoholism, BMI and Serum Cholesterol level are important determinants of ISH in young adults.

Key words: Isolated systolic hypertension (ISH), Isolated diastolic hypertension (IDH), Systolic diastolic hypertension (SDH), Systolic blood pressure (SBP), Diastolic blood pressure (DBP).

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Introduction: For a long time the diastolic hypertension was thought to be the most important as an indicator of high BP. In many people with hypertension, both systolic and diastolic pressures are high, whereas in some, systolic pressure may be raised while diastolic pressure is normal. This is isolated systolic hypertension or ISH. It is the most common type of hypertension in people over 60 years of age and increase in SBP being the principal characteristic in this population. Interestingly, data from a number of studies suggest that ISH is also prevalent in adolescents and young adults^{1,2,3,4} but findings from previous studies examining this question are inconclusive^{5,6,7,8}. So, the aim of our study is to find out the prevalence and the determinants of isolated systolic hypertension in the young healthy adults in western Rajasthan.

Material and Method: The present study was conducted on 400 young individuals of western Rajasthan of age group from 18 to 30 years. The numbers of years completed on last birthday were taken as age of the subject. The study

population was divided into 4 groups depending on their age: - (1) 18-21 years (2) 22-24 years (3) 25-27 years (4) 28-30 years. Then the participants were subjected to a set of questionnaire which included socio-demography determinants (age, sex, occupation and annual household income), personal habits (dietary habits, smoking, alcohol consumption), past history and family history of hypertension. They were then subjected to the measurement of height, weight, pulse rate, blood pressure, fasting blood sugar and serum cholesterol level. An informed consent of the participants was taken. Limitations:-As the scope of the present study does not collect data on the menstrual status among the women, and thus, we have not controlled the potential effect of menstrual status on the risk of blood pressure in women.

Measurement of Blood Pressure: The auscultatory method of BP measurement with a properly calibrated and validated sphygmomanometer has been used. Subjects were made to sit comfortably in a chair for at least 5 minutes with arm supported at heart

level. The appropriate size cuff (bladder length 80% and width at least 40% of arm circumference) used to ensure accuracy. The Systolic BP was defined as appearance of the first sound (korotkoff phase 1) and Diastolic BP was defined as disappearance of the sound (korotkoff phase 5). Three blood pressure readings of each subject were recorded at an interval of 5 minutes each. The mean of these three readings was considered for the present study.

Statistical analysis was conducted using the Student's t test and ANOVA test for independent groups (two tailed), with the help of Microsoft EXCEL 2010 and the MSOffice 2010. The level of significance was taken as p-value <0.05 and with the help of p-value for

each determinant, we found the effect on the Systolic blood pressure, whether significant or insignificant.

Table 1: Criteria of Hypertension

Categories	SBP	DBP
Normal	<140 mmHg	<90 mmHg
ISH	≥ 140 mmHg	≤90 mmHg
IDH	≤140 mmHg	≥90 mmHg
SDH	≥ 140 mmHg	≥90 mmHg

Result: Table 2 shows that ISH increases according to age. IDH does not show any significant correlation. SDH and Total HTN also increase according to age. ISH is more than SDH in the age groups 18-21 and 22-24 years, after this, both are equal.

Table 2: Correlation of ISH, IDH and SDH with Age

AGE (Years)	No. of Subjects	ISH (%)	IDH (%)	SDH (%)	Total HTN (%)	Mean SBP	p-value
18-21	135	3 (2.22%)	2 (1.48%)	2 (1.48%)	7 (5.18%)	115.47±8.88	<0.05
22-24	82	4 (4.87%)	1 (1.2%)	2 (2.44%)	7 (8.53%)	118.70±9.61	
25-27	83	4 (4.81%)	1 (1.2%)	4 (4.81%)	9 (10.84%)	120.58±10.59	
28-30	100	6 (6%)	2 (2%)	6 (6%)	14 (14%)	121.24±12.17	
Total	400	17 (4.25%)	6 (1.5%)	14 (3.5%)	37 (9.25%)	118.63±10.57	

Table 3 show the correlation of ISH with various determinants of which gender, BMI, dietary habits, socio-economic status, smoking, family h/o hypertension and serum cholesterol level are significant.

Discussion:- In our study we have taken 400 individuals randomly between the age group 18-30 years, out of these 400 individuals, total 37 (9.25%) are hypertensive (systolic, diastolic or both systolic and diastolic). In our study, the mean age of subjects is 23.86 ± 3.9 and the mean systolic blood pressure is 118.63 ± 10.57. So, we observed that the prevalence of hypertension between the age group 18-30 years is quite higher in our region. We also

found that the prevalence of systolic hypertension is quite higher than diastolic hypertension and ISH is more common than SDH hypertension.

In our study, ISH increases according to age. IDH does not show any significant correlation. SDH and Total HTN also increase according to age. ISH is more than SDH in the age groups 18-21 and 22-24 years, after this, both are equal. Mean SBP of age group 18-21 years is 115.47 ± 8.88, 22-24 years is 118.70 ± 9.61, 25-27 years is 120.58 ± 10.59 and 28-30 years is 121.24 ± 12.17. So, the mean SBP also increases as the age advances.

Table 3: Correlation of ISH with various parameters

	No. of Subjects	ISH (%)	Mean SBP	p-value
GENDER				
MALE	308	13 (4.22%)	119.31 ±10.59	<0.05
FEMALE	92	4 (4.34%)	116.37 ±10.18	
BODY MASS INDEX(BMI)				
<18.5	24	2 (8.33%)	119.41 ±10.30	<0.05
18.5-24.99	321	12 (3.7%)	117.5 ± 9.94	
25-29.99	45	2 (4.44%)	123.19 ±11.77	
≥30	10	1 (10%)	132 ±10.28	
HABITANT				
RURAL	224	11 (4.9%)	118.6 ±10.78	0.94
URBAN	176	6(3.4%)	118.58 ±10.3	
DIETARY HABBIT				
NON-VEGETARIAN	94	5 (5.31%)	120.65 ±10.89	<0.05
VEGETARIAN	306	12 (3.92%)	118.01 ±10.39	
ANNUAL HOUSEHOLD INCOME				
<100000	196	14 (7.14%)	120.6±12.02	<0.05
100000-399999	134	2 (1.49%)	116.98±8.39	
≥400000	70	1 (1.42%)	116.28±8.81	
SMOKING				
SMOKERS	35	2(5.7%)	123.42±9.71	<0.05
NON-SMOKERS	365	15(4.1%)	118.17±10.48	
ALCOHOL CONSUMPTION				
ALCOHOLIC	44	3(6.8%)	121.27±11.8	0.079
NON-ALCOHOLIC	356	14(3.93%)	118.31±10.36	
FAMILY H/O HYPERTENSION				
PRESENT	115	9 (7.82%)	123.84 ±12.44	<0.05
ABSENT	285	8 (2.8%)	116.53 ±8.89	
FASTING BLOOD SUGAR(FBS)				
< 100mg/dl	374	16 (4.27%)	118.5± 10.53	0.36
≥ 100mg/dl	26	1 (3.84%)	120.46± 10.91	
SERUM CHOLESTEROL				
<200 mg/dl	375	9 (2.4%)	117.52 ±8.97	<0.05
200-239 mg/dl	17	6 (35.2%)	136.94 ±10.87	
≥240 mg/dl	8	2 (25%)	145.5 ±6.06	

Our study is also supported by that of Regina C. Greblaet al⁹. They concluded that ISH in young adults had a higher prevalence than systolic/diastolic hypertension (1.57 ± 0.23% vs.

0.93 ± 0.18%) in young adults. Our study is supported by TanuMidhaet al¹⁰, according to which the prevalence of ISH according to JNC-7 criteria was 4.3%, which was 5.1% in men and

3.6% in women aged 20 years and above. A significant increase in the prevalence of ISH was seen with an increase in age. This is in accordance with the study of RuchikaGoel et al¹¹. They observed that hypertension was seen in 6.4% students aged 14–19 years in New Delhi, India of which 2.7% were isolated systolic, 2.0% were isolated diastolic and 1.7% were both.

Conclusion: In our study, we concluded that prevalence of ISH, IDH, SDH and Total HTN are significantly high in young adults in our region and collectively, the study suggests that physicians caring for young adults should be more aware of the need to monitor weight and blood pressure even when they are considered normal. As in our study, ISH is positively correlated with age, female gender, non-vegetarian diet, low socio-economic status, family history of hypertension, smoking, BMI and Serum Cholesterol level, whereas, ISH does not show significant correlation with rural/urban in-habitants, alcohol consumption and fasting blood sugar level. In our study, a number of young healthy males have ISH but various studies show that sometimes they have normal BP. No evidence is available that they may be benefitted from antihypertensive treatment. On the basis of current evidence, these young individuals can only receive recommendations on lifestyle, their follow-up should be done and if still uncontrolled then the anti-hypertensive treatment should be given. At present, available evidence is scanty and controversial. Long-term follow-up of these individuals is now required to determine whether they are at increased risk compared with age-matched normotensive individuals.

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Analysis Of Lung Functions In Obese Young Adult Male

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Abstract: Background: To determine the effect of obesity on pulmonary function abnormality in young adult male medical students. Method : One forty male subjects underwent physical examination, computerised pulmonary function tests (spirometry, lung volumes) and various anthropometric measurements (waist-hip ratio, BMI, skin fold thickness) out of which seventy were case and seventy were control. Result: Result showed that expiratory reserve volume and maximum voluntary ventilation were significantly decreased in overweight group ($p < 0.001$). There was negative correlation observed between BF% and ERV(-0.49), FVC(-0.05), and MVV(-0.11). There was negative correlation observed between BMI and ERV(-0.46) and MVV(-0.17). WHR also showed negative correlation with ERV(-0.14). All skin fold measurements show negative correlation with ERV, FVC and MVV. Conclusion: A significant negative correlation of ERV, FVC with body fat percentage. It was also observed that statistically significant decreased ERV as the BMI increases.

Key Words: Pulmonary function tests, BF-body fat, BMI-body mass index, Waist Hip ratio, Skin fold thickness, Young adult male.

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Introduction: An increase in the prevalence of obesity in young adults has been seen around the world.¹ Although the influence of obesity on pulmonary function tests has been examined, the role of body fat distribution has received limited attention. Pulmonary studies of patients severely affected by upper body obesity suggest they have more severely compromised lung volumes than obese patients with lower body obesity.

Multiple measures of adiposity showed a significant inverse relationship with both spirometry and static lung volumes. There is no doubt that the percentages are even greater nowadays because of physical inactivity and westernisation in diet. In adults, pulmonary function abnormalities are well reported complications of obesity; the most frequently reported abnormalities are reductions in lung volumes and expiratory flow rates.²⁻⁶ Thus the aim of the study determine the effect of obesity on pulmonary function abnormality in young adults in our population.

Material And Method: Study was performed on 140 healthy, otherwise asymptomatic young individuals in the age group of 18 to 24 yrs selected from medical students. Individuals doing regular exercise, having respiratory infections or any other respiratory diseases, smokers, hypertensive, or having any

musculoskeletal deformities of chest/vertebral column were excluded from the study.

The subjects, to be enrolled for the study, were informed about the study and procedure details and an informed consent was obtained. The subjects were all healthy asymptomatic.

All participants provided information on age, family history, personal habits (alcohol intake, tobacco consumption, type and level of physical exercise, drug ingestion, known pathological conditions). A detailed physical examination was conducted to exclude cardiac or pulmonary diseases. Our study was reviewed and approved by the Ethics Committee. All the records i.e. anthropometric measurements, skin fold measurements and recording of pulmonary function tests were conducted in one sitting on the same day. Anthropometric variables like height and weight were obtained. Height was measured to the nearest of 0.1cm and weight was measured to the nearest of 0.1kg with minimum of clothes and no shoes. Body mass index was calculated by Quetelet's Index.⁷

The waist circumference (cm) was measured at a point midway between the lower rib and iliac crest, in a horizontal plane. The hip circumference (cm) was measured at the widest girth of the hip. The measurements were recorded to the nearest 0.1 cm.

Skin fold thickness was measured at four standard anatomical sites with the help by measuring skin fold thickness at four sites (4SFT-biceps, triceps, subscapular and suprailiac) with the help of Harpenden’s caliper. The percentage of body fat was estimated by using the method of Durnin and Womersley.⁸

Pulmonary functions were recorded on a computerized portable lung function unit SP-1. The recorded parameters were compared with the inbuilt pulmonary function norms for the Indian population depending upon the age, sex, height, and weight. Recording of static and dynamic pulmonary function tests was conducted on motivated young healthy volunteers in standing position⁹

These tests were recorded at noon before lunch, as expiratory flow rates are highest at noon. For each volunteer three satisfactory efforts were recorded according to the norms given by American Thoracic Society¹⁰. The essential parameters obtained were, tidal volume (VT), expiratory reserve volume (ERV), inspiratory capacity (IC), forced vital capacity (FVC), timed vital capacity (FEV1), maximum ventilator volume (MVV) and peak expiratory flow rate (PEFR).

Result:The effect of body fat percentage on ventilatory lung function tests were compared in both the normal (BF<20%) and obese (BF>20%) groups by the ‘unpaired t’ test. Also the effect of body mass index on ventilatory lung function tests were compared in control (BMI18-25Kg/m2), overweight (>25 Kg/m2) groups by the unpaired T test Data were expressed as Mean±SD. Statistical significance was indicated by ‘P’ value <0.05.

Correlation of ventilatory lung function tests with body fat percentage was noted by using Pearson’s correlation coefficient test. The non zero values of ‘r’ between -1 to 0 indicate negative correlation.

Anthropometric parameters of the subjects are given in Table 1. In this study there was statistically significant difference in body mass index and waist to hip ratio observed in obese

subjects. There was also statistically significant difference observed between skinfold thickness of biceps and suprailiac skinfold thickness in this study.(Body Fat % – Calculated By urnin and Womersley Method)

Table 1: Comparison Of Mean±Sd Values Of Anthropometric Parameters Of Control And Obese Group

PARAMETERS	CONTROL(N=70) (BF<20%)	OBESE(N=70) (BF>20%)	P VALUE
Age(years)	19.03±0.24	22.14±0.24	0.834
Height(cm)	171.6±0.71	166.3±0.54	0.5901
Weight(kg)	64.89±1.036	80.09±0.53	0.6001
Bmi(kg/m2)	22.07±0.30	29.00±0.20*	P<0.0001
Whr	0.83±0.009	0.93±0.007	0.7854
Skinford thickness (mm)			
Biceps	7.8±0.31	14.6±0.22*	0.7854
Triceps	9.8±0.36	18.7±0.42	0.842
Subscapular	13.1±0.38	23.14±0.56	0.768
Suprailiac	15.31±0.4	27.04±0.68*	0.0256

*p<0.05 is statistically significant (student t-test ,unpaired observations)

Table 2 shows results of pulmonary function tests in control(bf<20%) and obese groups(bf>20%). Result shows that expiratory reserve volume and maximum voluntary ventilation were significantly decreased in obese group (p<0.001).

Table 2: ComparisonOfMean±Sd Values Of Pulmonary Function Tests Amongst The Control And Obese Groups

Parameter	Control (N=70) (Bf<20%)	Obese (N=70) (Bf>20%)	P Value
ERV(L)	1.1±0.041	0.71±0.0079*	<0.0001
IC(L)	3.31±0.018	3.14±0.041	0.8004
FVC(L)	4.18±0.047	3.74±0.03	0.751
FEV ₁ /FVC	0.7904±0.0025	0.79±0.0024	0.9154
MVV (L/Min)	127.5±3.56	118.9±1.31*	0.0257
PEFR (L/Min)	424.9±10.68	445.5±9.38	0.8500
FEF _{25-75%} (L/Sec)	4.913±0.014	4.919±0.011	0.7448

*P<0.05 is statistically significant (student tTest ,unpaired observations)There was negative correlation observed between BF% and ERV (-0.49),FVC(-0.05),and MVV(-0.11). There was negative correlation observed between BMI and ERV(-0.46) and MVV(-0.17). WHR also showed negative correlation with ERV(-0.14).

All skin fold measurements shows negative correlation with ERV. In this study we have also made a correlation of BMI and pulmonary function tests by dividing subjects in two groups. Significant decrease in ERV and FVC was observed in overweight group.

Table 3: shows pearson correlation coefficients in all subjects

	ERV(L)	IC(L)	FVC (L)	FEV1/FVC	MVV (l/min)	PEFR (l/min)	FEF 25-75%
BF%	-0.49	0.22	-0.05	0.227	-0.119	0.126	0.032
BMI (Kg/m ²)	-0.46	0.31	-0.11	0.250	-0.175	0.071	0.031
WHR	-0.14	0.18	0.01	0.045	-0.108	0.107	0.099
BICEPS SFT(mm)	-0.42	0.20	-0.13	0.263	-0.145	0.117	-0.036
TRICEPS SFT(mm)	-0.36	0.27	-0.20	0.273	-0.141	0.148	0.077
SUBSCAPULAR SFT(mm)	-0.46	0.27	-0.04	0.199	-0.087	0.144	0.002
SUPRAILIAC SFT(mm)	-0.42	0.21	-0.05	0.190	-0.133	0.122	0.055

Table 4: ComparisionOfMean±Sd Values Of Pulmonary Function Tests Amongst The Control, Overweight Group

PARAMETERS	CONTROL (n=70) (18-25 Kg/m ²)	OVERWEIGHT (n=70) (>25 Kg/m ²)	p value
ERV(L)	1.045±0.49	0.66±0.096*	<0.0001
IC(L)	3.32±0.17	3.11±0.35	0.6374
FVC(L)	3.67±0.41	3.10±0.51*	<0.0001
FEV ₁ /FVC	0.79±0.022	0.80±0.02	0.7865
MVV(L/Min)	121±32.16	117.8±8.6	0.9653
PEFR(L/Min)	428.6±66.15	439.7±63.48	0.8743
FEF _{25-75%} (L/Sec)	4.92±0.14	4.98±0.10	0.7864

*p<0.05 is statistically significant (student t-Test ,unpaired observations)

Discussion: The present study demonstrated the relationship between pulmonary function and body fat percentage in young males in age group 18-24 yrs. Collected data were analyzed by comparing BMI as well as calculated body fat percentage and their relationship with pulmonary functions in young individuals

Fat% And Pulmonary Function: In the present study obese group showed decreased ERV, FVC, MVV. There was no significant difference observed in IC , FEF25-75%,FEV1/FVC ratio .Decreased ERV, FVC,MVV were also statistically significant(p<0.05). In present study we

observed that fat% had negative correlation with ERV,FVC,MVV. The obese group with more than 20% increased fat% showed significant decreased ERV,FVC and MVV. Results obtained in the present study were in tune with the previous studies.^{5,19}

BMI And Pulmonary Function: In the present study it was observed that increase in BMI is associated with significant decrease in ERV. Inverse relationship of BMI with FVC was observed in the present study. There was no significant correlation of BMI and IC, FEV1/FVC,MVV,PEFR and FEF25-75% Many

previous studies also observed that increased BMI is associated with decreased ERV, as seen in our study also.^{11,12,13,14,15}

BMI is a global measure of body fat mass that includes both fat and lean mass and takes no account of differences in fat distribution. Body mass index has been proposed to analyze the effects of increased weight on pulmonary function tests, but its use is only valid for lung function indices where the contribution of fat and muscles are synergistic.

The site of fat accumulation is crucial in determining the effect of obesity on respiratory system mechanics. BMI alone does not provide sufficient information about the bodily distribution of fat mass (FM).⁴ It was also noted that Indians are considerably obese at low BMI²⁰. So the evaluation of the change in pulmonary function in overweight subjects should be done by estimating body fat percentage.

In present study there was no significant effect of BMI on FEV1/FVC ratio observed. Body fat% also showed no positive correlation as well as no significant decrease in FEV1/FVC ratio. These all findings are in tune with previous studies and also observed that major effect of obesity is on lung volumes with no direct effect on airway obstruction.²⁰⁻²⁴

Another possible mechanism for the association of abdominal adiposity and pulmonary function is a mechanical limitation of chest expansion during the FVC maneuver. Increased abdominal mass may impede the descent of the diaphragm and increase thoracic pressure.

The cross sectional nature of this study is a limitation, as it does not provide information about temporal sequence. However longitudinal studies of longer duration are needed to further investigate how abdominal obesity and body fat influences pulmonary function.

Conclusion: A significant negative correlation of ERV with body fat percentage, indicating that

ERV diminishes in inverse proportion of body fat percentage. A significant negative correlation of FVC with body fat percentage. The observed values of decreased FVC suggested displacement of air by fat within thorax and abdomen. It was also observed that lung volumes decreased as the BMI increases. In the present study it was also observed that although BMI of control group volunteers was within normal range, observed body fat percentage was on higher side. Hence, body fat percentage is more reliable marker for assessment of obesity.

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Study Of Forced Vital Capacity, FEV₁ And Peak Expiratory Flow Rate In Normal, Obstructive And Restrictive Group Of Diseases

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Abstract: Background: In India, due to smoking, environmental pollution, use of bio mass as a fuel in rural areas etc, there is increase in incidence of pulmonary disorders. Hence, a review of pulmonary function tests is needed. This study has therefore been carried out to reassess the pulmonary function values in normal, Indian population and to check their variations in various obstructive and restrictive pulmonary disorders. Forced spirometry is one of the best test for assessing pulmonary disorders. This simple test provides written record of forced vital capacity (FVC), % forced expiratory volume in 1st second (FEV₁) and peak expiratory flow rate (PEFR). Method: Ours is a cross sectional, comparative study in which we measured FVC, FEV₁ and PEFR in 30 normal subjects with the help of computerized spirometer. We also measured the same values in patients of pulmonary disorders and collected data of 30 patients having restrictive and 30 patients having obstructive lung disease. Thereafter, we compared the pulmonary function tests, FVC, FEV₁ and PEFR in three groups. Result: Our observations show that as compared to normal values, in obstructive lung diseases, FVC remained same but there is decrease in FEV₁ and PEFR. And in restrictive group of lung diseases, FVC is less than normal but FEV₁ and PEFR are same as that of normal subjects. Conclusion: By our study we can conclude that pulmonary function tests like FVC, FEV₁ and PEFR can be used to distinguish between obstructive and restrictive group of diseases.

Key words: lung diseases, obstructive, pulmonary function tests, restrictive.

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Introduction: We have approximately 150 million smokers in our country. According to the World Health Organization (WHO), 12% of the world's smokers are in India. A million Indians in the productive age group of 30-69 years will die every year starting 2010 from a range of conditions caused by smoking¹. About 70% of our population live in village and a majority of them use wood and bio mass products as fuel for cooking. Burning of such fuel produces a lot of smoke and results in both restrictive and obstructive types of respiratory diseases. Environmental pollution has also increased steadily in this country in line with the industrial progress and development. Looking to all these factors a review of pulmonary function in Indian population is urgently needed. This study has therefore been carried out to reassess the pulmonary function value in normal, Indian population and to check their deterioration in various pulmonary disorders

Pulmonary function tests permit a precise and reproducible assessment of functional state of

the respiratory system. With the help of specific pulmonary function tests, quantification of the severity of disease becomes easier as also the assessment of its natural history and the response to therapy. Although pulmonary function tests can specifically demonstrate a lung function that has been deranged by disease, most of these tests have their strengths and weaknesses e.g. variation can be caused by age, sex, height, occupation, smoking, climatic condition and the degree of air pollution. Forced spirometry is one of the best test for volume (load) assessment². This simple test provides a written record of slow vital capacity and/or forced vital capacity (FVC), % forced expiratory volume in 1st second (FEV₁) and peak expiratory flow rate (PEFR). Consequently, simple breath pulmonary function test are used extensively in assessing the pattern of ventilatory impairment in restrictive and obstructive group of pulmonary diseases³. Most of the standard values of these tests are based upon western observations. They may differ in India due to variety of reasons. Spirometry has been used in this work as it helps in simple

evaluation of the level of functional impairment and at the same time it gives a general idea about the patient of such impairment and their reversibility. Our aim was to find out normal values of some pulmonary function tests like forced vital capacity (FVC), percentage of forced expiratory volume in first second (FEV1 %) and peak expiratory flow rate (PEFR) in normal, healthy individuals and to find out the difference in these values in normal persons and those suffering from obstructive and restrictive group of pulmonary diseases.

Material and Method: Our study is a cross sectional, comparative study in which, we included 30 normal subjects (statistician was consulted prior to the study regarding sample size. Sample size was selected after their expert advice.) and carried out pulmonary function tests on them using a computerized spirometer (RMS – Med spirometer). Pulmonary function tests were also carried out on patients having respiratory disorders and out of them, the data of 30 patients having respiratory symptoms of obstructive type of pattern and 30 patients having restrictive type of pattern was evaluated. Hence, we collected data of pulmonary function tests in 30 normal (control) subjects, 30 subjects having obstructive pulmonary diseases and 30 subjects having restrictive pulmonary diseases. Written consent of all the subjects in vernacular language was taken before performing pulmonary function tests. All subjects selected were in the age group of 20-60 yrs. Height and weight of each subject was taken.

Detail clinical history of the subjects was taken. At the time of study none of the normal subjects were suffering from a recent upper respiratory infection or allergic episodes and none was on antihistaminic or bronchodilators. All the tests were done at the same time of the day to avoid diurnal variation. The subject was made to sit in front of the electronic spirometer on the table with the mouth piece of spirometer at the level of his lips. The whole procedure was explained to the subject and demonstration was made before the subject. Tight clothing and waist belt were loosened and nostrils were closed with nose clip. The subject was then asked to take full and unhurried inspiration, then close lips around the mouth piece and expire forcefully in the mouth piece. Out of all the pulmonary function tests, FVC, FEV1% and PEFR have been taken into consideration. We have used these three parameters because they are considered standard indices for assessing and quantifying airflow limitation. These not only help in diagnosing obstructive and restrictive diseases, but also help in assessing the severity of disease.

Statistical analysis: Mean and standard deviation of all subjects was calculated. Statistical analysis was done by one way ANOVA test using GraphpadInstat. $p < 0.05$ was considered as statistically significant.

Result: Following observations were made from the study of pulmonary function tests in 30 normal (control) subjects, 30 subjects having obstructive pulmonary diseases and 30 subjects having restrictive pulmonary diseases.

Table 1: Comparison of physical characteristic in normal subjects and those suffering from obstructive and restrictive pulmonary diseases.

Physical parameters	Normal subjects	Obstructive pulmonary disease	Restrictive pulmonary disease
	Mean ± SD	Mean ± SD	Mean ± SD
Age(Yrs.)	38.1 ± 15.88	40.47 ± 0.69*	35.4 ± 0.88*
Height (Cms.)	162.2 ± 12.52	162.5 ± 0.09*	160.83 ± 0.43*
Weight (Kgs.)	53.87 ± 8.84	51.07 ± 1.27*	52.47 ± 0.46*
<ul style="list-style-type: none"> *$P > 0.05$ as compared to control 			

From above table it is apparent that the difference in age, height and weight in all the three group is insignificant ($p > 0.05$). Thus all three groups match closely for these three physical characteristics.

Table 2: Comparison of pulmonary function tests in normal subjects and those having restrictive and obstructive pulmonary diseases

Tests	Normal	Obstructive pulmonary disease	Restrictive pulmonary disease	Mixed
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
FVC (L)	3.57 ± 0.96	3.52 ± 0.82*	1.8 ± 0.74 **	1.64±0.13**
FEV1 %	86.34 ± 4.79	62.17 ± 7.79**	94.8 ± 0.9 *	51.2±2.95**
PEFR (L/S)	5.95 ± 2.09	2.30 ± 2.66 **	5.08 ± 0.12*	1.16±0.20**
• * P > 0.05 , ** P < 0.002				

Table 2 shows that the mean FVC in obstructive pulmonary disease does not change compared to control group because P > 0.05 but FEV1 % and PEFR are greatly reduced in obstructive pulmonary disease P < 0.002.

Similarly in restrictive group of pulmonary disease there is statistically significant reduction in FVC compared to normal subjects P < 0.002. However, FEV1 % remains normal or slightly increased P > 0.05 but value of PEFR remains almost same p > 0.05 which is not statistically significant.

As shown in table no2, 4 subjects showed mixed picture. In these subjects, FVC, FEV1% and PEFR were reduced significantly, suggesting obstructive as well as restrictive (mixed) disease

Table 3: A comparison of FVC in normal subjects with % predicted values

Tests	Predicted value	Measured value	% predicted value
	Mean ± SD	Mean ± SD	Mean ± SD
FVC (L)	3.57 ± 0.96	3.73 ± 0.73	96.85±7.7

Discussion: From table 1 it is apparent that the difference in age, height and weight in all the three groups is insignificant (P > 0.05). Thus all three groups match closely for these three physical characteristics.

The main purpose of this study was to find out the differences in certain pulmonary function tests like FVC, FEV1% and PEFR in normal (control) group, patients having obstructive lung pathology and patients having restrictive lung pathology.

Ventilatory capacity is greatly influenced by the size of the lungs, which for many purposes is represented by FVC. Our results indicate that the value of mean FVC in normal subjects is 3.57±0.96 L. It is normally greater than 80% of the predicted value⁴(Table 3) This was also concluded by Ashok⁵ in their study. In obstructive group of pulmonary disorders, the mean FVC was 3.52±0.82 L and p>0.005, which is not statistically significant. This suggests that FVC is not appreciably reduced in pure obstructive lung diseases. Our studies also indicate that in the restrictive group of lung disorders the mean FVC is 1.8±0.74 and p<0.002 compared to normal subjects. This decrease of FVC in restrictive disorders is highly significant. Decreased FVC is a hallmark of restrictive pattern of pulmonary disorders.

FVC is used to standardize the forced expiratory volume for lung size. For this purpose FEV1 is reported as % of FVC. It is used as a guide to airway caliber and is independent of body size and stature.

$$FEV1\% = \frac{FEV1 \times 100}{FVC}$$

Our results show that the mean value of FEV1 in normal subjects is 86.34±4.79. In normal subjects FEV1% > 80% of predicted value. In case of subjects having obstructive pulmonary disease, FEV1% is 62.17% ±7.79 with p<0.002 compared to normal subjects, which is highly significant. FEV1% is low when the airway resistance is high, which occurs in obstructive group of lung diseases. This observation is comparable with work of Deborah Leader, RN^{6,7}. Joshil, Sushma^{8,9,10} also concluded that there is little decrease in FVC but statistical decrease in FEV1% in obstructive lung diseases.

According to our results, mean FEV1% in restrictive pattern of respiratory disorder is $94.87\% \pm 0.9$, $p > 0.005$, which is not statistically significant, Hence, in restrictive disorders, FEV1% is normal or increased¹¹. Here, both FEV1 and FVC are reduced proportionately.

Our results indicate that the value of PEFR in normal subjects is $5.95\text{L}/\text{sec} \pm 2.09$. In obstructive group of pulmonary disorders, according to our study, mean value of PEFR is 2.30 ± 2.6 and $p < 0.002$, which is highly significant compared to normal subjects. Decreased PEFR is a hallmark of obstructive pulmonary disease and is a highly sensitive index. This observation is comparable with work of Deborah Leader, RN^{6,7}. Joshil, Sushma^{8,9} also concluded that there is decrease in PEFR in obstructive lung diseases. The peak flow mainly reflects the caliber of the bronchi and larger bronchioles which are subject to reflex bronchoconstriction due to airway obstruction, airway resistance is increased leading to decrease PEFR. Our results indicate that in restrictive group, the value of PEFR is $5.08\text{L}/\text{sec} \pm 1.66$. $p = 0.12$, hence $p > 0.002$. Therefore reduction in PEFR in restrictive group is not significant. i.e. in restrictive pattern of pulmonary disorders, expiratory flow rates are usually preserved as there is no airway resistance¹¹.

While evaluating and studying the pulmonary function tests in obstructive and restrictive group of pulmonary diseases, we encountered a group of subjects having mixed (obstructive + restrictive) pulmonary disorders. (Table 2). In these subjects, FVC was reduced but FEV1% is decreased and PEFR is also decreased.

Conclusion: By this study our results indicate that as compared to normal subjects, in subjects with obstructive group of pulmonary disorder, the hallmark is decreased PEFR. FEV1 is reduced but FVC is normal. Also, as compared to normal subjects, subjects having restrictive group of lung diseases, hallmark is reduction in FVC. FEV% is normal and so is PEFR. Hence, FVC, FEV1% and PEFR can be used to distinguish obstructive and restrictive group of disorders,

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A Study Of The Hematological Profile In Relation To Some Allergic Diseases (A Hospital Based Study)

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Abstract: Background: Eosinophils and neutrophils play major roles in pathogenesis of allergy. However the relation between peripheral blood cell counts of other major leukocyte groups, Hb%, ESR in allergic diseases is less clear. Therefore this study was conducted to find out if there is any variation in the haematological profile in subjects having allergic disease. Method: 50 cases of bronchial asthma, 50 cases of some allergic skin disorders and 50 cases of allergic rhinitis and 50 controls were chosen for this study. The study design was cross-sectional. Total Leucocyte Count, Absolute Eosinophil Count were done using Neubauer's chamber, Differential Leucocyte Count by Leishman's staining and Erythrocyte Sedimentation Rate using Westergren's method. Haemoglobin estimation was done by cyanmethaemoglobin method. The statistical analysis was done using one way analysis of variance (ANOVA) followed by t test. Result: The results showed a significant increase ($p < 0.05$) in the Total Leucocyte Count, Absolute Eosinophil Count, Erythrocyte Sedimentation Rate and the differential counts of neutrophil and eosinophil, and a significant decrease ($p < 0.05$) in the lymphocyte count among the cases as compared to the controls. Conclusion: It is seen that in allergic condition besides an increase in the eosinophil count, other haematological parameters also change.

Key Words: Allergy, Absolute Eosinophil Count (AEC), Differential Leucocyte Count (DLC), Total Leucocyte Count (TLC)

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Introduction: Allergy is a disorder of the immune system which is a form of hypersensitivity. Allergic reactions occur to normally harmless environmental substances known as allergens. These reactions are acquired, predictable and rapid. Strictly, allergy is one of four forms of hypersensitivity and is called type-1 (or immediate hypersensitivity). It is due to the combination of an antigen with an antibody (IgE) bound to mast cells in individuals previously sensitized to the antigen. This may occur as a local or systemic reaction.

The allergic diseases are a severe problem for the community as well as for the national economy¹. About 20% of the world populations are estimated to suffer from one allergic disease or another. According to Aggarwal et al., the total estimated burden of Asthma is an overall prevalence of 3% (30 million patients), and among adults over the age of 15, a median prevalence of 2.4%. They have also found higher prevalence rates among school children.¹ A recent survey carried out in India shows that 20-30% of the population suffer from allergic rhinitis and that 15% developed asthma². Therefore there is an impending need to create

awareness regarding allergic diseases and help thousands of people who suffer from the disease. It is well known that eosinophils and neutrophils play major roles in the pathogenesis of allergy. However the relation between peripheral blood cell counts of other major leukocyte groups, Hemoglobin%, Erythrocyte Sedimentation Rate in allergic diseases is less clear.

Diseases like bronchial asthma, allergic rhinitis and allergic skin disorders like eczema, urticaria are very common in the north-eastern region of India due to the geo-climatic conditions. In spite of this no previous study was done on the haematological profile of subjects having these disorders in this part of the country. Therefore this study was conducted with the following Aim and objectives:-

1. To estimate the haematological profile in normal healthy individuals.
2. To estimate the haematological profile in individuals having some allergic disorders.
3. Comparative analysis of the haematological profile in subjects having some allergic disorders with that in normal subjects.

Material and Method: In this study 50 cases of bronchial asthma, 50 cases of some allergic skin disorders and 50 cases of allergic rhinitis, altogether 150 subjects were chosen for this study from the inpatient and outpatient departments of, medicine, dermatology and ENT of Assam Medical College & Hospital, Dibrugarh. Due approval was taken from the ethical committee of our institution before proceeding with the study.

Inclusion criteria: Only the diagnosed cases of the respective diseases attending the Medicine, Dermatology and ENT OPD or admitted in the inpatient ward without having other ailment were included in the study.

Exclusion criteria:

1. Those having worm infestation or parasitic infestation.
2. Those on steroid therapy or any other medication.
3. Those having haematological disorders like bleeding disorders

50 apparently healthy individuals were selected as controls. The subjects for control group were taken from the healthy population of Assam Medical College and Hospital campus and also from the healthy attendants accompanying the diseased persons. Efforts were made to match each case with normal individual by age and sex and if possible by community also. The patients who fulfilled the inclusion of criteria were subjected to a detailed history, clinical examination and ancillary investigations following a pre-designed proforma.

Method: Total Leucocyte Count was done manually using Turk’s Diluting Fluid and Neubauer’s chamber, DLC was done by examination of blood films stained with Leishmain’s stain under the oil immersion objective. Haemoglobin estimation was done by the standard Cyanmethaemoglobin method using a spectrophotometer. Erythrocyte Sedimentation Rate (ESR) was examined by the Westergren method using Westergren’s pipette. Absolute Eosinophil Count was done by the Direct counting method using Neubauer’s chamber and Dunger’s solution. Indirect

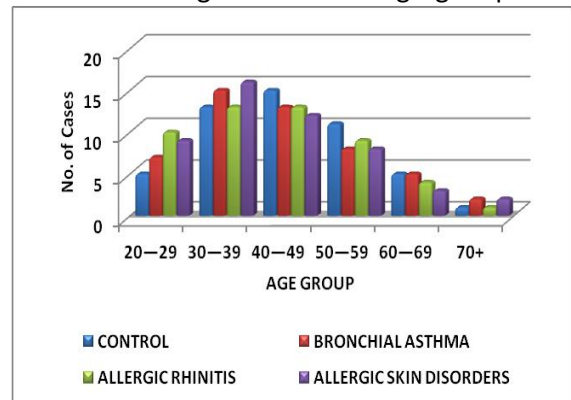
counting method was simultaneously used to check the result of direct counting. All the Samples were collected at 10 am to avoid diurnal variations in Absolute Eosinophil Count (AEC). Statistical analysis was done using t-test and One Way Analysis Of Variance (ANOVA).

Result: Table–1 and Fig -1 shows that the maximum number of cases of control group belongs to the age group 40–49 years (30%) followed by age group 30-39 years (26%).

Table 1: Showing Distribution Of Controls And Cases According To Different Age Groups

AGE GROUP	CONTROL		BRONCHIAL ASTHMA		ALLERGIC RHINITIS		ALLERGIC SKIN DISORDERS	
	No	%	No.	%	No	%	No	%
20–29	5	10.00	7	14.00	10	20.00	9	18.00
30–39	13	26.00	15	30.00	13	26.00	16	32.00
40–49	15	30.00	13	26.00	13	26.00	12	24.00
50–59	11	22.00	8	16.00	9	18.00	8	16.00
60–69	5	10.00	5	10.00	4	8.00	3	6.00
70+	1	5.00	2	4.00	1	2.00	2	4.00
TOTAL	50	100.00	50	100.00	50	100.00	50	100.00

Fig 1: Showing distribution of controls and cases according to different age groups



The maximum number of cases with allergic rhinitis were in the age groups of 30–39 and 40–49 years (26% each). The maximum number of cases with allergic skin diseases were from the age group of 30–39 (32%).

Table-2 shows that in controls the maximum number were male (68%), with female being 32%, similarly the maximum number of cases having asthma were males (56%), whereas the maximum number of cases having allergic rhinitis and allergic skin diseases were females, (64%) and (52%) respectively.

From the above tables and histograms it is seen that there was a significant difference in the Absolute Eosinophil Count, Total Leucocyte Count, Erythrocyte Sedimentation Rate and the differential leucocyte counts of Neutrophil, Lymphocyte and Eosinophil between cases and controls.

While doing paired t test it was found that: There was a significant difference in the Absolute Eosinophil Count, Total Leucocyte Count, ESR and differential leucocyte counts of neutrophil and eosinophil between the controls and cases with bronchial asthma and allergic skin disorders

Table 2 : Showing distribution of controls and cases according to gender

GENDER	CONTROL		BRONCHIAL ASTHMA		ALLERGIC RHINITIS		ALLERGIC SKIN DISORDERS	
	No.	%	No.	%	No.	%	No.	%
Male	34	68	28	56	18	36	24	48
Female	16	32	22	44	32	64	26	52
TOTAL	50	100	50	100	50	100	50	100

Table 3 : Comparison of different haematological parameters among cases and controls

Parameters		A	B	C	D	p value	t test
TLC (cells/cumm)		7474 ±1128.44	8609.60 ±1892.27	8267.80 ±2118.63	9102.80 ±2179.38	p<0.05	A vsB p<0.05 A vs C p<0.05 A vs D p<0.05
Hb(gm/dl)		11.4420 ±1.61322	11.2520 ±1.68985	10.72 ± 1.64	11.14 ± 1.63	p>0.05	A vs B p> 0.05 A vs C p>0.05 A vs D p> 0.05
ESR(mm AEFH)		5.72 ± 2.13	8.28 ± 2.73	9.14 ± 3.49	7.88 ± 2.95	p<0.05	A vs B p< 0.05 A vs C p< 0.05 A vs D p< 0.05
Differential Leucocyte Count	Neutrophil(%)	64.7 ± 2.14	65.26 ± 3.84	66.82 ± 4.23	65.30 ± 4.12	p<0.05	A vs B p <0.05 A vs C p> 0.05 A vs D p<0.05
	Lymphocyte(%)	30.52 ± 2.18	27.38 ± 4.20	25.12 ± 3.78	26.74 ± 4.07	p<0.05	A vs B p>0.05 A vs C p< 0.05 A vs D p>0.05
	Monocyte(%)	2.9 ± 1.11	2.14 ± 1.08	2.38 ± 1.19	2.16 ± 1.11	p>0.05	A vs B p>0.05 A vs C p>0.05 A vs D p>0.05
	Eosinophil(%)	1.8 ± 1.08	5.16 ± 1.73	5.66 ± 2.20	5.54 ± 1.84	p<0.05	A vs B p<0.05 A vs C p<0.05 A vs D p <0.05
	Basophil(%)	0.06 ± 0.23	0.1 ± 0.3	0.08 ± 0.27	0.08 ± 0.27	p>0.05	A vsB p>0.05 A vs C p>0.05 A vs D p>0.05
Absolute Eosinophil Count		193.28± 19.23	656.72 ± 97.94	553.22 ± 81.07	571.50 ± 131.15	p<0.05	A vs B p<0.05 A vs B p<0.05 A vs C p<0.05

A=Control, B= Bronchial Asthma, C= Allergic Rhinitis , D=Allergic Skin Disease

Fig 2: Showing differential leucocyte count in cases and controls

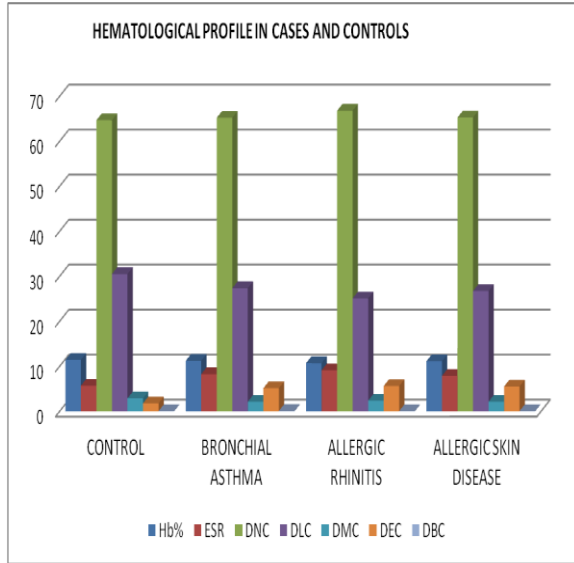


Fig 3: Total leucocyte count in cases and control

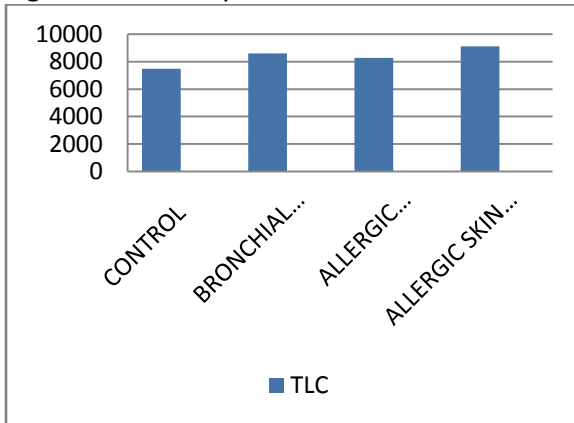


Fig 4: Showing absolute eosinophil count in cases and controls

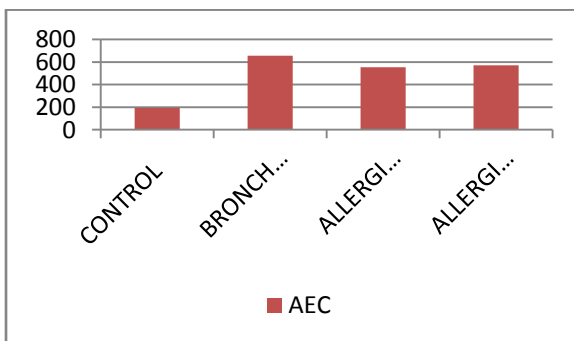
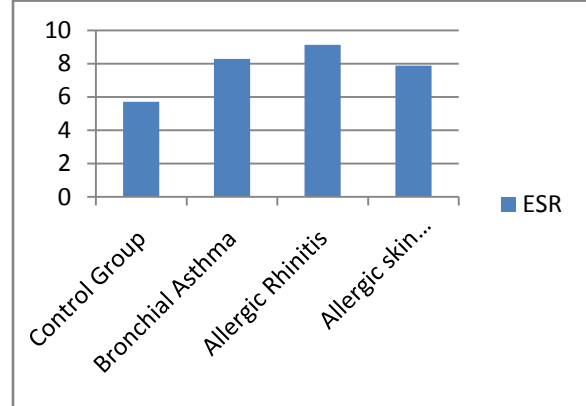


Fig 5: Showing the erythrocyte sedimentation rate in cases and controls



There was a significant difference in the differential leucocyte count of lymphocyte and eosinophil along with the Absolute Eosinophil Count, Total Leucocyte Count and ESR between the controls and cases with allergic rhinitis. Other parameters showed no significant difference.

Discussion: From the study we can observe that the Total leukocyte counts were higher in the diseased groups than in controls. This finding is consistent with the findings of Sarah A Lewis et al³. The level of Hb% was slightly lower in the diseased groups as compared to controls, but there was no statistical difference. In the present study it is seen that neutrophils, lymphocytes and eosinophils were higher in the diseased groups having bronchial asthma and allergic skin disorders than the control groups which is consistent with the findings of Sarah A. Lewis et al³.

However they have found that there was a significant decrease in the lymphocyte count between the controls and cases with allergic rhinitis, while in our study we have found that lymphocyte counts decrease in the cases having allergic rhinitis without any statistical difference. Neutrophil influx and the subsequent neutrophil activation involve IL-8 mediation. Although the stimuli that trigger this response may vary, the features point to the activation of innate immune mechanisms rather than IgE mediated activation of acquired immunity.⁴

In the last few years strong evidence has accumulated to suggest that lymphocytes, specially allergen-reactive type-2 T helper (T_H2) cells play an important role in the induction and maintenance of the allergic inflammatory cascade. First, cytokines and chemokines produced by T_H2 cells and those produced by other cell types in response to T_H2 cytokines or as a reaction to T_H2 -related tissue damage account for most pathophysiologic aspects of allergic disorders.⁵ The present study reveals that maximum number of cases having asthma, allergic rhinitis and allergic skin disorders had high absolute eosinophil count in the range of 601-800 (68%), 401-600 (76%), and of 401-600 (82%) respectively, while in the controls the count was in the range <200 cells/cumm (58%).

Dhar S. Et al⁶ in their study have also found that the average absolute eosinophil count was significantly higher in diseased group than in controls. Knott FA, Pearson RsB reported eosinophilia in allergic conditions in Guy's Hospital Report (1934-35)⁷. LowelFc also reported clinical aspects of eosinophilia in atopic diseases⁸.

The increase in eosinophils suggest increase activation of allergic response. This is inconsistent with the study of Tulinskaet *al.*⁹(2004), where they observed an increase in activation markers on eosinophil (CD 66b and CD 69) and Ogunbilejeet *al.*¹⁰ where they also reported significant increase in IgE. Circulating eosinophils are elevated in patients with allergic conditions. It has been reported that eosinophils recruitment is being induced by eotaxin (Conroy and Williams, 2001)¹¹ via IL-4 and IL-13 involvement (Rothenberg and Hogan, 2006)¹². BotHomocysteinetokines (IL-4 and IL-13) are known to be potent pro-fibrotic mediators.

In the present study ESR was found to be increased in the diseased groups compared to controls. CanozM *et al.*¹³ also found that ESR was raised in asthmatic patients compared to that of controls. Daniel Reichmuthet *al.*¹⁴ also found that ESR was raised in asthmatic patients as compared to that of controls. The study did not find significant changes in monocytes and

basophils. However they play important roles in the allergic response.

Monocytes migrate from the bone marrow to the inflamed tissue through the peripheral blood system. In tissues monocytes differentiate and mature into macrophages, the functional cell of the lineage. Monocytes can produce a complex repertoire of cytokines; are regulated by cytokines; and can actively participate in the pathogenesis of infection and several inflammatory diseases.¹⁵ A study found evidence for activation of alveolar macrophages, but not peripheral blood monocytes, in subjects with allergic rhinitis and asthma.¹⁶

Basophils circulate in the peripheral blood under homeostatic conditions and are often recruited to the affected tissues in allergic disorders, including asthma, atopic dermatitis and rhinitis. Basophils may function as initiators as well as effectors of the allergic inflammation and contribute to the recruitment of other proinflammatory cells such as eosinophils and neutrophils.

Basophils were thought to be precursors of mast cells in the immunologic response. However a recent study discussed the active immunomodulatory role of basophils. They showed IgE involved in a delayed-onset allergic inflammation in the skin, where basophils but not mast cells play an essential role in the development of inflammation. After encountering the corresponding antigens, IgE associated basophils are activated to secrete soluble factors, including cytokines which attract proinflammatory cells such as eosinophils and neutrophils, leading to chronic allergic inflammation.¹⁷

Another study by the authors recently demonstrated that basophils, unlike mast cells, have no significant contribution to IgE-mediated systemic anaphylaxis in a mouse model. Instead, basophils are involved in IgG-mediated systemic anaphylaxis under our experimental conditions.¹⁸

Conclusion: There is a variation in the haematological profile in subjects having allergic disorders. Therefore routine blood investigations should be made mandatory in all allergic conditions even with minimal or no symptoms which will further help in the early diagnosis and treatment.

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Correlation Of Glycemic Status With Indicators Of Myocardial Oxygen Usage

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Abstract: Background: Present study aimed to investigate the correlation between poor glycemic control determined by glycosylated haemoglobin (A1C) and myocardial oxygen demand. Method: Case-control study comprised of three groups of 50 each age matched (30-45 yrs) normoglycemics, prediabetics and type 2 diabetic mellitus (T2DM) as per American Diabetic Association 2011 (ADA) criteria. The haemodynamic determinants of myocardial oxygen demand measured were heart rate(HR), systolic blood pressure(SBP) and rate pressure product(RPP) Result: The observations revealed significant differences in the fasting plasma glucose(FPG) and glycosylated haemoglobin (A1c) in the three groups. The resting HR was significantly higher in patients with T2DM (91.06 ± 4.72 bpm; $p < 0.0001$) in comparison with controls and prediabetics. The SBP values (mm Hg) were in prehypertensives range in prediabetics and T2DM patients (125.5 ± 4.0 ; 130.6 ± 5.2). The RPP was estimated to be significantly higher in T2DM (11922.9 ± 1091.2) compared to prediabetics and controls (10197.6 ± 806.1 ; 8186.8 ± 635.3). Positive correlation was found between resting HR ($r = 0.97, 0.98$) and RPP ($r = 0.98, 0.98$) with FPG levels in prediabetic and T2DM patients. Similar positive correlation was established between resting HR ($r = 0.96, 0.95$) and RPP ($r = 0.97, 0.95$) with A1c values. Conclusion: Heightened resting HR and RPP in prediabetics and T2DM patients suggest increased myocardial oxygen demand. These haemodynamic derangements render them vulnerable to adverse outcomes.

Key words-Resting heart rate (HR), Rate pressure product (RPP), Systolic blood pressure (SBP)

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Introduction: Subjects with T2DM or glucose intolerance are prone to earlier development of coronary and extracoronary microvascular and macrovascular complications¹. Studies have reported that higher cardiovascular risk in patients with T2DM may be due to dysfunctional adrenergic control of myocardial oxygen perfusion and reduction in myocardial oxygen delivery²

High resting heart rate reflects an imbalance of the autonomic nervous system, with increased sympathetic activity and/or reduced vagal activity³. Heart rate is a major determinant of myocardial oxygen consumption and energy utilization⁴; furthermore, an increase in heart rate reduces the diastolic coronary perfusion time⁵. Therefore, increase in heart rate may trigger ischaemic events. Stevens MJ et al and Sayer JW et al reported disturbance of sympathovagal balance evidenced by resting tachycardia in T2DM patients^{6,7}. The product of HR and SBP is referred to as RPP which is a very reliable indicator of myocardial oxygen demand and is widely used clinically. Epidemiological studies have reported increasing prevalence of hypertension in T2DM patients. Systolic hypertension is known to increase myocardial

oxygen demand⁸. Hyperglycemia showed independent association with heightened rate pressure product. These haemodynamic derangements may contribute to undesirable adverse cardiovascular events in T2DM patients³. Epidemiological evidence suggest that complication of T2DM begin early in prediabetic stage⁹. As the risk and adverse consequences of high FPG occur at much lower fasting plasma glucose levels. Present study aimed to examine the association of FPG level and A1c with determinants of myocardial oxygen usage.

Material and Method: The study was carried out at the Department of Physiology and Medicine, Gandhi Medical College, Bhopal, Madhya Pradesh (M.P). The study was approved by institutional Ethics Committee. Informed consent was obtained from each participating subject.

Study design: Based on the reported prevalence of 2.9% of T2DM in M.P (WHO-2012). Sample size of 43 was calculated using Daniel formulae¹⁰ with alpha error of 0.05 and beta errors of 20%.

A total of 300 adults in the age range of 30-45 years were screened from urban Bhopal. On the basis of ADA 2011 criteria¹¹ and Joint National Committee criteria (JNC-7)¹² subjects were classified. After standard exclusion criteria were applied to ensure that any change in heart rate detected were due to hyperglycemia, 50 healthy controls, 50 prediabetics and 50 newly diagnosed T2DM patients were included in the study. History of prior anti hypertensive and anti diabetic drugs use were excluded from the study.

Study participants were divided into three groups; Controls (group I) defined as normoglycemics and normotensives (SBP < 120 mm Hg, DBP < 80 mm Hg); Prediabetics (group II) defined as FPG 100-125 mg/dl or A1c 5.7-6.4% and SBP < 140 mm Hg and/or DBP < 90 mm Hg and T2DM (group III) defined as FPG ≥ 126 mg/dl; A1c ≥ 6.5 gm%

T2DM diagnosed within 1 year and not on any medications were selected for the study. Baseline clinical characteristics, anthropometric measurements and biochemical data were recorded as per the standard procedures¹³. Subjects underwent clinical examination under standardized conditions. Resting heart rate was recorded after 5 min rest in supine position by using Electrocardiograph (ECG) machine – (Cardiart 6208 – 12 standard limb lead digital electrocardiogram of BPL Healthcare with recording sensitivity of 5-10-20 mm/mV). The highest heart rate achieved was calculated (1500/R-R interval).

Brachial artery blood pressure (first and fifth Korotkoff Sounds) of right arm was measured three times consecutively with 15 minutes interval on seated participants after they had rested for 5 minutes, with the use of a standardized mercury Sphygmomanometer (Diamond, Industrial Electronic and Allied Products, Pune) and Stethoscope (3M Littman Classic II, German D). The mean of the last two of these measurements was used for estimation of blood pressure. In cases where high blood pressure was recorded for the first time, the blood pressure was checked more than twice and average of two close readings was taken. Rate pressure product (Robinson Index)¹⁴ is calculated as a product of systolic blood pressure and heart rate (RPP = SBP × HR) and expressed in mm Hg.bpm¹⁵

Fasting plasma glucose was measured by glucose oxidase peroxidase method (GOD-POD) using autoanalyser (MERCK300) using kits supplied by AGGAPPE diagnostics, Kerala (Product number 11018001). A1c was measured by microcolumn method at recommended temperature (AGGAPPE) and is quantified by direct photometric reading at 415 nm by photocalorimeter.

Statistical analysis: All values were expressed as Mean ± Standard deviation. ANOVA was done to compare groups. Bivariate correlations between variables were evaluated by Pearson's correlation. Statistical analysis was done using SPSS-16.0 (Statistical package for Social science)

Result:

Table 1: Baseline Characteristics Of Study Population

PARAMETERS	GROUP I (n=50)	GROUP II (n=50)	GROUP III (n=50)	F value	P value
AGE (years)	38.5±4.3	38.8±4.6	38.2±4.5	0.234	NS
BMI (kg/m ²)	21.9±1.3	25.5±2.2	28.2±3.2	85.03	0.001
SBP (mm Hg)	112.4±5.0	125.5±4.0	130.6±5.2	188.2	0.001
DBP (mm Hg)	73.1±2.9	83.3±4.1	83.9± 2.2	183.2	0.001
HR (bpm)	72.7±4.2	81.2±5.8	91.0±4.7	170.2	0.001
RPP(SBP×HR)	8186.8±635.3	10197.6±806.1	11922.9±1091.2	233.5	0.001

*Resting values of SBP, DBP and HR were taken.

Table 2: Biochemical profile of study group

Parameter	Group I	Group li	Group lii
FPG(mg/dl)	84.1±8.3	112.4±7.0	149.1±12.3
A1c (%)	4.9±0.5	5.6±0.4	7.7±0.01

Table 3: Correlation of metabolic indicators of oxygen usage with glycemic status

	Group I (R)	Group li (R)	Group lii (R)
FBG vs HR	0.74	0.97	0.98
HbA1c vs HR	0.18	0.96	0.95
FBG vs RPP	0.74	0.98	0.98
HbA1c vs RPP	0.14	0.97	0.95
FBG vs SBP	0.63	0.95	0.95
HbA1c vs SBP	0.09	0.95	0.92
FBG vs DBP	0.51	0.94	0.95
HbA1c vs DBP	0.14	0.94	0.94

As depicted in table1 baseline characteristics are distributed differently in three study groups ($p < 0.001$), which is indeed a prerequisite for study.

Prediabetics and majority of T2DM patients were classified as overweight as per WHO criteria¹⁶ (BMI 25-29.99). 2.4% T2DM patients were obese (BMI>30 Kg/m²) and were categorised as prehypertensives as per JNC-7 criteria¹². No resting tachycardia as identified. Diabetic patients showed poor glycemic control as evident from the FPG and A1c values as evident from Table 2.

This study does establish a very strong correlation among variables of glycemic status (FPG and A1c) and variables of myocardial oxygen usage (resting HR, SBP, RPP) in prediabetics and T2DM patients compared to normoglycemic participants [Table 3].

Discussion: Elevated heart rate (HR) is a risk factor for cardiovascular morbidity and mortality in healthy people as well as in patients with cardiac diseases is supported by numerous epidemiological association studies.¹⁷⁻²⁰ Elevated HR is frequently associated with high blood pressure (BP) and metabolic disturbances

and increases the risk of new onset hypertension and diabetes¹⁷. In the present study resting HR was found higher in T2DM patients as compared to healthy normoglycemic controls. No resting tachycardia was found (Table 1). The pathogenetic connection between HR and cardiovascular disease has been discussed in several reports^{18-19,21,22}

The results of two recent longitudinal analyses have shown that elevated HR may predispose to the development of obesity and type 2 diabetes mellitus²³⁻²⁵. In the present study heart rate in prediabetics was on higher side than subjects with normal plasma glucose levels. The observation suggests increased future Type 2 diabetic and cardiovascular risk in these subjects. The elevated heart rate in prediabetics might be due to increased sympathetic tone and insulin resistance²⁶⁻³⁰.

The prediabetics and T2DM patients were found overweight (BMI>24.5 kg/m²). Di Carli MF et al studied the role of chronic hyperglycemia in the pathogenesis of coronary microvascular dysfunction in 35 young type 1 and 2 diabetic patients³¹. Positron emission tomography imaging was used to measure myocardial blood flow at rest. They reported reduction in myocardial blood flow and impaired coronary vascular function in patients with DM, suggesting a key role of chronic hyperglycemia in the pathogenesis of vascular dysfunction in diabetes.

An important observation in present study was that SBP was found in prehypertensive range in prediabetics and newly diagnosed T2DM patients. Elevated SBP also increases myocardial oxygen demand and together with elevated heart rate would tend to increase future cardiovascular risk. The elevated RPP is an important indicator of heightened oxygen demand. The higher values of HR, SBP and RPP in prediabetic group indicates increased myocardial oxygen usage much before the beginning of T2DM.

K. Foo, N.Sekhri et al studied the effect of diabetes on heart rate and other determinants

of myocardial oxygen demand in acute coronary syndromes. They found higher values of heart rate, systolic blood pressure and rate pressure product in patients with diabetes than without diabetes. They concluded that in patients with diabetes and coronary artery disease reduction in myocardial oxygen delivery may be compounded by increased myocardial oxygen demand, increasing the risk of regional ischaemia².

Glycated haemoglobin has been used to monitor glycaemic control in diabetics for more than two decades. It helps clinicians and their patients to stratify the treatment strategy and avoid long-term complications. In the present study fasting blood glucose (mg/dl) and A1c levels were positively correlated with resting heart rate and rate pressure product.

Elevated A1c increases the risk of micro-vascular and macro-vascular complications in diabetics as well as non-diabetics. As previously reported, A1c levels below the threshold for a diagnosis of prediabetes (<6.5%) are associated with a very high risk of CHD³².

Park S et al studied the effect of A1c in non diabetic population as a better predictor of cardiovascular disease and coronary heart disease related mortality than fasting or post prandial glucose levels³³. Poor glycemic control in patients with T2DM as evidenced by their A1c values (>7%) makes them more vulnerable to future cardiovascular complications.

Study Limitation: The autonomic functions were not measured and their relation to haemodynamic parameters were not recorded which was potentially relevant to confirm sympathovagal imbalance. Measurement of A1c was done by microcolumn method not by ADA recommended ELISA method.

Conclusion: Our study concluded that not only diabetics but prediabetics are also equally prone to cardiovascular risk. Thus simple non invasive measures like resting heart rate and rate pressure product in prediabetics and T2DM patients may prove to be beneficial in early

detection of autonomic neuropathy and prevention of future cardiovascular mortality and morbidity.

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Correlation Between HbA_{1c} Values And Lipid Profile In Type 2 Diabetes Mellitus

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Abstract: Background: Patients with type 2 diabetes have an increased prevalence of lipid abnormalities. A timely intervention to normalize circulating lipids could reduce the chances of cardiovascular complications. Glycated hemoglobin (HbA_{1c}) is the indicator of glycemic status over long term. This study was designed to evaluate the correlation between levels of HbA_{1c} and lipid profile. Method: 150 non obese, non hypertensive type 2 diabetic patients (74 males & 76 females) attending the Diabetic OPD, Civil hospital Ahmedabad were enrolled in the study. After obtaining informed consent from patients, detailed history was taken followed by thorough physical examination and investigations like fasting and post prandial blood sugar, HbA_{1c} and lipid profile (Cholesterol, Triglycerides, HDL, LDL & VLDL). The patients were classified into two groups depending on their HbA_{1c}; Good Glycemic Control (GGC) group having HbA_{1c} < 7.0% (n=70) and Poor Glycemic Control (PGC) group having HbA_{1c}>7.0% (n=80). Result: HbA_{1c} showed direct and significant correlations with cholesterol, triglycerides, LDL & VLDL and inverse correlation with HDL. Conclusion: These findings suggest that HbA_{1c} level can be used as good parameter for predicting the lipid profile of both male and female diabetic patients.

Key Words: Glycemic control, HbA_{1c}, Serum lipid profile, Type 2 diabetes.

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Introduction: In the ancient Sanskrit literature, diabetes mellitus was described as "honey-urine disease," associated with gross emaciation and wasting. Diabetes Mellitus (DM) comprises a group of common metabolic disorders that share the phenotype of hyperglycemia. It is a global endemic with rapidly increasing prevalence in both developing and developed countries¹. WHO has declared India as "Diabetic Capital of the world"². Although the prevalence of both type 1 and type 2 DM is going to increase, type 2 DM is expected to rise more rapidly in future because of increased obesity and reduced activity levels. The chronic complications of DM affect many organ systems and are responsible for the majority of morbidity and mortality associated with the disease. The risk of chronic complications increases as a function of the duration of hyperglycemia; they usually become apparent in the second decade of hyperglycemia.

Glycated hemoglobin (HbA_{1c}) is routinely used as a diagnostic tool for measuring long term glycemic control. In accordance with its function as an indicator for the mean blood glucose level, HbA_{1c} predicts the risk for the development of diabetic complication in diabetes patients. The UKPDS study has shown that in patients with type 2 diabetes, the risk of

diabetic complications were strongly associated with previous hyperglycemia. Glycemic control with decreased level of HbA_{1c} is likely to reduce the risk of complications³. Estimated risk of Cardio Vascular Diseases (CVD) has shown to be increased by 18% for each 1% increase in absolute HbA_{1c} value in diabetic⁴. Even in non diabetic cases with HbA_{1c} levels within normal range, positive relationship between HbA_{1c} and CVD has been demonstrated^{5,6}. A few studies have previously tried to find the correlation between HbA_{1c} levels and lipid profile. Some of these have shown that all the parameters of lipid profile have significant correlation with glycemic control⁷. On the other hand, some studies do not report significant correlation between glycemic control and all parameters of lipid profile⁸. These controversies inspired us to take forward this study which was aimed to find out association between glycemic control (HbA_{1c}) and serum lipid profile in non obese, non hypertensive type 2 diabetic patients attending the Diabetic OPD, Civil hospital Ahmedabad.

Material and Method: A total of 150 non obese, non hypertensive patients of DM type II with no other cardiovascular, renal or thyroid ailments reporting to Diabetic OPD, Civil

hospital Ahmedabad meeting the following criteria were enrolled in the study.

Inclusion Criteria

Patients of age ≥ 30 years of both genders
 Patients with known diagnosis of type- 2 DM

Exclusion Criteria

- Patients with known diagnosis of type-1 DM
- Hypothyroidism
- Chronic renal failure, Nephrotic syndrome
- Familial hypercholesteremic syndromes.
- Cholestatic jaundice
- Patients already on lipid lowering drugs.
- Hypertensive using beta blockers or thiazide diuretics
- BMI more than 30 & Patients using Alcohol

After obtaining informed consent from patients, detailed history was taken followed by thorough physical examination and laboratory investigations as under –

- Estimation of serum glucose by Glucose oxidase-peroxidase method.
- Estimation of glycated haemoglobin (HbA1c) by Ion Exchange Resin method Principle.
- Estimation of serum total cholesterol (TC) by cholesterol oxidase / phenol aminoantipyrine method.
- Estimation of serum triglycerides (TG) by glycerol phosphate oxidase – phenol aminoantipyrine method.
- Estimation of serum High density lipoprotein (HDL) by cholesterol oxidase / phenol aminoantipyrine method
- Estimation of serum Low density lipoprotein (LDL) by Friedewald formula.
- Estimation of Very low density lipoprotein (VLDL) using Friedewald’s equation.

The patients were classified into two groups depending on their glycated hemoglobin (HbA1c); Good Glycemic Control (GGC) group having HbA1c < 7.0% and Poor Glycemic Control (PGC) group having HbA1c > 7.0%. For serum lipid reference level, National Cholesterol Education Programme (NCEP) Adult Treatment Panel III (ATP III) guideline was referred⁹. According to NCEP-ATP III guidelines,

hypercholesterolemia is defined as TC > 200 mg/dl, high LDL when value > 100 mg / dl, hypertriglyceridemia as TG > 150 mg/dl and low HDL when value < 40 mg/dl. Dyslipidemia was defined by presence of one or more than one abnormal serum lipid concentration¹⁰.

Finally, Statistical analysis was carried out by using student’s unpaired ‘t’ test using Graph pad software¹¹. Pearson’s correlation coefficient was also calculated using online calculator to find the correlation between HbA1c and lipid parameters¹². Value of HbA1c was given as percentage of total haemoglobin and values of all other parameters were given in mg/dl. All Values are expressed as mean \pm SD. The results were considered non-significant when P > 0.05.

Result: Among total 150 type 2 diabetic individuals included in this study, 74 were male and 76 were female. The mean age \pm SD of male and female subjects were 52.14 \pm 6.40 and 51.46 \pm 5.62 years respectively. The mean value of HbA1c and FBG were slightly higher in females in comparison to male patients but the differences were not significant. When lipid profiles were taken in to consideration, 62 patients (41.3%) had TG levels > 150 mg/dl; 27 patients (18%) had LDL > 100 mg/dl; 16 patients (10.6%) had TC > 200 mg/dl & 1 (0.7%) patient had HDL < 40 mg/dl. There was no statistically significant difference in Total cholesterol, Serum Triglyceride, LDL or VLDL levels among both the genders though HDL levels in females were significantly more than males.(Table 1)

Table 1: Male and female lipid parameters results of Male and Female type 2 Diabetic patients

Parameter	Males (n=74)	Females (n=76)	Total (n=150)
FBG (mg/dl)	122.65 \pm 33.81	131.06 \pm 38.71	126.94 \pm 36.51
HbA1c (%)	7.29 \pm 1.40	7.69 \pm 1.45	7.50 \pm 1.44
TC (mg/dl)	147.37 \pm 35.40	156.25 \pm 30.43	153.91 \pm 34.08
TG (mg/dl)	144.33 \pm 51.33	160.43 \pm 66.20	152.81 \pm 59.59
LDL (mg/dl)	65.89 \pm	72.81 \pm	71.40 \pm

	34.64	29.78	32.05
VLDL (mg/dl)	28.87 ± 10.87	32.09 ± 13.24	30.56 ± 11.92
HDL (mg/dl)	45.79 ± 4.12	54.34 ± 3.23	51.95 ± 7.22

Table 2: Lipid parameters categorized by patient’s glycemic control (HbA1c)

Parameter	HbA1c < 7 (GGC)	HbA1c > 7 (PGC)	P value
FBG (mg/dl)	108.20 ± 22.26	143.55 ± 38.68	P < 0.0001
HbA1c (%)	6.30 ± 0.48	8.55 ± 1.14	P < 0.0001
TC (mg/dl)	142.95 ± 27.01	158.31 ± 29.58	P = 0.0012
TG (mg/dl)	138.61 ± 45.77	165.39 ± 67.40	P = 0.0057
LDL (mg/dl)	65.59 ± 20.88	73.88 ± 22.61	P = 0.0216
VLDL (mg/dl)	27.72 ± 9.15	33.08 ± 13.48	P = 0.0057
HDL (mg/dl)	52.63 ± 7.28	50.01 ± 7.5	P = 0.0321

Out of 150 patients, 70 patients had HbA1c values less than or equal to seven (GGC) while rest of 80 patients had HbA1c values more than seven (PGC). A very strong positive correlation was observed between FBG and HbA1c as shown by pearson’s correlation coefficient. Similarly, values of TC, TG, LDL & VLDL in GGC group were significantly lower than PGC group. Values of TG had Moderate positive correlation with HbA1c values while TC, LDL & VLDL values had only weak positive relationship. HDL levels were significantly high in GGC group as compared to PGC group and demonstrated a weak negative correlation.

Discussion: In this study we have evaluated the correlation between glycemic control (HbA1c) and lipid profile among diabetic patients. Gender wise evaluation of the data shows that there is no significant difference in glycemic parameters as well as lipid profile between males and females except in HDL values which are significantly higher in females. This warrants the need for more critical monitoring of lipid profile in diabetic males so as to prevent cardiovascular complications in them.

This study shows that quite a good number of diabetic patients have hypercholesterolemia, hypertriglyceridemia, high LDL and low HDL levels which are well established risk factors for car-diovascular diseases.

Insulin impacts the liver apolipoprotein production which regulates the enzymatic activity of lipoprotein lipase and Cholesterol ester transport protein. These could be the likely causes of dyslipidemia in Diabetes mellitus as reported by Goldberg¹³. Over and above this, insulin deficiency also reduces the activity of hepatic lipase and several other steps in the production of biologically active lipoprotein lipase may also be altered in DM¹⁴.

A positive correlation between HbA1c and dyslipidemia was observed in the present study. Positive correlation of HbA1c level with TC and TG in diabetic patients has also been reported in past¹⁵. Khan et al., also reported that severity of dyslipidaemia increases in patients with higher HbA1c value¹⁶.

Controlling the glycemic levels may significantly decrease the risk of cardiovascular events in diabetics. Khaw et al has reported that reducing the HbA1c level by 0.2% could lower the mortality by 10%¹⁷. Thus present study suggests the importance of glycemic control in prevention of cardiovascular diseases in type 2 diabetics.

Conclusion: There was no difference in the glycemic status of males and females as measured by Fasting glucose levels and HbA1c. HbA1c showed positive correlations with TC, TG, LDL & VLDL and negative correlations was found between HbA1c and HDL levels. These findings suggest that HbA1c level can be used as good parameter for predicting the lipid profile of both male and female diabetic patients. So, HbA1c may be utilized for screening diabetic patient for risk of cardiovascular events and also for timely intervention with lipid lowering drugs.

Future prospects: Identical non diabetic controls should be added for better comparison of lipid profiles. As the menopausal status of females affect the lipid profiles, this should also be given due consideration while performing any such study.

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Evaluation Of The Effect Of Chronic Heavy Smoking By Pulmonary Function Test

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Abstract: Background: Pulmonary functions are significantly affected by the chronic smoking. Study has done to investigate relationships between heavy cigarette smoking (20 cigarettes/bidis per day) and pulmonary function in Adult men. Objective is to find out If Chronic heavy smoking start affecting the lung functions as early 5 years of habit. Method: A cross sectional study on 112 individuals , selected randomly from general population of Ahmedabad city was performed. A thorough history analysis (Height, Weight, BMI), Physical examinations Spirometry were done on all individuals after explaining them procedure and taking their cosent. Parameters measured by the spirometer were FEV1, FVC, FEV1/FVC, PEFR, MEF75, MEF50, MEF25, VC. Result: Among the measured parameters of PFT, smokers have significantly decreased values($p < 0.05$) of FVC, FEV1, FEV1/FVC & PEFR. Conclusion: Chronic heavy smoking leads to significant decrease in pulmonary functions in smokers group, and It can be concluded that chronic smoking affects the health of the individuals. Therefore, smoking habit should be avoided for better health.

Key Words: Smokers , Nonsmokers, Pulmonary function tests, Height, Weight, Body Mass Index(BMI)

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Introduction: Cigarette smoking has been identified to be the most important determinant of ventilatory impairment.

Although it is known that smoking causes respiratory dysfunction, but very few works^{1,2,3} have been actually done on the dose and time dependent effect of smoking on lungs. In longitudinal studies smoking has been shown to impair the growth of forced expiratory volume in one second (FEV1) in children and cause an accelerated decline in FEV1, in adults. Objective is know whether the chronic heavy smoking start deteriorating the pulmonary function test as early as 5 years of smoking habit.

Spirometry is a simple test to measure the amount of air a person can breathe in and out, and the amount of time taken to do so. Spirometry is the first and most commonly done lung function test. It measures how much and how quickly you can move air out of your lungs. For this test, subject has to breathe into a mouthpiece attached to a recording device called spirometer, and device give data regarding respiratory functions of the subject.

Material and Method:The present study was conducted on total 112 male subjects in Ahmedabad City. Subjects were divided in

group of smokers and non-smokers, and according to their smoking habits(bidis or cigarettes) , those who were heavy smoker who smoked 20 bidis or cigarettes per day for ≥ 5 years were included in the Smokers group, , and those subjects who have not smoked any time in their lifetime, were included in the NonSmoker group. The approval of B.J.Medical College, Ahmedabad human ethics committee were obtained.

All the subjects were properly explained about the Aim and objectives, methodology, expected outcome and implications prior to the commencement of the study. Written informed consents were obtained from all the subjects. All the subjects were males. The subjects were between 20 to 60 years of age. Height and body weight was measured to calculate the body mass index (BMI). A primary screening was done to exclude gross pulmonary diseases, anatomical deformity of the chest or spine that may affect the respiratory parameters or any infective lung diseases like tuberculosis. Subjects having any known anatomical deformity of the chest or spine that may affect the respiratory parameters or any infective lung diseases or gross pulmonary diseases were excluded from the study. The subjects were further divided into smoking and non-smoking group with 50 subjects in smoker group, and

based on their smoking history, their age and BMI were matched. In smoker group, only those subjects who were heavy smokers (20 bidisor cigarettes) since last 5 years were selected. The data sheet of the subjects was collected in the form of questionnaire and was kept confidential.

Inclusion Criteria

Age 20-60 years

Smoking one pack (20 units of bidis or cigarettes per day) for ≥ 5 years (Smoker group)

No history of smoking any kind of tobacco in life time (Non-smoker group)

Exclusion Criteria

Gross Respiratory Disorders

Anatomical Deformity of Chest

Anatomical Deformity of Spine

Infective Lung Diseases

History Of Tuberculosis

Pulmonary function test (PFT), carried out with the help of The EasyOne™, 4 a handheld spirometer, which is a non-invasive and quite accurate method of assessing respiratory health status of an individual, specially the ventilation functions of lung. PFT parameters were measured by The EasyOne™ spirometer is manufactured by Medizintechnik (Switzerland). The EasyOne™ spirometer is designed for the diagnosis and management of chronic respiratory disease and asthma. The EasyOne™ is registered on the TGA and received approval from the FDA in 200010.

At the beginning, satisfactory demonstrations were given regarding the equipment and the procedure of the study. The following parameters were recorded by the computerized spirometer: vital capacity (VC), forced expiratory volume in 1st second (FEV1), peak expiratory flow rate (PEFR), FEV1 as a percentage of VC (FEV1/FVC), Mid Expiratory flow rate 75 %(MEF75), Mid Expiratory flow rate 50 %(MEF50), Mid Expiratory flow rate 25 %(MEF25). Before recording, subjects were allowed to relax. They were asked to inhale from and exhale into the disposable mouthpiece of the spirometer twice. The lips

were tightened around the mouthpiece to prevent leakage of air , as airflow must be through the mouthpiece to and from the lungs. The manoeuvres were repeated thrice and the best of the three readings was taken. At the end of the procedure , the instrument showed the detailed PFT value and readings and graphs, which were taken into consideration and noted down.

Statistical analysis: Analysis was done by applying Independent t-test by using software IBM SPSS version 21.

Result:The present study was conducted on total 112 individuals in Ahmedabad city to evaluate the effect of chronic heavy smoking the function of the Lungs.

Subjects were divided in group according to their habit of smoking those who were heavy smokers (>20 units per day) for ≥ 5 years in smoker group and, and those who has not smoked any time in their life were included in Nonsmoker group.

Table 1: Demographic data(Mean ±SD)

Parameters	NONSMOKERS (n=62)	SMOKERS (n=50)
Age	37.21±11.28	38.8 ± 9.3
Height(Cms.)	170.48±5.19	169.78±5.38
Weight(Kg.)	66.97±11.65	68.48±10.6
BMI	23.03±3.88	23.78±3.67

There was statistically no significant demographical difference between smoker and non-smoker group. Hence they were comparable for the study (TABLE 1).

Pulmonary function tests were done on all the subjects and data were compiled. Parameters which were measured by the tests are Forced Vital Capacity(FVC), Forced Expiratory Volume (1 sec)(FEV1), FEV1/FVC, Peak Expiratory Flow Rate (PEFR), Mid Expiratory Flow Rate 75%, Mid Expiratory Flow Rate 50% and Mid Expiratory Flow Rate 25%.Normality test was done on the data and Data appear to be normal

by Kolmogorov-Smirnov test. After that Independent t-test was applied on the data for measuring the difference whether it was significant or not. Results are shown in Tabular and Chart form.

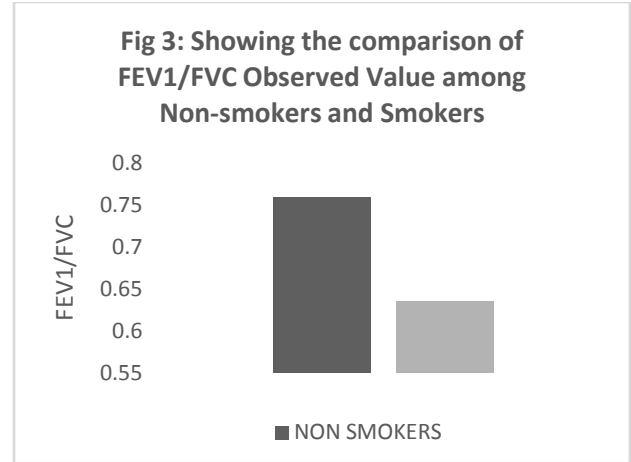
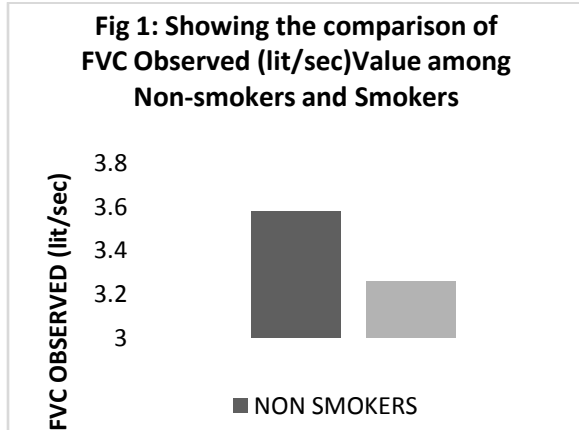


Table 2 shows the results of the PFT in both Smokers and Non-smokers group. As the age group of both groups are comparable, we can rule out the effect of aging.

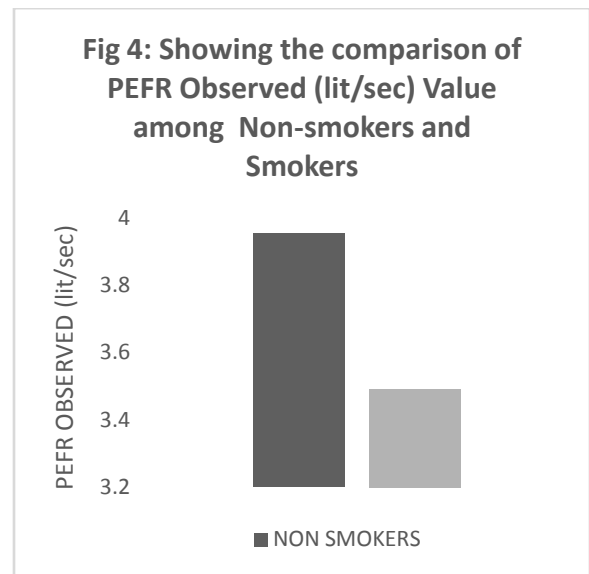
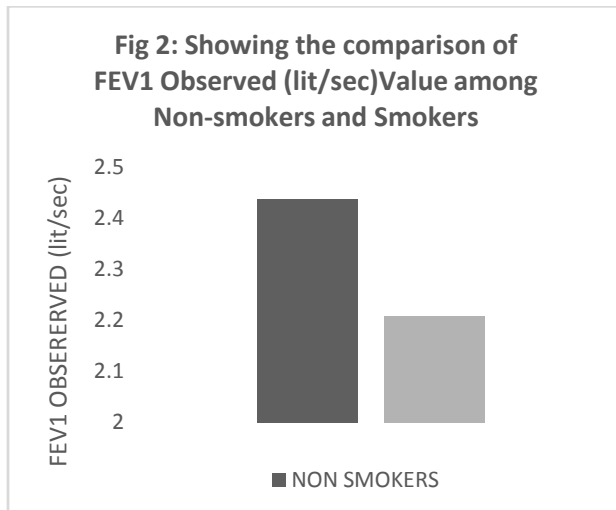


Table 2: Pulmonary function Tests comparison between smokers and Non-smokers Group and Statistical significance between two groups

PULMONARY FUNCTION TEST PARAMETERS	NON SMOKERS (N=62)		SMOKERS (N=50)		Independent t – test result	
	Mean	SD	Mean	SD	p value	SIGNIFICANT (YES/NO)
FVC OBSERVED (lit/sec)	3.58	0.59	3.25	0.53	0.004	YES
FVC PREDICTED (%)	86.59	12.06	81.50	13.64	0.038	YES
FEV1 OBSERVED (lit/sec)	2.43	0.68	2.20	0.45	0.045	YES
FEV1 PREDICTED	71.88	18.89	65.26	12.81	0.036	YES
FEV1/FVC OBSERVED	0.75	0.41	.63	0.12	0.045	YES

FEV1/FVC PRED (%)	86.83	19.46	79.03	18.76	0.034	YES
PEFR OBSERVED (lit/sec)	3.95	0.99	3.49	1.16	0.026	YES
PEFR PREDICTED (%)	56.98	20.31	48.34	19.38	0.024	YES
MEF 75 OBSERVED (lit/sec)	3.32	1.52	3.08	1.16	0.360	NO
MEF 75 PREDICTED (%)	44.91	22.81	49.42	21.50	0.289	NO
MEF50 OBSERVED (lit/sec)	2.57	1.27	2.63	1.02	0.798	NO
MEF 50 PREDICTED (%)	52.66	26.16	54.22	20.24	0.730	NO
MEF25 OBSERVED (lit/sec)	1.12	0.53	1.08	0.64	0.754	NO
MEF25 PREDICTED (%)	51.37	24.40	50.64	27.07	0.880	NO
VC OBSERVED (lit/sec)	3.29	0.77	3.03	0.58	0.048	YES
VC PREDICTED (%)	81.67	16.33	76.24	11.52	0.049	YES

SD=Standard Deviation

As if the aging affects the Lung functions then both the group of the study would have the similar data of the pulmonary function test parameters. And it's clearly found in our study that Major parameters like FVC, FEV1, FEV1/FVC, PEFR are affected in the chronic heavy smokers. It has been found in our study that, there is difference in the values like FVC, FEV1, FEV1/FVC, PEFR are lower in chronic heavy smokers statistically significantly than Non-smokers.

Discussion: Our finding suggest that there is significant difference in the Pulmonary Function test parameters among the chronic heavy smokers from non smoker. There is significant decline in the PFT values like FVC, FEV1, FEV1/FVC and PEFR, clearly stating that there is decrease in the functionality of the normal lungs in smokers. Smoking causes fatal diseases to develop in many parts of the body including cancers of the upper and lower respiratory tracts (mouth, nasopharynx, larynx, and lung), the oesophagus, and the kidney.⁵

Smoking also increases the risk of cardiovascular disease, aortic aneurysm, Crohn's disease, gastric and duodenal ulcers, cataracts, and age-related macular degeneration (causing a loss of central vision)⁵

The two most common respiratory diseases caused by smoking are lung cancer and chronic obstructive pulmonary disease (COPD).

Tobacco smoke contains chemicals in the form of particulate substances and gases. A number

of the substances found in tobacco smoke are known human carcinogens.⁵ Environmental tobacco smoke (ETS) contaminates indoor air in homes and workplaces.⁴

Constituents of tobacco smoke cause damage throughout the respiratory tree from the main airways (bronchi) to the peripheral airways (bronchioles), right down to the terminal alveoli (air pockets), as well as to the immune system. Loss of cilia and mucous gland hypertrophy occur in the upper airways; inflammation, epithelial changes, fibrosis and secretory congestion occur in the peripheral airways, and alveoli are destroyed with loss of gas exchange surface area and airways flexibility.

There are vascular changes to the small arteries and capillaries of the bronchioles and the alveoli. Smoke also causes inflammation⁶ of the cells of the bronchial tree leading to squamous metaplasia (a precancerous condition), smooth muscle hypertrophy, and peribronchial fibrosis.⁵ Damage is evident in the results of bronchoalveolar lavage .

Chronic obstructive pulmonary disease COPD is characterised by airflow obstruction. This obstruction is usually progressive, not fully reversible, and does not change markedly over several months. And the smoking is found out to be one of the leading cause of the COPD.⁷

Study done by Beck GJ et al⁸, Smoking and lung function, Residual lung function (observed-predicted) was examined in these groups for forced expiratory volume in one second (rFEV1)

and for maximal expiratory flow rates at 50% and 25% of the vital capacity. Mean residuals by sex, age, and smoking category were compared and revealed an increasing progression of lung function loss with advancing age in males and females in all smoking categories. These age-related trends were due primarily to the amount smoked by persons in each group. The age of onset of these abnormalities was found to be as early as the age group 15 to 24 yr. Abnormalities were greater in smokers than ex-smokers, even when the amount smoked was taken into account.

Higgins MW et al⁹ conducted study 'Smoking and lung function in elderly men and women' and they found Lung function was related inversely to pack-years of cigarette use. Prevalence rates of impaired lung function were highest in current smokers and lowest in never smokers.

Only Fletcher et al¹⁰ and Peat et al have reported quantitative estimates of the association between the numbers of cigarettes smoked and the rate of decline of FEV₁ in a regression model adjusting for age and, in the study of Fletcher et al, for mean FEV₁/height. Their study was carried out in a middle aged male population in London and the study of Peat et al in a population aged 20 years or older in Western Australia.

Chhabra SK et al¹¹ found in their study that lung function of asymptomatic nonsmokers was consistently and significantly better among both male and female residents of the lower-pollution zone. Present study is corroborative with few of the previous studies^{1,3,8,9,12,13}, indicating significant decrease in the lung functions¹² due to heavy and chronic smoking.

Conclusion: Study concluded that smoking, as damaging the respiratory system, thereby affecting the Pulmonary function test of the chronic heavy smokers and it can be considered one of the major risk factor for chronic disorders of the lung like COPD and Carcinoma of Lung. Hence, we can say that those major

chronic fatal disease can be prevented drastically by avoiding the smoking habits and creating the awareness in the general population especially in youth, about the hazards of smoking. Conflict of interest: No conflicts of interest, financial or otherwise are declared by the others.

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Effect Of Anulom Vilom Pranayam On Visual Reaction Time In Young Adults Of Indian Population

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Abstract: Background: Reaction time, an indirect but reliable index of the processing ability of central nervous system, is significantly correlated to changes in breathing period. Objective of the study was to evaluate effect of Anulom Vilom pranayam on visual reaction time. Method: 60 subjects (study group 30 subjects and control group 30 subjects) from a tertiary care hospital of Mumbai were included in the study. Subjects from study group practised Anulom Vilom pranayam for 8 weeks and subjects from control group were busy in their routine activities during that period. Pre-study and post-study measurements of visual reaction times for red and green light were done in both groups. Result: Statistical analysis was carried out and paired t-test was applied. Post-study visual reaction time of study group for red and green light showed significant decline than control group. Conclusion: Anulom Vilom pranayam which observed to reduce visual reaction time have health promoting, boosting and toning effects on central neural structures, quantity and pattern of release of neurotransmitters and mental interaction involved in information processing. Thus, Anulom Vilom pranayam is complementary to overall stress management.

Key Words: Anulom Vilom pranayam, Stress management, Visual reaction time.

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Introduction: During our day –to– day experiences we detect changes in the environment and react appropriately. Often we have to respond almost instantaneously to different simple as well as complex stimuli.

Human reaction time (RT) is the time interval between the application of a stimulus and the appearance of appropriate voluntary response by a subject¹. Reaction time provides indirect but reliable index of the processing ability of central nervous system and a simple mean of determining sensory-motor association and performance². Measurement of reaction time is a sensitive, reproducible and non-invasive test and can be done with simple apparatus and set up. It is useful in the study of peripheral as well as central neural structures. It acts as a reliable indicator of rate of processing of sensory stimuli by central nervous system and its execution in the form of motor response³. It is an index of cortical arousal⁴ and decrease in it indicates an improved sensory-motor performance and an enhanced processing ability of the central nervous system.

It has been found that changes in breathing period produced by voluntary control of breathing are significantly correlated to changes

in reaction time⁵. Physical conditioning exercises have been shown to shorten Visual reaction time (VRT)⁶. Various Method of pranayam are mostly characterized by breath holding at the end of maximum inspiration or maximum expiration and slowing of the respiratory rate. They also bring equipoise between psychic and somatic aspects of bodily functions⁷. Pranayam which is a yogic breathing technique produces consistent physiological changes and have sound scientific basis⁸. The physiological and psychological benefits of pranayama have been demonstrated in several studies⁹. Benefits have been reported in peripheral nerve function¹⁰ as well as central neuronal processing¹¹. Studies have demonstrated that subjects trained in yoga and pranayam can achieve a state of deep psychosomatic relaxation (undisturbability)¹².

Having a short reaction time is vital in our day to day lives and also it has important implication in sports physiology. From biological point of view, an animal's ability to cope with the environmental changes for the maintenance of homeostasis depends on the integrity of cell communication and responses given by the various systems in terms of sensory perception and motor response.

The above observations gave us an impetus to study the effect of practicing Anulom Vilom pranayam on visual reaction time. We have tried to construct a neurophysiological explanation for the results.

Material and Method: The study was conducted in a well-known tertiary hospital in Mumbai after the institutional ethical clearance. The participants of the study were medical students of age group 18 to 22 years of both the sexes. Informed and written consent was taken from all the participants. The duration of the study was eight weeks¹³. Students who don't have any neurological illness, any acute illness, having normal vision were included in this study after detailed history and clinical examination to detect systemic involvement of any disease. Those participants who were having red-green colour blindness, any organic disease of eye and nose, chronically ill or under any drug treatment and those who are undergoing any physical activity such as sports, athletic training or any other type of physical exercise were excluded from this study.

The apparatus used for measuring reaction time in this study was "Research Reaction Time apparatus" manufactured by Anand agencies, Pune-2. Visual reaction time was measured where subject has to respond to red and green colour stimuli by pressing the response button and the readings were recorded in milliseconds on the digital screen of the apparatus for red and green colour light respectively. Subjects were given practice session before actual measurements.

Before the start of study, Visual reaction time (VRT) for red light and green light were measured in all 60 voluntary participants. After taking the pre-study readings, the 60 individuals were divided into study group and control group, each group containing 30 subjects of both sexes. Each individual from the study group was explained about the procedure of Anulom Vilom pranayam and sufficient trials were given for proper understanding. Anulom Vilom pranayam was practiced by the subjects

of study group daily once in the morning for a period of 8 weeks on regular basis under our direct supervision without any holiday during the study period and the subjects from the control group were busy in their routine activities during that period. No subject in either group has been performing any pranayam before. At the end of 8 weeks parameters of the study were reassessed in both the study and control groups under similar environmental conditions.

Procedure of Anulom Vilom pranayam¹⁴: The subject was seated in a comfortable sitting posture with back straight. Inhalation is through one nostril, and then breath is retained followed by exhalation through the other nostril in a ratio of 2:8:4, with eyes closed and concentrating on breathing.

One round of Anulom Vilom pranayam consists of six steps:-

- i. Inhale through the left nostril, closing the right with the thumb, to the count of four.
- ii. Hold the breath, closing both nostrils, to the count of sixteen.
- iii. Exhale through the right nostril, closing the left with the ring and little fingers, to the count of eight.
- iv. Inhale through the right nostril, keeping the left nostril closed with the ring and little fingers, to the count of four.
- v. Hold the breath, closing both nostrils, to the count of sixteen.
- vi. Exhale through the left nostril, keeping the right closed with the thumb, to the count of eight.

This is one complete round of Anulom Vilom pranayam. After every 10 minutes one takes rest pause for 20-30 seconds. This procedure was practiced for 20 minutes daily. Data was collected and the level of significance was tested by paired t-test by SPSS software version 16.0 for windows. The p-value less than 0.05 indicate that the results are significant statistically and the p-value less than 0.01 indicate that the results are highly significant statistically.

Result:

Table 1: Pre-study and post-study visual reaction time (VRT) for red light in study group and control group

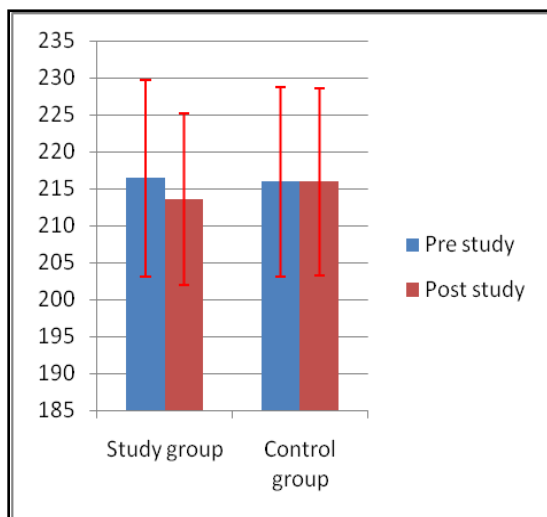
Values are expressed as Mean ± Standard Deviation. N=30 in each group.

Visual reaction time (VRT) for red light				
	Control group		Study group	
	Pre-study	Post-study	Pre-study	Post-study
VRT for red light	215.9 ± 12.8	215.9 ± 12.6	216.4 ± 13.3	213.6 ± 11.6
t-value	0.081		4.785	
95% CI	-1.107 to 1.174		1.159 to 4.308	
p-value	0.936 (NS)		0.01(S)	

Note: CI= Confidence interval, S= Significant, NS= Non Significant

Table 1 shows that visual reaction time for red light in the subjects from study group was found to be significantly decreased (p value <0.01) when compared before and after Anulom Vilom pranayam whereas, the corresponding change in control group was not significant (p value >0.05).

Graph 1: Pre-study and Post-study VRT for red light in study group and control group



Graph 1 shows difference in the pre-study and post-study VRT for red light in the study group whereas none at all in the control group. Even in study group there is considerable overlapping of the error bars of standard deviation (SD).

Table 2: Pre-study and post-study visual reaction time (VRT) for green light in study group and control group

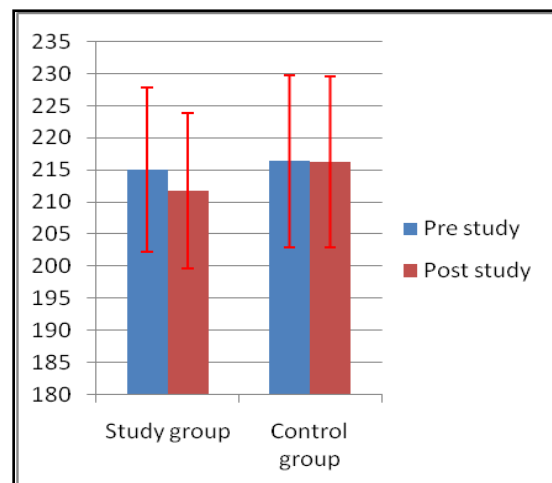
Values are expressed as Mean ± Standard Deviation. N=30 in each group.

Visual reaction time (VRT) for green light				
	Control group		Study group	
	Pre-study	Post-study	Pre-study	Post-study
VRT for green light	216.4 ± 13.4	216.2 ± 13.3	215.07 ± 12.8	211.8 ± 12.1
t-value	0.665		23.02	
95% CI	-0.839 to 1.372		2.817 to 3.583	
p-value	0.511(NS)		0.01 (S)	

Note: CI= Confidence interval, S= Significant, NS= Non Significant

Table 2 shows that visual reaction time for green light in the subjects from study group was found to be significantly decreased (p value <0.01) when compared before and after Anulom Vilom pranayam whereas, the corresponding change in control group was not significant (p value >0.05).

Graph 2: Pre-study and Post-study VRT for green light in study group and control group



Graph 2 shows difference in the pre-study and post-study VRT for green light in the study group whereas none at all in the control group. Even in study group there is considerable overlapping of the error bars of standard deviation (SD).

Discussion: In present study visual reaction time decreases after practicing Anulom Vilom pranayam in study group which was statistically significant. This observation indicates and can be explained on the basis of improved sensorimotor performance due to an enhanced processing ability of the central nervous system. These effects could be due to greater improved concentration power, ability to ignore and/or inhibit extraneous stimuli and also due to its beneficial effect on the autonomic nervous system. Reaction time gives us insight about the efficiency of information processing which involves the nature, intensity, frequency, pattern of stimuli, structural and functional characteristics of neuronal receptors, afferents, centers (i.e. central neurons), efferents and neurotransmitters. It is also influenced by several host factors like gender, age, level of consciousness, personality types, exercise, training, practice and errors etc.; several physiological factors like breathing cycles, fasting; environmental factors like types of stimuli; disease factors like lesions of central nervous system, musculo-skeletal system, physical illness (hypothyroidism), mental illness; abnormal conditions like brain injury, finger tremors; drugs factors like use of sedatives and toxicological factors like consumption of alcohol. In chronological studies like ours, it is influenced by the interaction of the individual and the environment which constitutes the degree of stress. Hence it is logical that if specific training in stress management is given then the information processing would improve and the reaction time would reduce¹⁵.

In human beings information processing is affected by the instinctual status, mental status, instinctual and intellectual development. Thus, a person with emotional disturbance or a confused or baffled individual would take more time to respond as compare to other individual with greater intellectual and emotional composure and conceptual clarity. Being pranayam an art of control of breathing, a practitioner of Anulom Vilom pranayam not only tries to breathe, but at the same time, tries to keep his/her attention on the act of breathing, leading to concentration. This act of

concentration removes his attention from worldly worries and de-stress him/her. This stress free state of mind evokes relaxed responses¹⁶. In this relaxed states, parasympathetic nerve activity overrides sympathetic nerve activity¹⁷.

Pranayam shows a reduction in sympathetic activity which is the basis of its use in stress management¹⁸. In Anulom Vilom pranayam, the idea is to maintain a slow rhythmic pattern of breathing using both nostrils alternately which also produces a beneficial effect on the autonomic nervous system as reported in a study as decrease in sympathetic tone, and the associated increase in parasympathetic tone following pranayam¹⁹. Another study reported that pranayam rapidly alters cardiopulmonary responses and improves simple problem solving²⁰. Other studies reported the effect of short term training in slow breathing pranayam on reaction time and found that there was appreciable but statistically insignificant shortening of reaction time²¹.

Another study reported that nostril rhythm in pranayama increases the theta rhythm, the mean alpha (a) and beta (b) power followed by reduction in the asymmetry in b band in the EEG²² indicating facilitation of processes of sensory signal transmission. As stated above, previous training is an important factor affecting reaction time and pranayam is also found to reduce reaction time. Thus pranayam in general and Anulom Vilom pranayam in particular which are observed to reduce visual reaction time have health promoting, boosting and toning effects on all the neuromuscular structures involved, central neural structures, quantity and pattern of release of neurotransmitters, and mental interaction involved in information processing. This is how, Anulom Vilom pranayam makes the mind steady and hence less distractible, more acute, pointed, precise, and quick in responding to any stimuli. The intricacies of central and autonomic nervous mechanisms involved in the effects of Anulom Vilom pranayam on visual reaction time needs further more psychophysiological, electrophysiological and neurobiochemical studies.

Conclusion: Anulom Vilom pranayama is complementary to overall stress management (physical, instinctual, emotional, intellectual and spiritual). Hence the best effects of these techniques would be evident if coupled with the other measures involved in Total Stress Management.

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Effect Of Oral Contraceptive On Absolute Basophil Counts During Different Phases Of Menstrual Cycle

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Abstract: Background: Different Method are used to detect the time of ovulation. It is difficult to find out exact time of ovulation. Leucocytes have an active role in ovulation. In our previous studies we have found that there is significant change in Absolute basophil count in peripheral blood at the time of ovulation. Present study was done to find out effect of oral contraceptive on absolute basophil count in different phases of menstrual cycle and establish a correlation between basophil count and ovulation. Method: Absolute basophil count and ultra sonography was done in forty four female subjects aged 20-40 years. Result: Statistical significant fall in absolute basophil count was seen on 14th day (calculated date of ovulation) as compare to 7th and 21st day of menstrual cycle with signs of ovulation by ultra sonography in subjects with spontaneous ovulation. But no significant change was seen in absolute basophil count as compare to 7th and 21st day of menstrual cycle and no signs of ovulation were seen in ultra sonography on 14th day of menstrual cycle, In subjects having Anovulatory cycle and Anovulatory cycles induced by oral contraceptives. The significant fall in basophil count in peripheral blood in subjects with spontaneous ovulation was probably due to migration of these cells from peripheral blood toward the maturing follicle in ovary. While this change was not seen in subjects with anovulatory cycles and subjects in which anovulation induced by oral contraceptives. Conclusion: There is a significant fall in basophil count at the time of ovulation. The absolute basophil count can be used as an indicator of ovulation.

Key words: Absolute basophil count, C.D.O.(Calculated date of Ovulation), Ultra sonography, Anova

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Introduction: Different Method are used to detect the time of ovulation. Exact timing of ovulation still represents a major diagnostic problem. The direct proof of ovulation rest on establishment of pregnancy or recovery of ovum from fallopian tube. Many classical inflammatory mediator appear to participate in the process of ovulation, leucocytes have an active role in ovulation¹. Many studies showed a mid cyclic fall in the basophil count^{2, 6, 7}. The ovulation can be prevented by giving oral contraceptives. They act via, multiple mechanisms like suppressing level of LH and FSH, mid cyclic surge of LH does not occur and endogenous steroid levels are diminished preventing ovulation⁸. Keeping this view mind present study was conducted that if we try to induce anovulation by oral contraceptives, the mid cyclic fall in basophil count will not occur. And this can support our hypothesis that absolute basophil count can be a good indication of ovulation.

Material and Method: After taking institutional ethical committee approval, the present study was done in 44 female subjects ageing 20 to 40 years, having history of regular menstrual cycle and in other group subjects taking oral contraceptive were included in the study. While subjects who were taking any hormonal preparation, for any reason (Infertility cases) having irregular cycles and suffering from any bacterial or viral infection were not included in the study. After taking consent and detail menstrual history from them, the proper clinical examination was done, so that the calculated date of ovulation can be found out. The subjects were divided in different group

Group I : study group Induced anovulation by oral contraceptive.

Group II: spontaneous ovulation

Group III: Anovulatory

Subjects of group I (Study Group) were taking the oral contraceptive from day 1 of menstrual cycle asked to report on 7th, 12th, 13th, 14th

and 21st day of menstrual cycle. Date of ovulation was calculated on the basis of history of menstrual cycle. And were asked to report on 7th day and 3day prior to calculated date of ovulation (as the subjects of regular cycle were included) mostly they were called from day 12th day and their absolute basophil count was done by using Fuchs-Rosenthal haemocytometer according to Moores and James method³ Ultra sonography⁴ was done so that follicular and endometrial changes can be studied till subjects showed signs of ovulation (Include in Group II) subjects which did not showed the signs of ovulation on 14th day were studied. Further for 2-3 days so that even if there is delayed ovulation can be studied (Included in Group III) all the subjects were called again on 21st day for the absolute basophil count and ultra sonography.

Statistical analysis: all the data were analyzed by SPSS (Statistical Package for Social Sciences) Individual intra group comparison was done using paired test. Inter group comparison were derived by ANOVA followed by Bonferroni post hoc test safer multiple comparison⁹

Result: This study was consisting of three groups namely study group (subjects using oral contraceptives) Ovulatory and Anovulatory group. The observations were taken on 7th, 12th, 13th, 14th and 21st day. The results shows that in study group the mean basophil counts in cells/cumm with S.D. were 50.08 (± 27.28) on 7th day, 47.74 (± 24.87) on 14th day and 52.42 (± 20.42) on 21st day. In ovulatory group the mean basophil counts with S.D. were 40.78 (± 13.39), 13.70 (± 11.81) and 41.73 (± 14.24) respectively on 7th, 14th and 21st day. Similarly in Anovulatory group the observations were noted as 44.67 (± 17.99), 31.12 (± 18.87) and 47.23 (± 19.82) respectively on 7th, 14th 21st day.

The individual intra group comparisons between the 7th, 14th and 21st day observations showed that there is fall in basophil count from 7th day of cycle to 14day in all the groups. The

changes on 14th day observation form 7th day observation was non-significant but 14th day observation was significantly lowered from its 21st day observation in study group and similar findings were observed for Anovulatory group while results of **ovulatory group** were entirely different form these two groups where 14th day observations were significantly lower than its corresponding 7th day and 21st day observations. (Using paired t test – Table II, III and Graph)

Table 1 :Means basophil count with SD

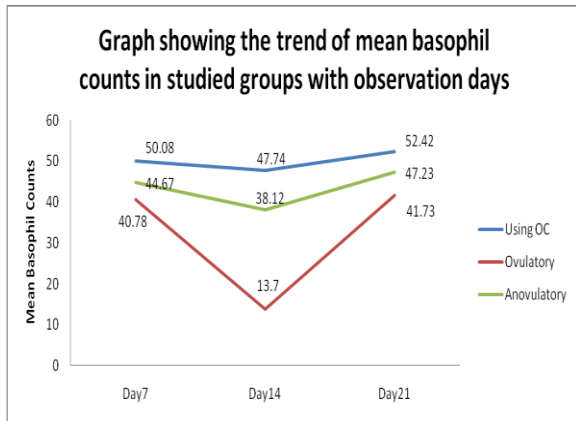
No	Group		Day 7	Day 14	Day 21
1.	Case	Mean	50.08	47.74	52.42
		SD	27.28	24.87	20.42
		N	12	12	12
2	Ovulatory	Mean	40.78	13.70	41.73
		SD	13.39	11.81	14.24
		N	21	21	21
3	Anovulatory	Mean	44.67	38.12	47.23
		SD	17.93	18.87	19.82
		N	11	11	11
4	Total	Mean	44.29	29.09	46.02
		SD	19.08	23.23	17.69
		N	44	44	44

Table 2 : Paired Sample statistics

Group			Mean	N	SD
Study	Pair 1	Day 7	50.08	12	27.28
		Day 14	47.74	12	24.87
	Pair 2	Day 14	47.74	12	24.87
		Day 21	52.42	12	20.42
	Pair 3	Day 7	50.08	12	27.28
		Day 21	52.42	12	20.42
Ovulatory	Pair 1	Day 7	40.78	21	13.39
		Day 14	13.70	21	11.81
	Pair 2	Day 14	13.70	21	11.81
		Day 21	41.73	21	14.24
	Pair 3	Day 7	40.78	21	13.39
		Day 21	41.73	21	14.24
Anovulatory	Pair 1	Day 7	44.67	11	17.9309
		Day 14	38.12	11	18.87461
	Pair 2	Day 14	38.12	11	18.87461
		Day 21	47.23	11	19.82021
	Pair 3	Day 7	44.67	11	17.9309
		Day 21	47.23	11	19.82021

Table 3: Paired Samples Test

Group	Pairs		Paired Differences		Sig.
			Mean	SD	
Study	Pair 1	Day7-Day14	2.33	11.28	0.48
	Pair 2	Day14-Day21	-4.67	7.36	0.05
	Pair 3	Day7- Day21	-2.34	14.19	0.57
Ovulatory	Pair 1	Day7-Day14	27.07	10.90	0.00
	Pair 2	Day14-Day21	-28.02	11.43	0.00
	Pair 3	Day7-Day21	-0.94	8.81	0.62
Anovulatory	Pair 1	Day7-Day14	6.54	10.32	0.06
	Pair 2	Day14-Day21	-9.10	12.93	0.04
	Pair 3	Day7-Day21	-2.56	6.07	0.19



Inter group comparisons for the specific day observation were derived by ANOVA followed by Bonferroni post Hoc tests for multiple comparisons and results reveals that 7th and 21st day observations did not differ significantly for either of the groups however 14th day observations of ovulatory group were

considerably lowered from those of study and Anovulatory groups, a significant F ratio ($F=15.643$; $P<0.0001$, $p=0.000$ for study/Ovulatory and $p=0.002$ for Ovulatory/Anovulatory and $p=0.617$ for study/Anovulatory)

When the absolute basophil count on 7th, 14th and 21st day were compared between group I and III. It is seen that the difference is there but it is insignificant. This difference might be due to ovustatic effect of oral contraceptive, while 14th day observation of group II when compared with group I and III. There was highly significant

change. These findings support our previous study that basophil count fall at the time of ovulation. This fall in count is prevented by oral contraceptives. (Present Study)

Table 4: One way ANOVA Day 7

	Sum of Squares	Df	Mean Square	Sig.
Between Group	661.858	2	330.92	0.41
Within Group	14994.848	41	365.72	
Total	15656.706	43		

Discussion: The changes in the absolute basophil count during the different phases of menstrual cycle obtained in present study are consonance with Rajan, Mettler^{6, 7}. At the time of ovulation due to presence of inflammatory mediator in vicinity of maturing ovum there in five fold increase of leucocytes.

Basophils degranulate and release of histamine occur might be responsible for ovulation. Brannstrom et al¹ reported that at ovulation there was a marked increase in density of Macrophages and Neutrophilic granulocyte in the follicular wall, especially in the thecal layer. There was no significant change in density of these cell type when early and late leuteal phase were compared, When he tried to study the frozen sections labeled with panel of monoclonal antibodies against leucocyte subtype marker and detected by immunohistochemical method. No such study has been reported for basophil. Kannan N et al¹⁰ have reported that they have found no significant changes in Eosinophil, Monocyte, Basophil counts in different phases of menstrual cycle. We could not compare our study with them as they have not focused mainly on the day of ovulation. The statistical significant fall in the absolute basophil count at the time of ovulation has been reported at the time of ovulation in our previous studies and the studies by Rajan and Mettler. If oral contraceptives are given due to their ovustatic effect, the ovulation is prevented and this might

prevent migration of basophil resulting in no change or slight change in peripheral blood in count at time of ovulation.

Conclusion: This significant fall in basophil count at the time of ovulation and insignificant change in natural and induced (by oral contraceptive) Anovulatory cycle support that basophil count changes at the time of ovulation and it can be used as an indicator of ovulation.

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Ankle Brachial Pressure Index (ABI), A Cardiovascular Risk Prediction Tool

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Abstract: Background: In recent years significant attention has been paid in identifying markers of increased cardiovascular risk, in particular the coronary artery disease. The ankle-brachial pressure index (ABI), an easily accessible, inexpensive bedside test can be a significant tool to assess the vascular risk in symptomatic and asymptomatic cardiovascular patients. Objective: To determine the association between an abnormal ankle brachial index (ABI) and coronary artery disease (CAD). Method: The study population included 150 subjects divided in two groups, 80 patients with AMI and 75 age and sex matched healthy subjects as controls. Ankle Brachial Pressure Index (ABI) was measured in all the subjects along with their LDH level. Result: A significantly low ABI (<0.9) was observed among the AMI patients as compared to healthy controls. Moreover the ABI showed negative correlation with the level of LDH in the AMI patient. Conclusion: ABI calculation would be able to identify more patients at high risk and as such it should be considered routine investigation for cardiovascular risk prediction. A follow up study with large cohort will help in stratification of individual risk of developing coronary artery disease (CAD)

Key words: ABI (Ankle brachial index), AMI (Acute Myocardial Infarction), Lactate Dehydrogenase (LDH)

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Introduction: Ischemic heart disease (IHD) is the major cause of morbidity and mortality all over the world¹. It is usually attributable to atherosclerotic obstruction of coronary vessels and clinically presents as a spectrum of signs and symptoms ranging from angina pectoris to acute myocardial infarction (AMI), more aptly termed as acute coronary syndrome². A number of risk factors are known to predispose patients to IHD. Some of these cannot be modified, for example age, gender and family history. Modifiable risk factors include dyslipidemia, hypertension, smoking, diabetes mellitus, obesity, physical inactivity, alcohol consumption and psychological factors³. These conventional risk factors do not account for all cases of atherosclerotic coronary artery disease (CAD) and myocardial infarction (MI) still occurs in individuals having no obvious traditional risk factor. These observations under-score the need to identify an additional marker for coronary atherosclerosis. Although several tools have been proposed⁴⁻⁶, frequently the clinical utility of measuring such markers remains uncertain for several reasons, including costs, low reproducibility, conflicting studies or lack of confirmatory studies, and lack of measurement standardization⁵. The presence of peripheral arterial disease measured non-invasively by

ankle brachial index (ABI) is a risk marker for coronary artery disease (CAD). The ankle brachial index (ABI), a ratio of ankle systolic blood pressure to brachial systolic pressure, is used in clinical practice to assess the patency of the lower extremity arterial system and to screen for the presence of occlusive peripheral arterial disease. Epidemiological and clinical studies have found that low ABI levels are associated with cardiovascular risk factors, coronary and carotid artery disease and predict cardiovascular and overall mortality⁷.

The objective of this study was to determine the association between an abnormal ankle brachial index (ABI) and the presence of AMI and to correlate it with the level of tissue damage in AMI, as evident by the LDH level.

Material and Method: The study consisted of 80 patients (52 men and 28 women) with a mean age of 49.50 ± 6.28 years admitted in the Coronary Care Unit of Jawaharlal Nehru Medical College Hospital, Aligarh Muslim University, Aligarh, India with the diagnosis of AMI. The diagnosis of AMI was based on a history of prolonged ischemic chest pain, which lasted for up to 3 hours, ECG changes (ST elevation of 2 mm or more in at least two leads) and elevated

creatine kinase isoenzyme MB (CK-MB) and troponin T within 12 h after the onset of pain. The control group consisted of 70 healthy, age matched subjects, 48 men and 22 women, recruited from the institution. The study was duly approved by the Board of Studies/Institutional Ethical Committee and a valid informed consent was obtained from all the subjects (including both the cases and controls).

Inclusion criteria: Patients with diagnosis of AMI and admitted within 24 hours of onset of symptom.

Exclusion criteria: Patients/Control with any history of diabetes mellitus, asthma, smoking, oral antioxidant or vitamin intake.

Measurement of Ankle Brachial Pressure

Index: The Ankle Brachial Pressure Index (ABI) is the ratio of the blood pressure in the lower legs to the blood pressure in the arms. American Heart Association recommendations were taken into consideration for ABPI calculation⁸. After resting the subjects for 5 minutes in a supine position, brachial artery systolic and diastolic blood pressure was recorded in both arms using a mercury sphygmomanometer. Appropriate sized blood pressure cuffs were applied over each brachial artery.

The cuff was rapidly inflated to 20 mmHg above the systolic pressure recorded by palpatory method in each arm and then deflated at a rate of 2 mm per heart beat to the lowest even reading. Highest systolic reading was measured in both arms as the pressure at which the first sustained sound was audible. Diastolic pressure was recorded at the disappearance [phase five] of Korotkoff sounds. The higher of the two arms' pressure was taken as index arm. Two more readings were taken on the same arm and the average was taken as the index systolic blood pressure in the arm. In all cases, ankle pressure in both ankles was measured by Doppler with 8 MHz probe which is the Gold standard. The cuff was positioned on the ankle proximal to the malleoli. The pulse was located with a Doppler probe and the cuff inflated until the pulse was obliterated; the cuff

was deflated and the pressure was recorded at the point when the pulse

reappeared. The leg with lower systolic pressures was taken as index leg. Within the index leg dorsalis pedis artery pressure was taken as index ankle pressure if it was higher than the posterior tibial and vice versa. Two more readings were taken on the same artery and the average was recorded.

ABI (ankle brachial index) was calculated by dividing the average systolic blood pressure of the index ankle artery by the average systolic blood pressure of the index arm. A resting ABI value ≤ 0.90 defines the presence of peripheral arterial disease and it has a sensibility of about 95% in identifying the presence of a hemodynamically significant arterial stenosis at angiography between heart and foot and near 100% specificity in excluding a normal subject⁹

LDH measurement: Peripheral blood samples were obtained from all the patients and controls. Sera were separated by centrifuging the blood sample at 3000 rpm for 15 minutes. The analysis Serum LDH was determined with standard techniques using Cobas 8000 Analyzer (Roche Diagnostics GmbH, Germany).

Statistical Analysis: All data were expressed as mean \pm SD. The statistical significance was evaluated by Student's t-test using Statistical Package for the Social Sciences (SPSS) ver 17.0. Pearson's correlation coefficients were determined between the measured parameters at 5% level of significance. A p-value of < 0.05 was considered statistically significant

Result: Table 1 shows the demographic and clinical characteristics of normal healthy controls and AMI patients. The control group consisted of 48 males and 22 females with a mean age of 46.75 ± 7.69 years whereas among the 80 AMI patients there were 52 males and 28 females with mean age 49.50 ± 6.28 years.

AMI patients had a mean weight of 65.80 ± 7.59 kg which was significantly higher than that of

controls where the mean weight was 60.17 ± 7.73 kg. BMI was significantly high in AMI group as compared with control. A significant rise in both systolic as well as diastolic blood pressure was seen in AMI patients as compared to control.

Table 1: Demographic data and Clinical characteristics of the healthy group and AMI patients

Variables	Control (N=70)	Cases Of Ami (N=80)
Age (years)	46.75 ± 7.69	49.50 ± 6.28
Male	68.57%	65%
Female	31.43%	35%
Weight (kg)	60.17 ± 7.73	$65.80 \pm 7.59^*$
Height (cm)	163.06 ± 6.38	163.82 ± 5.93
BMI (Kg/m ²)	22.44 ± 2.09	$25.02 \pm 3.01^*$
Waist-to-hip ratio	0.84 ± 0.05	$0.96 \pm 0.11^*$
Systolic BP(mm Hg)	119.75 ± 7.50	$132.20 \pm 8.51^*$
Diastolic BP(mmHg)	79.85 ± 6.63	$82.95 \pm 6.21^*$
Hypertension	-	52%
Continuous variables are presented as mean \pm SEM and the other variables are shown as percentage of patients.* represents 'p' value <0.05		

Table 2.shows level of cardiac markers (CK, CK-MB, troponin T, LDH) were significantly higher AMI groups when compare to control subjects.

The mean ABI was 1.06 ± 0.22 in the control group and 0.98 ± 0.24 in the AMI patients. It was not significantly different in two groups ($p=0.428$, Figure 1). However the frequency of patients with lower ABI (≤ 0.9) was significantly higher compared to the frequency of control patients with lower ABPI (33.75% and 5.72%, respectively; $p=0.02$, Table 3).

The LDH level of AMI patients showed a significant negative correlation with the ABI ($r=-0.46$, $p=0.004$)

Discussion: Atherosclerosis and its complications are the leading causes of mortality and morbidity worldwide. Many risk factors have been defined for atherosclerosis and CAD. Interest in the use of formulas and tables to predict an individual's risk of a subsequent cardiovascular event is increasing. To date, these have been based on conventional risk factors, such as cigarette smoking, hypertension, and hypercholesterolemia, and have used data from large observational studies, including the Framingham study¹⁰.

Table 2: Cardiac biomarker levels in the healthy group and AMI patients

Markers	Control (N=70)	Cases Of Ami (N=80)
CK (IU /L)	73 ± 15.6	$126 \pm 26.5^*$
CK-MB (IU/ L)	12.5 ± 2.8	$97 \pm 7.8^*$
Troponin T(ng/ml)	0.021 ± 0.005	$1.27 \pm 0.14^*$
LDH (IU/L)	256.49 ± 9.30	$181.63 \pm 5.77^*$

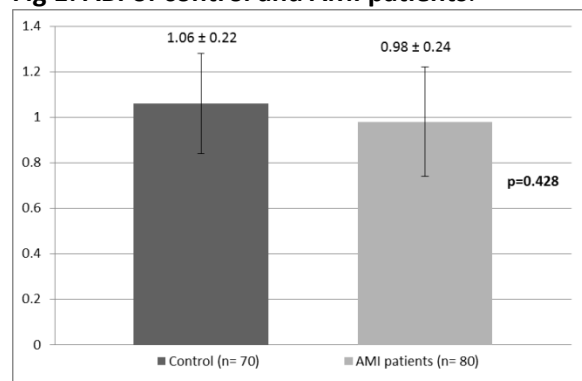
Table 3: Distribution of ABI groups within patient and control groups

		Patient		Control		Total	
		N	%	n	%	n	%
ABI	≤ 0.9	27	33.75	4	5.72	31	20.67
	> 0.9	53	66.25	66	94.28	119	79.33
	Total	80	100	70	100	150	100
Chi-Square=5.421 ; $p=0.020^*$							

Such predictions are increasingly being used in clinical practice to determine whether the benefits of preventive treatment (for example, aspirin administration) outweigh the potential side effects of such interventions. The results of the present analyses suggest that the ABI may add to the sensitivity of the present risk factor assessment tests. ABI value is implemented as an easy and non-invasive method for early determination of atherosclerotic lesions. Many studies have shown that atherosclerosis incidence increases in cases with $ABI \leq 0.9$. Low ABI values in patients with CAD were related

the existence of atherosclerosis and the number of affected coronary arteries^{11,12}. In the current study, the mean ABI was 0.98 ± 0.22 in the patient group and 1.06 ± 0.18 in the control group. No statistically significant differences between the patient and control groups were observed in terms of ABI (Figure 1.). Relatively small number of cases may cause these different results. Moreover, there were marked proportions who lacked important risk factors such as smoking, hypertension and diabetes. However the frequency of low ABPI (≤ 0.9) was significantly higher compared to the control patients (Table 3).

Fig 1: ABI of control and AMI patients.



In addition it has been seen in the study that the ABI of the AMI patients shows a significant negative correlation with the LDH level. LDH, a marker of tissue degeneration can be used as a surrogate marker for the severity of the AMI. Experimental study in rats has shown that elevation in the LDH enzyme activity in the serum correlated with a decrease in the activity of cardiac muscle LDH¹³.

Data from ARIC (Atherosclerosis Risk In Communities) and other studies suggest that the average risk of future coronary heart disease (CHD) events increases with decreasing ABI as a continuous but not linear function. Similar results have been reported for exertional leg pain, for carotid intima media thickness and coronary artery calcium¹⁴. The choice of relevant ABI cut off at which risk factor modification therapy should be instituted to reduce further CAD risk should be based on absolute rather than relative risk of future CAD events.

An ABI ≤ 0.9 has been consistently associated with a 2 to 5 fold increase in all-cause death

and a 3 to 8 fold increase in cardiovascular death when compared with an ABI > 0.9 ¹⁵⁻¹⁸. However, there are still some issues to be addressed about the use of the ABI as a diagnostic tool. First, there is limited research on how the risk of vascular events varies across the whole range of ABI in the general population. Second, there is no ABI cut point that is universally accepted as being the best predictor of cardiovascular events, although for screening purposes, it may be hypothesized that an ABI ≤ 0.9 is likely to be more sensitive than a lower cut point. Finally, although change in ABI has been related to worsening peripheral arterial disease¹⁹ or outcome after vascular operation²⁰, its predictive value for subsequent vascular events has not been investigated in any detail. Further research with large sample size and longer duration of study is required to reach a substantial conclusion.

Conclusion: ABI calculation would be able to identify more patients at high risk and as such it should be considered routine investigation for cardiovascular risk prediction. A follow up study with large cohort will help in stratification of individual risk of developing coronary artery disease (CAD)

Limitations of the study: The study has been conducted on a relatively small sample size and as such the conclusion arrived may not be sufficient to be implemented on a general population. A larger sample size might provide more conclusive evidence. The severity of AMI in the study would have been best described in terms of the involvement of the coronary artery viz. single vessel disease, double vessel disease and triple vessel disease but unfortunately due to unavailability of a catheterization lab in our setup we had to use LDH as a surrogate marker.

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Effect Of Different Modes Of Aerobic Exercise On Cardiorespiratory Efficiency And Exercise Performance In Sedentary Males

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Abstract: Background: Physical activity is a complex behaviour that is nurtured by environmental and biological factors. In day-to-day life, moderate level of physical activity has a number of positive influences on all systems, especially cardiovascular and respiratory systems. Few studies reported how the different modes of aerobic exercise influence the cardiovascular efficiency and physical fitness in sedentary subjects. This study was aimed to study the effect of whole body exercise, walking exercise, upper and lower limb exercise and combined exercise on sedentary males. Method: Seventy five healthy non-smoking males aged between 15-25 years were recruited for 12 week exercise training. Participants were divided into five groups, 15 in each. Each group performed different exercise for 12 weeks under the supervision of physical trainer. Interventions included respiratory rate, resting pulse rate, blood pressure, forced expiratory volume in one second (FEV1), peak expiratory flow rate (PEFR), 6 minute walk distance (6 MWD), 12 minute walk distance (12 MWD), 6 minute bicycle ergometer (6 MBE) test and 6 minute arm ergometer (6MAE) test. Parameters were studied twice before and after exercise training. Data was represented as mean±SD. Students paired t test was applied for pre and post data analysis. Result: The increase in cardiorespiratory efficiency was found significantly higher in response to whole body, combined and walking exercise. The other mode like only upper limb or lower limb exercises are not as beneficial. Conclusion: In conclusion cardio-respiratory efficiency and exercise performance both are improved by regular exercise training and whole body exercise is the best among all. Lower limb exercise is least beneficial.

Key Words: Key words: 6MWD, 12 MWD, 6MBE, 6MAE, FEV1

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Introduction: Development of brain occurred as men is destined to move locomotive apparatus constitute the majority of body mass. Basic instrument of mobility and locomotive apparatus is skeletal muscle¹.

Exercise has been a means of testing the physical capabilities and physiological responses of an individual that form the basis of good health and well-being. It develops the ability to tolerate, withstand stress, and carry on in circumstances where an unfit person cannot continue. The American College of Sports Medicine (ACSM) defines aerobic exercise as "any activity that uses large muscle groups, can be maintained continuously, and is rhythmic in nature." It is a type of exercise that overloads the heart and lungs and causes them to work harder than at rest² and the example are walking, jogging, running, skipping, dancing, swimming, bicycling etc.

In the many advance laboratories of exercises physiology specific exercise programme have

been develop for specific training and conditions. There are many evidences confirming that the changes, which occur due to the regular physical work, not only increase the functional capacity of organism, but also decrease the risk of various diseases³⁻⁴. Exercise training is important for the improvement of cardio-respiratory efficiency, work performance and the functioning of other systems. Physical activity is known to improve physical fitness and to reduce morbidity and mortality from numerous chronic ailments⁵.

Exercise training influence a number of factors which affect exercise performance. It may cause increase muscle strength, maximal oxygen uptake, structural and functional changes in a number of organ systems and there are psychological changes as well. The aerobics exercise is a system of acyclic exercises, which improves the capacity of cardiovascular functions, develops the toughness of muscles and the coordination of movement. A regular

participation in aerobics exercise program, as in other endurance exercises, increases the capacity of cardiovascular system⁶⁻⁷.

There are few studies reported on aerobic exercise and pulmonary function in general population. As far as the recent developments concern exercise physiology have shown significantly positive improvements, however non-significant associations have also been reported.⁸⁻¹⁰ There are different parameters used for the measurement of lung functions but FEV1 has been proven to be most crucial in detecting pulmonary changes easily and effectively in clinical settings the patient turnover is high and in settings where obesity is prevalent.¹¹

With this idea sedentary human were trained in different forms of exercise for 12 weeks. Their cardio-respiratory efficiency and exercise performance were measured and compared before and after exercise training. Authors were keen to know the role of physical activity in the modification of cardiovascular functions, lung functions; positive results if derived could then be communicated to the students for their fitness and well-being.

Material and Method: Participants: This study was conducted in Department of Physiology, PSMC, Karamsad after ethical clearance. Longitudinal experimental study was conducted in total 75 male subjects. After taking informed consent detailed history was noted. This was followed by a physical examination of each participant and those with a past medical history suggestive of asthma or exercise-induced asthma, smoking, chronic cough, recurrent respiratory tract infection, history of chest or spinal deformity, obesity, and chronic obstructive lung diseases were excluded from the study. Only healthy, non-smoker and non addict subjects were selected for the study. The aim of the study and procedure of the tests were explained to all subjects and only those who volunteered, included in the study. Now subjects were divided in to 5 different groups, 15 in each. Each group was trained for different

exercise. Anthropometric measurements were taken.

Exercise training: Five different modes of exercise were used. All participants underwent the 12 week exercise training for half an hour daily, five times in a week. Table 1 showed the training protocol

Material and Interventions: All the subjects were studied for cardiorespiratory efficiency and exercise performance. Interventions were performed twice, before and after the 12 week of physical training. The following interventions were taken.

(A) Cardiorespiratory efficiency tests:

1. Measurement of resting pulse rate and blood pressure.

2. Respiratory rate: Resting respiratory rate was taken before the study and after the exercise training.

3. Forced expiratory volume in one second (FEV1): For the measurement of FEV1 digital spirometer SP-1A was used. Subjects were asked to breathe in deeply in upright position, then to take mouthpiece firmly between their lips and breathe out as strongly as possible for more than two seconds.

4. Peak expiratory flow rate (PEFR): To measure the PEFR the mini Wright's peak flow meter was used. The subjects were asked to take a full and deep inspiration and then to blow out fast and forcefully in to the mouth piece of peak flow meter.

(B) Exercise performance test: (1) Walking tests: 6 minute (6MWT) and 12 minute walk tests (12MWT) were performed. Both the tests were carried out on a level enclosed passage. Subjects were asked to walk as much as distance as they could in 6 and 12 minutes and instructed to walk continuously as fast as possible without any stoppage or slowing down in speed. Subjects should put their maximum efforts to cover maximum distance. A physical instructor accompanied the subject, acting as time keeper and giving the necessary

encouragement. Distance was measured in meters.

2. Bicycle Ergometer test: Six minute ergometer distance (6MED) was performed on Hero allegro Exer bike. The subjects were instructed to pedal (at moderate tension of 30 kg.m/sec) as fast as possible for a period of six minutes. During the test they were continuously encouraged to reach a maximal pedalling. The result was expressed as distance covered in kilometres. Six min maximum arm ergometer test (6MAE) was also performed by setting a moderate tension

(30 kg.m/sec) on handle bars of hero allegro Exer bike. The subjects were instructed to row the pedals as maximally as possible for a period of six minutes. During the test they were continuously encouraged to reach a maximally rowing speed.

Statistical analysis: Students paired t-test (2 tail) was applied to compare the pre and post training values. Statistics were tested at the $p < 0.05$ level of significance and data were reported as mean \pm SD.

Table 1: Exercise Training Protocol

Exercise training	Instrument used	Type of exercise	Speed	Tension
Whole body Group A (N=15)	Hero allegro Exer bike	Rowing+ pedalling+ walking	20 times/ min 20 kms/hr 10 kms/hr	Moderate 30 kg.m/sec
Combined limb Group B (N=15)	Hero allegro Exer bike	Rowing+ pedalling	20 times/min 20 kms/hr	Moderate 30 kg.m/sec
Walking Group C (N=15)	-	walking	10 kms/ hr	-
Upper limb Group D (N=15)	Hero allegro Exer bike	Rowing	20times/min	Moderate 30 kg.m/sec
Lower limb Group E(N=15)	Hero allegro Exer bike	Pedalling	20kms/hr	Moderate 30 kg.m/sec

Table 2: Anthopometric parameters

Data	Whole body (N=15)	Combined limbs (N=15)	Walking (N=15)	Upper limbs (N=15)	Lower limb (N=15)
Age (Yrs)	17.9 \pm 0.9	17.9 \pm 0.9	17.53 \pm 0.64	18.93 \pm 0.40	17.73 \pm .59
Weight (kg)	57.75 \pm 9.19	57.75 \pm 9.19	61.67 \pm 12.26	57.40 \pm 7.27	57.2 \pm 8.55
Height (cms)	168.55 \pm 5.52	168.55 \pm 5.52	168.33 \pm 4.91	172.07 \pm 5.70	167.4 \pm 5.47
BSA m ²	1.65 \pm 0.13	1.65 \pm 0.13	1.70 \pm 0.15	1.67 \pm 0.11	1.63 \pm 0.11

Result: There were 75 sedentary male subjects aged between 15-25 years were studied. Besides cardio-respiratory efficiency tests, exercise performance tests were also studied. Table 2 showed the anthropometric data of subjects for each group which include age, weight, height and body surface area. Table 3 showed the values of pre and post exercise changes in cardio-respiratory efficiency. Pulse rate and SBP decreased after all exercise modes, while DBP has shown variable values. Respiratory rate is not affected by exercise while FEV1 and PEFR improved after all modes

of exercises except lower limb exercise. Table 4 showed the improvement in exercise performance as 6 MWD, 12 MWD both increased after exercise training. Results showing that whole body exercise showed significant changes in all parameters.

It consisted of rowing, pedalling on hero allegro exer bike and walking. Combined limbs exercise or walking exercise training is the next best and lower limb or upper limb exercise alone follows them.

Table 3: Comparison of effect different modes of exercise on cardio-respiratory parameters

Parameters	Whole body		Combined limbs		Walking		Upper limbs		Lower limb	
	Before	After	Before	After	Before	After	Before	After	Before	After
RR (/min)	15.7±2.37	16.0±2.14	14.9±2.25	15.2±1.82	15.7±2.37	16.0±2.14	14.5±1.96	15.6±1.88	15.1±2.6	15.5±1.60
PR (/min)	77.3±3.2	71.8±2.92***	77.3±3.18	72.3±3.1***	76.5±3.66	71.6±3.48***	78.1±3.34	70.9±2.71***	77.3±2.69	72.7±2.69***
SBP (mm/Hg)	116.7±7.2	109.9±5.88***	117.0±5.6	109.2±4.65***	120.2±7.55	112.2±6.88**	114.8±8.28	108.5±5.15*	115.3±8.34	109.6±6.47*
DBP (mm/Hg)	76.03±8.21	71.67±7.02**	75.3±6.40	73.5±8.21	78.4±8.01	75.6±6.73	73.87±6.44	66.53±4.75**	76.53±11.22	71.07±7.25
FEV1 (L)	3.4±.67	4.7±.61***	3.38±.71	4.36±.45***	3.26±.66	4.12±.33***	3.51±.03	4.07±.34**	3.31±.45	3.43±.47
PEFR (L/min)	556.6±61.15	594.7±64.39**	530.3±56.93	605.6±64.17**	577.3±47.88	615.6±55.45*	580.3±65.64	611.6±53.87*	538.6±61.4	546.0±62.7

RR= Respiratory rate, PR= pulse rate, SBP= systolic blood pressure, DBP= diastolic blood pressure, FEV1= forced expiratory volume in first one second, PEFR= peak expiratory flow rate, * P <0.05, ** P<0.005, *** p<0.001

Table 4: Comparison of effect different modes of exercise on exercise performance test

Test	Whole body		Combined limbs		Walking		Upper limbs		Lower limb	
	Before	After	Before	After	Before	After	Before	After	Before	After
6 MWD (m)	705.5±47.21	743±56.7***	694.6±30.26	758.6±57.99**	705.5±55.65	761.2±58.23*	715.6±46.4	717.2±46.53	706.4±54.66	734.8±58.57
12 MWD (m)	1439.6±13.4	1534.3±19.2***	1441.4±6.541	1551.2±13.0***	1453.9±120.1	1553.0±104.3*	1462.7±126.4	1506.6±8.18	1427.3±13.8	1526.8±165.3
6MBE (Km)	3.26±0.53	3.90±0.60***	3.13±0.50	4.36±0.41***	3.39±0.40	4.17±0.44***	3.37±0.61	3.51±0.61	3.13±0.57	3.57±0.46*
6MAE (m)	306.0±33.2	347.9±40.9***	296.8±35.36	373.5±29.7***	312.4±37.98	332.8±35.29	311.2±26.07	371.1±25.1***	303.7±33.22	314.1±39.07

6MWD= 6 minute walk distance, 12MWD= 12 minute walk distance, 6MBE= 6 minute bicycle ergometer test, 6MAE= 6 minute arm ergometer test, * P <0.05, ** P<0.005, *** p<0.00

pathophysiology, and exercise prescription for rehabilitation¹³⁻¹⁶.

Pulse decreases significantly in all kind of exercises. Resting pulse depends upon vagal and sympathetic tone, but the vagal tone predominates¹⁷. Aerobic exercise increases the vagal tone and also increases the concentration of circulatory catecholamine. Reflex activation of heart rate due to cardiovascular and pulmonary reflexes is reduced and the effect of stretch receptor of muscle and joints on heart rate also reduced.¹⁸

Discussion: Our study state that regular moderate aerobic exercise training significantly improves cardiorespiratory efficiency in sedentary male subjects. Whole body exercise training causes maximum benefits in subjects.

Walking and combined limb exercise training are the next. Lower limb and upper limb exercise training has variable effects¹².

It is reported that aerobic exercise is particularly useful for evaluating the cardiopulmonary capacity of athletes and normal people, as well as for clinical practice, such as diagnosis and evaluation of cardiovascular disease, assessment of treatment effect, ascertainment of

Blood pressure depends upon central and peripheral mechanism of regulation, peripheral vascular resistance, mechanical efficiency of heart and cardiac output. Exercise decreases the magnitude of central and peripheral mechanism, also reduced the peripheral vascular resistance may cause increase mechanical efficiency of heart.¹⁹ Exercise is a stressful condition that produces marked change in body functions, improves endurance and reduces breathlessness. Skeletal muscle

control many crucial elements of aerobic conditioning, including lung ventilation. The possible explanation could be that regular forceful inhalation and deflation of the lungs for prolonged periods leads to strengthening of respiratory muscles.²⁰ There might be an increase in the maximal shortening of the inspiratory muscles as an effect of training, which has been shown to improve lung function²¹. FEV1 depend upon airway resistance, lung compliance and contraction power of respiratory muscle. In present study FEV1 increase significantly in whole body and combined and walking exercise in males. This may be due to increased elasticity of joints concern with respiratory movements leading to greater expansion and recoil of thoracic cage. FEV1 is also improved after exercise in asthmatic persons but the rise was statistically insignificant maybe due to respiratory muscle weakness.²² Our study improvement in FEV1 after an 12-week exercise course is comparable to a study in which significant augmentation in FEV1 and FVC were observed after physical training in healthy male welders. These results also agreed with a previous study which proved that ventilatory exercise programme improves all measured pulmonary parameters.²³⁻²⁴

Our study found that PEFr improved after all exercises. It is reported that 16 weeks aerobic exercise plan (five 20 minute sessions of jogging in a week) can improve the PEFr up to 17% significantly²⁵. As far as airways are concerned, activity-induced bronchodilation reduces airway resistance and improves pulmonary ventilation. It is known that normally the volume and pattern of ventilation are initiated by neural output from the respiratory centre in the brainstem. This output is influenced by input from chemoreceptors, proprioceptors in muscles, tendons and joints and impulses sent by nerves to the intercostal and diaphragmatic muscles.²⁶ Our result correlates with Y.J. Cheng et al. who showed in their study that physical activity improved pulmonary function in healthy sedentary people²⁷

Our study found that exercise training not only improves the cardio-respiratory capacity but

also increase the exercise efficiency. Exercise training improves the 6 MWD and 12 MWD. We found that the 6'WT is a reliable and reproducible test. It is reported that after exercise training, a significant improvement of walking distance (WD) was shown in T-CHD²⁸. The 6MWT appears reproducible and valid relative to cycle ergometer assessments of cardio-respiratory responses, and offers a simple method of clinical assessment. An 8-week moderate walking program improves the cardiopulmonary fitness of children with CP, as measured by 6MWT.²⁹

Conclusion: In conclusion the longitudinal purposeful physical exercises significantly improve the cardiorespiratory efficiency in sedentary persons. Amongst different modes of aerobic exercises the whole body exercise is best suited to the individuals. It is confirmed above mentioned aerobic exercise improves the physical health component of quality of life and endurance in persons. It should be included as a part of a comprehensive health promotion strategy.

Results of blood pressure enlightened the further way of hypertension management. Our study suggests that the moderate aerobic exercise can improve airway functions in healthy people and thus provides further support for the aerobic exercise as an important component of pulmonary rehabilitation. This will lead to better and improved treatments of COPD. Repeated periodic exercise helped in improving lung functions, especially FEV1. Periodic measurement of FEV1 with regular exercise can help in generating awareness regarding lifestyle modifications, and acquiring a healthy habit of being active.

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HbA_{1c}: Future Diabetic And Cardiovascular Risk In First Degree Relatives Of Type 2 Diabetes Mellitus

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Abstract: Background: The patients with type 2 diabetes mellitus (T2DM) are at high risk for future cardiovascular events. The present study was aimed to assess the future 8 year diabetic and 10 year cardiovascular risk in first degree relatives of T2DM and association with glycemic status as measured by Fasting plasma glucose (FPG) and glycosylated haemoglobin (A1c) levels. Method: Out of 230 first degree relatives of T2DM patients attending the diabetic clinic of Hamidia hospital, 60 subjects having FPG in prediabetic range and 60 age and sex matched (30-60 yrs) normoglycemics healthy controls were selected. FPG, A1c and lipid profile were measured as per the standard laboratory Method. Prediabetes and T2DM was defined as per American Diabetes Association criteria (2011) and dyslipidemia was defined as per NCEP ATP III guidelines (2004). Future diabetic and cardiovascular risk were assessed by using Framingham Risk Score (2007) and Framingham cardiovascular risk score (2008). Result: Dyslipidemia was identified in 32 % of prediabetics. Overall diabetic and cardiovascular risk in prediabetic group was found to be 23.13 ± 9.85 % and 10.85 ± 9.19 % respectively. Dyslipidemia was associated with 26.28 ± 8.65 % diabetic and 12.88 ± 9.98 % cardiovascular risk. FPG and A1c showed positive correlation with future diabetic risk ($r=0.55, 0.61$) and cardiovascular risk ($r=0.49, 0.73$). Conclusion: It is concluded that A1c levels below the threshold for diagnosis of diabetes (<6.5%) associated with dyslipidemia carry high future diabetes and cardiovascular risk.

Key Words: HbA_{1c}, dyslipidemia, diabetic risk, cardiovascular risk.

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Introduction: Epidemiological evidences suggest that the complications of diabetes begin early in the progression from normal glucose tolerance to frank diabetes. Prediabetes raises short-term absolute risk of T2DM by 3-to 10-fold^{1,2}. Early identification and efforts to improve glycemia in persons with prediabetes have the potential to reduce or delay the progression to diabetes and related cardiovascular diseases^{3-7,8}.

Acknowledging these challenges, present study aimed to identify existence of prediabetes in first degree relatives of T2DM patients and to assess their future 8 year diabetic and 10 year cardiovascular risk.

Material and Method: The study was carried out in the Department of Physiology, Gandhi Medical College, Bhopal (M.P.) in collaboration with the Department of Medicine. The study was approved by the Ethics Committee of Gandhi Medical College, Bhopal (Letter No. 1666-67/MC/7/2013). Informed consent was obtained from the each participant.

Study Design: Sample Selection: Sample size based on the reported prevalence of 3.6% of prediabetes in India, the sample size (53) was calculated by using the formula⁹. 230 first degree relatives (117 males, 113 females) of T2DM patients attending the Diabetic Clinic who gave consent to participate in the study were selected. On the basis of fasting plasma glucose (FPG) 60 subjects were identified as prediabetes as per ADA 2011 criteria. Mean age was 45.2 ± 8.9 years. 60 age and sex matched healthy normoglycemic employees of the Gandhi Medical College and Hamidia Hospital served as control. All the subjects included in study had no known endocrinal, renal and cardiovascular disorder.

Subjects having FPG >126 mg/dl, abnormal ECG and taking hormonal therapy, hormonal contraceptive, lipid lowering drugs or drugs to control blood sugar level were excluded from the study.

Method: Baseline clinical characteristics, anthropometric measurements and biochemical data were recorded as per the standard

procedures. Subjects underwent clinical examination under standardized conditions.

Biochemical Analysis: 5 ml of the fasting blood samples were collected for further analysis of FPG, HbA1c, total cholesterol (TC), triglyceride, high density cholesterol (HDL) and low density cholesterol (LDL) .

All analytes were measured in Auto analyzer (Merck 300) using Kits supplied by Aggappe Diagnostics, Kerela. A1c was measured by Microcolumn method at recommended temperature range (21 – 26 °C). Plasma glucose was measured by glucose oxidase – peroxidase method.

Serum total cholesterol and triglycerides were measured by CHOD-PAP method and GPO-PAP method. Serum HDL-C was measured by precipitation method. LDL-C was calculated using Friedewald’s Formula (TC-(VLDL+HDL).

Dyslipidemia was defined based on National Cholesterol Education Programme NCEP-ATP III(2004) criteria.

The 8 Year Diabetic Risk was assessed using Framingham Risk Score(basedon: The Framingham Offspring Study, 2007)

10 years general cardiovascular risk was assessed by using Framingham risk score based on a general cardiovascular risk profile for use in primary care: The Framingham Heart study (2008).

Statistical Analysis: All values were expressed as mean ± standard deviation. Comparison of means between the two groups was done using a student t test. Bivariate correlations between variables were evaluated by Pearson’s correlation. Statistical analysis was done using SPSS version 16.00 (Statistical package for Social science)

Result: Prediabetics exhibited both central and generalised obesity. The blood pressure values were in the prehypertensive range(Table 1).

Table 1 : Comparison Of Baseline Physical Characteristics Of The Study Population

Parameters	Control Group (N = 60)	Prediabetic Group (N = 60)	P- Value
Age (Years)	45.3 ± 9.1	45.2 ± 8.9	N.S.
WC (cm)	83.1 ± 6.6	92.3 ± 9.7	< 0.0001
BMI (kg/m ²)	22.1 ± 1.4	26.1 ± 2.8	< 0.0001
SBP (mm Hg)	116.9 ± 8.7	131.5 ± 8.2	< 0.0001
DBP (mm Hg)	76.6 ± 5.5	87.1 ± 6.8	< 0.0001
Pulse Rate (RPM)	81.2 ± 8.1	82.2 ± 7.7	N.S.

Table 2 : Biochemical Parameters Of The Study Population

Parameters	Control (n = 60)	Prediabetic (n = 60)	P- value
FPG (mg/dL)	84.6 ± 8.1	113.2 ± 7.1	< 0.0001*
A1C (%)	4.8 ± 0.5	5.7 ± 0.5	< 0.0001*
TC (mg/dL)	150.1 ± 27.1	179.4 ± 25.2	< 0.0001*
TG (mg/dL)	116.7 ± 27.2	158.1 ± 21.8	< 0.0001*
HDL-C (mg/dl)	44.4 ± 6.8	34.9 ± 6.3	< 0.0001*
LDL-C (mg/dl)	82.70±23.6	111.66 ± 23.13	< 0.0001*

The A1c values in the range of 5.7-6.4(%) confirmed the presence of prediabetes in first degree relatives of T2DM patients. Central obesity and dyslipidemia confirmed the coexistence of metabolic syndrome in prediabetics.

Table 3: Comparison of 8 - year diabetic risk and 10 - year general cv risk

Prediabetics	8-Yr diabetic risk (%)	10-Yr CV risk (%)
Without metabolic Syndrome(n = 17)	13.6 ± 5.3	5.6 ± 3.2
With Metabolic Syndrome(n = 43)	26.2 ± 8.6	12.8 ± 9.9
Overall	23.1 ± 9.8	10.8 ± 9.1
Controls (n=60)	-	4.5 ± 3.1

As evident from the observation, coexistence of metabolic syndrome and prediabetes has increased the future diabetic and CV risk significantly.

Strong Positive correlation of FPG ,A1c level and dyslipidemia could be established with future CV and diabetic risk(Table- 4).

Table 4: Correlation of biochemical parameters with 8-yr diabetic risk and 10-year CV risk in the prediabetic group

Parameter	Correlation with 8-Yr Diabetic Risk (r)	Correlation with 10-Yr General CV Risk (r)
FPG (mg/dL)	0.55*	0.49*
A1C (%)	0.61*	0.73*
TC (mg/dL)	0.40*	0.34*
TG (mg/dL)	0.65*	0.37*
HDL- C (mg/dL)	-0.59*	-0.53*
LDL- C (mg/dL)	0.39*	0.34*

*Significant at 95% confidence interval

Discussion: According to Das et al. (2001)¹⁰ T2DM has a strong genetic component. T2DM often exhibits familiar aggregation, in their siblings nearly 4 fold increased risk for future T2DM compared with general population has been reported.

Tilburg et al. (2005)¹¹ suggested that the genetic contribution to T2DM arise from genetic variations in several genes, each confirm a small increase in the risk. These gene variations do not cause diabetes but increase its risk by interacting with other diabetes susceptibility genes, the metabolic environment of the body.

The present study investigated the existence of prediabetes in the first degree relatives of T2DM. Out of a total of 230 first degree relatives of T2DM, 60 subjects (29.5 %) were identified as prediabetic on the basis of Impaired FPG and A1c. Ma H et al (2011)¹² investigated the prevalence of prediabetes in the first-degree relatives (FDR) of patients with T2DM and reported that FDR of T2DM patients had greater standardized prevalence of diabetes than those without a family history of diabetes (26.6% vs. 9.2%).

In the present study, diabetic risk was assessed using Framingham Scoring as a Tool. Overall 8-year diabetic risk in prediabetic group was 23.1

± 9.8 %. A highly significant positive correlation ($p < 0.0001$) was found between FPG and A1c levels and diabetic risk ($r = 0.55, 0.61$)

Stephen M et al (2007)¹³ reported that about 3%–10% of people per year with prediabetes develop T2DM. Prediabetes confers about a six fold increased risk of T2DM compared with normal glucose tolerance. They reported that in most populations studied, the rates of conversion from IFG and IGT to diabetes were similar, with IGT having greater sensitivity but less specificity than IFG in predicting diabetes risk.¹²

The 10-year general cardiovascular (CV) risk in prediabetic group (mean 10.85 ± 9.19 %) was significantly higher than the control group (mean 4.51 ± 3.15 %). Numerous research studies indicated that the risk of CV disease maintains a linear association with glycemia well below the present diagnostic threshold for T2DM. Stephen et al (2007)¹³ reported that people with prediabetes have an increased risk of developing cardiovascular disease (CVD) and all-cause mortality. There was two- to three fold increased prospective risk of cardiovascular events.

They also reported that increased serum TG levels, decreased HDL-C levels were more common in adults with prediabetes compared with those with normal glucose tolerance. In the present study, a positive correlation was found between TC, TG and LDL-C levels and CV risk ($r = 0.34, 0.37, 0.34$). A strong negative correlation was found between HDL-C levels and CV risk ($r = -0.53$). Based on Updated NCEP ATP III Criteria (2004), existence of metabolic syndrome was identified in 7 % of the control and 72 % of the prediabetics.

Conclusion: Before people develop T2DM, they almost always have "Prediabetes"—blood glucose levels that are higher than normal but not yet high enough to be diagnosed as diabetes. The study recognized that the prediabetic state involves the presence of other cardiometabolic risk factors in addition to the elevated blood glucose. Strong correlation of

A1c could be established with 8- year diabetic Risk ($r = 0.61$)and 10-Year general CV risk ($r = 0.73$) suggesting use of A1c estimation to evaluate future risk . It is concluded that A1c levels below the threshold for diagnosis of diabetes($<6.5\%$) associated with dyslipidemia carry high future T2DM and cardiovascular risk. The study emphasises the need to lower A1c in prediabetics to avoid future long term complications

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Pulmonary Function Tests In Rural Women Exposed To Biomass Fuel

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Abstract: Background: Biomass fuel accounts for more than one-half of the domestic energy in most developed countries and as much as 95% in developing countries. As the combustion efficiency of biomass fuel is very low, it yields relatively high levels of products of incomplete combustion which may induce various harmful effects on the lung function. The aim of this study was to evaluate the effect of biomass fuel combustion on pulmonary function tests (PFTs) and comparing the PFTs between biomass users and Liquefied petroleum gas (LPG) users. Method: Three hundred healthy non-smoking women were randomly selected within the age group of 21-50years for this cross-sectional study. The study group comprised of 150 subjects who used biomass fuel for cooking (Biomass users) and 150 age matched subjects who were not exposed to biomass served as the controls (LPG users). A standardized respiratory questionnaire was administered to all the subjects and pulmonary function tests were evaluated by using spiro excel. Result: The lung function parameters were significantly lower the study group, exposed to biomass fuel than the controls FEV1 ($p<0.001$); FEV1/FVC ($p<0.001$) and PEFr ($p<0.001$), except FVC ($p<0.338$). The evaluation of PFTs suggested the increased risk to the obstructive type of pulmonary disease in biomass users. Conclusion: The reduction in the pulmonary function in the biomass exposed women could be due to high exposure to biomass pollutants with inadequate ventilation in cooking area leading to chronic pulmonary disease.

Key Words: Biomass fuel, Liquefied petroleum gas, Pulmonary function test.

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Introduction: Air pollution is generally perceived as an urban problem associated with automobiles and industries. But indoor air pollution emitted from traditional fuels and cooking stoves is a potentially large health threat in rural regions.

Air pollution is either due to gases or particulates. These, individually or in combination can cause respiratory impairment if inhaled in adequate concentration over a long period of time¹. Inhalation is probably the most important route of exposure in the workplace and is an inescapable route to toxins in the general environment.

Biomass fuel (wood, cow dung, crop residue) accounts for more than one-half of the domestic energy in most developed countries and for as much as 95% in developing countries². The adverse health effects of indoor air pollution are often exacerbated by lack of ventilation or by the poor design of stoves that do not have hoods to take smoke out of the living area. As the combustion efficiency of biomass fuel is very low, thus it yields relatively high levels of products of incomplete

combustion, like particulate matter, carbon monoxide, hydrocarbons, oxygenated organics, free radicals and chlorinated organics which are more damaging to health³.

Different studies have reported that the biomass smoke produced by combustion of solid fuels acts as a cause of acute upper and lower respiratory infection^{4,5}; chronic bronchitis/obstructive airway disease⁶⁻⁹; lung cancer¹⁰; asthma, pulmonary tuberculosis¹¹; low-birth weight babies¹².

Epidemiological studies have shown that pulmonary functions are decreased with long term/short term exposure to polluted air¹³. Therefore, the current study was carried out to evaluate the effects of biomass fuel combustion on pulmonary function tests in the women of villages in and around Mullana, Ambala (Haryana) and comparing the pulmonary function tests between biomass fuel users and non-users i.e. those using clean fuels like liquefied petroleum gas (LPG).

Material and Method: This cross-sectional study was conducted in Maharishi Markandeshwar Institute of Medical Sciences and Research, Mullana, Ambala, Haryana (India). Out of total 300 women, the study group (exposed to Chula smoke) consisted of 150 women from randomly selected rural background of the age group 21-50yrs, with exposure of 3-4 hours/day. 150 women formed the age-matched healthy control group (not exposed to Chula smoke) using LPG.

The anthropometric data i.e., age, height, weight, blood pressure, respiratory rate was noted and the subject's medical history was taken and clinical examination was also being done. Informed and written consent of all the subjects was taken before conducting the study. The Ethical clearance was obtained from the institutional human ethical committee.

Subjects were broadly categorized as follows:

Group I : Age group 21-30yrs.

Group II : Age group 31-40yrs.

Group III : Age group 41-50yrs.

Inclusion criteria:

- Females between the age group of 21-50 yrs.
- Females having 10yrs or more than 10yrs of exposure to Chula smoke, using biomass fuel wood, cow dung or crop residue.
- Females using separate enclosed outdoor kitchens.
- Females using biomass fuel for domestic cooking without any gap in between cooking duration.

Exclusion criteria:

- Females having less than 10yrs of exposure to Chula smoke.
- Females with respiratory problems and on treatment.
- Any chronic medications.
- Any chronic or morbid illness.
- Smokers.
- Pregnancy.
- LPG users.

Pulmonary function Test: Pulmonary function tests were performed using computerized spirometer, spiroexcel (Medicaid systems Chandigarh). It has a turbine flow meter and the range for flow measurement was 0-3L/sec. Range for volume measurement is 0-10L/sec.

Initially the subjects were made to sit comfortably and breathe in and out normally to familiarize themselves with the equipment. The subjects were then asked to inhale to their maximum capacity and then forcefully blow out into the sensor (nose clipped) as hard as and for as long as possible. This procedure was repeated and the best of three readings were considered for analysis. The parameters measured were Forced vital capacity- FVC (normal value >80% of predicted value), Forced expiratory volume in first second- FEV1 (normal value >75-80% of predicted value), Ratio of FEV1/FVC (normal value >70% of the predicted value), Peak expiratory flow rate- PEFR (normal value of about 380-500L/min or 6-9L/sec).

Statistical analysis: Statistical analysis was done with the SPSS software. Independent t-test was used for the comparison between the groups and One Way ANOVA followed by Post Hoc Multiple comparisons was applied for comparison of age groups within each group and odd ratio was calculated on the basis of PEFR. $p < 0.05$ was considered as significant.

Result: A total of 310 women were approached from the villages in and around Mullana, Ambala, Haryana for assessing the pulmonary function tests. Of which only 300 women agreed to pulmonary function tests. Further two groups were formed, Biomass users and LPG users consisting of 150 women each of the age group of 21-50 years (3-4hours/day exposure). The mean age and BMI of the Biomass and LPG users was 36 ± 9.11 and 35 ± 4.77 years; 18.87 ± 1.63 and 23.65 ± 1.37 kg/m^2 respectively. All the subjects were asymptomatic without any respiratory symptoms.

The mean of all the parameters (FVC, FEV1, FEV1/FVC and PEFR) of biomass and LPG users is shown in table 1. The lung functions except

Table 1: Comparison of PFT values of biomass exposed women and LPG users exposed

Parameters	Biomass users	LPG users	p-value
FVC(L)	1.7±0.52	1.89±0.16	p<0.338
FEV1(L)	1.34±0.41	1.78±0.13	p<0.001
FEV1/FVC (%)	79.88±11.2	85.24±2.99	p<0.001
PEFR (L/sec)	2.36±1.07	9.16±1.24	p<0.001

Table 2: PFT values in different age groups of Biomass & LPG users

Parameters	Groups	Biomass Users	LPG Users	p-value
FVC (L)	I	1.85±0.46	1.91±0.16	p<0.33
	II	1.77±0.5	1.86±0.15	p<0.24
	III	1.48±0.52	1.88±0.16	p<0.001
FEV1 (L)	I	1.45±0.36	1.79±0.13	p<0.001
	II	1.34±0.4	1.79±0.13	p<0.001
	III	1.24±0.46	1.76±0.13	p<0.001
FEV1/FVC	I	83.61±9.05	96.1±1.74	p<0.001
	II	79.57±11.22	96.1±1.74	p<0.001
	III	76.45±12.15	93.5±4.07	p<0.001
PEFR (L/sec)	I	2.8±1.14	9.29±1.24	p<0.001
	II	2.43±1.23	9.29±0.12	p<0.001
	III	1.85±0.46	8.9±1.22	p<0.001

Table 3: Risk of obstructive lung disease in biomass and LPG users.

Study Population	Obstructive Type	Normal Pulmonary Function	Total
Biomass users	67	83	150
LPG users	23	127	150
Total	90	210	300

OR = 4.45 CHI-SQ = 30.73 P<0.0001 (HS)

FVC (p<0.338), reduced significantly (p<0.001) in case of biomass users as compared to LPG users. From table 2, it is clear that with increasing age and duration of exposure to biomass fuel combustion, the pulmonary functions reduced significantly (except the group I and II of FVC) in biomass users compared to LPG users. Further, Odd's ratio (OR) was calculated to compare the risk of obstructive lung disease in biomass and LPG users on the basis of PEFR (Table 3). OR

calculated was 4.45; which was highly significant (p<0.0001). PEFR as one of the main indicators of obstructive lung disease hereby indicates high risk of developing obstructive disease in biomass users as compared to LPG users.

Discussion: The effect of biomass fuel on pulmonary functions in current study showed that, Forced Expiratory Volume in one second (FEV1), FEV1/FVC, Peak Expiratory Flow Rate (PEFR) values in the biomass group were significantly decreased (p<0.001) when compared to that of LPG groups. The decrease in the lung function in biomass fuel users may be due to the chronic inhalation of particulate matter and toxic gases emitted during biomass combustion leading to inflammatory changes.

FVC was reduced in biomass users as compared to LPG users but not significantly which could be due to minor changes in the lungs by the chronic irritation of biomass combustion products. FEV1 and PEFR reduction in the pulmonary function tests was highly significant and could be due to obstruction of airways during expiration. The FEV1/FVC ratio in biomass group was below the normal which indicates high risk of obstructive type of lung disorder, which was highly significant. The risk was calculated between biomass and LPG users on the basis of PEFR by Odd's ratio (OR=4.45), which was highly significant (<0.0001). Many earlier studies also showed association of exposure to biomass fuel (wood, cow dung cake and crop residue) with higher levels of indoor air pollution and with increased incidence of pulmonary diseases. Studies conducted in early 1980s found a higher occurrence of chronic bronchitis and cor pulmonale in rural women exposed to chulas fuelled with cow dung cakes and firewoods.

Few studies have suggested a link between indoor air pollution from the use of solid fuels and tuberculosis^{11, 14}. Desai and colleagues¹⁵ taking into account various studies have estimated that exposure to solid fuel smoke exacerbates asthma with a relative risk of 1.6 for children between 5-14years and 1.2 for

persons older than 15 years. The adverse health effects of indoor air pollution are often exacerbated by the lack of ventilation in homes using biomass fuel and poor design of stoves that do not have hoods to take smoke out of kitchens.

The present study showed a significant relationship between biomass fuel combustion and decrease in lung function. This could be due to exposure to high concentration of respiratory irritants emitted during biomass fuel combustion and poor ventilation. Thus decline in lung function in biomass fuel exposed women can be avoided by improving adequate household ventilation, by improvement in stoves and change of the fuel type for cooking and heating.

Conclusion: The healthy non-smoking women using biomass fuel for cooking had sub clinical respiratory impairment, identified by pulmonary function tests, which are sensitive and simple tests to identify early respiratory impairments. Indoor pollutants liberated from incomplete biomass fuel combustion may be risk factor for pulmonary diseases like COPD.

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Gender Differences In Preferences Of Various Modalities Of Learning Styles Among Undergraduate Medical Students

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Abstract: Background: Learning style in students can vary by preferences of various modalities as visual (learning from graphs, charts, and flow diagrams), auditory (learning from speech), read-write (learning from reading and writing), and kinesthetic (learning from touch, hearing, smell, taste, and sight). These preferences can be assessed using the VARK questionnaire. The purpose of the study is to find if gender differences in learning style preferences is present among undergraduate students. Method: We administered the VARK questionnaire to 100 undergraduate students (50 males and 50 females). Result: The responses were assessed for gender difference in learning style preference. 54% of females and only 18 % of males preferred a single mode of information presentation. Among students preferring unimodal way of presentation the female students 30% preferred auditory mode, 2 % visual, 10% preferred printed words and 12 % preferred kinesthetic mode. In contrast, male students were evenly distributed in preference, with 8% of the students preferring auditory or kinesthetic mode each and 2% preferred reading mode. 46 % of female and 82 % of male preferred multiple modes. Conclusion: To conclude majority of males preferred multiple modes of information presentation. Male students may adjust to the different teaching styles. In contrast; the majority of female students preferred a single mode of information presentation. Although female learners can use all of the sensory modes in learning, one mode is dominant and preferred. Thus, male and female students have significantly different learning styles. It is the responsibility of the instructor to address this diversity of learning styles and develop appropriate learning approaches..

Key Words: Learning styles, VARK, gender, medical education.

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Introduction: Men and women are different but do these differences extend to learning styles? Do the evolutionary biology and the social influences have a say in the preferences in learning styles of the students? There is always an emotional debate regarding gender differences in various learning aspects. This debate is further inflamed by questions regarding “innate differences” between males and females and theories that claimed that women were biologically incapable of reason¹. We ask these questions because the answers may dramatically alter the ways in which we teach.

Male and female are physiologically different. These variances have a biological basis. These differences are found in various sense organs as well which may influence the pattern preferred in learning. In visual perception male eyes are generally more sensitive to motion whereas female eyes are more sensitive to color differentiation². This is due to the difference in distribution of rods and cones in the eye.

Females are also more sensitive to sound than males². Apart from this male and female brains vary in their myelination, structure, function, and chemistry³. Brain volume is greater in men than women and women have a higher percentage of gray matter and men a higher percentage of white matter. Global cerebral blood flow is higher in women than in men. Sex-specific differences indicate that male and female brains are neurochemically distinct⁴. Some of these brain differences can be seen during puberty and in females are linked to sex hormones. Gender based differences in vision, hearing, and brain structure should be important to classroom educators because these factors affect how students perceive and process information about the world. If teachers can better understand the biological variance between the genders then they can be better prepared to anticipate and accommodate their student's needs.

If teaching approach are adapted to meet the different learning style preferences of the

students it can improve their performances⁵. Learning style preferences are the manner in which, and the conditions under which, learners most efficiently and effectively perceive, process, store, and recall what they are attempting to learn⁶. Knowing the students learning style preferences and the gender differences will aide in the development of the most effective teaching approaches⁷.

There are a number of different ways to define and assess learning styles, but one of the more practical and recently popular ways to do so is according to the sensory modality that one most prefers to use when learning. As Bruner⁸ and Piaget⁹ observed, the four different sensory modalities that humans use to assimilate information are visual, auditory, reading/writing, and kinesthetic (VARK). Flemming than built on this concept an online questionnaire¹⁰ that categorizes learning styles on the basis of VARK modality preferences.

Learners with a V preference learn best by seeing or observing (drawings, pictures, diagrams, demonstrations, etc.). Learners that prefer an are best suited to learn by listening to or recording lectures, discussing material, and talking through material with themselves or others. R-type learners learn through interactions with textual materials. K-style learners perform best by using physical experiences: touching, performing an activity, moving, lessons that emphasize doing, and manipulation of objects

Although no student is restricted to only one sensory mode for learning, a stronger preference for one particular mode may exist. According to the VARK questionnaire, the first preference is the sensory modality that obtains the highest score, and, depending on the score distribution among the four sensory modalities, there are unimodal and multimodal (bimodal, trimodal, and quadmodal) students¹¹.

Through this study we were interested in assessing the preferred learning styles of students to determine if males and females have similar learning styles. To achieve these

Aim, we tested the hypothesis that males and females have different learning style preferences. Fleming's¹⁰ VARK inventory tool (version 7.2) for assessing individual learning style preferences was administered to our students.

Material and Method: To test the hypothesis that males and females have different learning style preferences, the VARK questionnaire developed by Fleming was administered to our undergraduate students. VARK was selected due to its ease of use (a simple 16-question survey), it (English version) was recently validated¹², its free availability online for both students in this study and for readers of this article who may wish to use this tool in their classroom. In addition, this tool offers both students and instructors a method to enhance student learning by better understanding preferred modes of information transfer.

100 undergraduate physiology students, 50 males and 50 females from B.J. Medical College (admitted in 2012) participated in this study. The english version of the VARK test which is a self-reported multiple-choice questionnaire was given to the students in hard copy and were asked to fill in their responses. Students were informed that there were no right or wrong answers. Other relevant explanations, such as "answers should represent what you would really do in the context of each question and not what you believe is expected to be done" were also given to them .

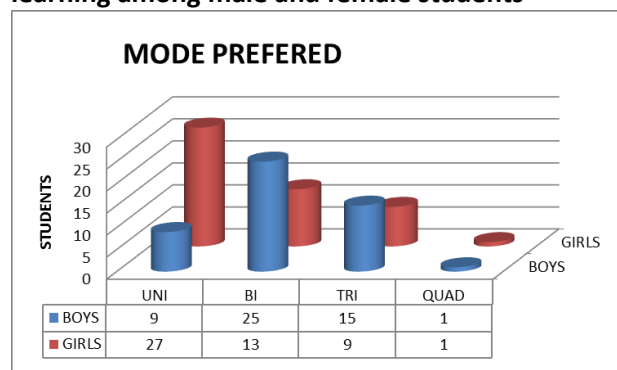
Their responses were categorized according to the scoring chart of the VARK questionnaire. The 100 students that participated in the study were classified according to their preferred sensory modality for learning as V, A, R, or K learners. The preferred sensory modality was the modality that obtained the highest score in each individual VARK questionnaire. When two or more sensory modalities got the same first score (tied) they were classified as bimodal, trimodal or quadmodal depending on number of sensory modalities with same first score. Thus the scoring also allowed discrimination between students that mainly use one sensory

modality for learning (unimodal students) and those that use two or more sensory modalities (multimodal students).

Data are reported as percentages of students in each category of learning style preference. The number of students who preferred each mode of learning was divided by the total number of responses to determine the percentage.

Result: Most females preferred unimodal learning, whereas males preferred multimodal learning. Specifically, 54% of females and only 18% of males preferred a single mode of information presentation. Of the females who preferred multiple modes of information presentation 46%, 26 % of the students preferred two modes (bimodal), 18% of the students preferred three modes (trimodal), and 2% of the students preferred four modes (quadmodal). Of the males who preferred multiple modes of information presentation (82%), some preferred two modes (bimodal, 50%), three modes (trimodal, 30%), or four modes (quadmodal, 2%).

Fig 1: Preferences of different sensory mode of learning among male and female students

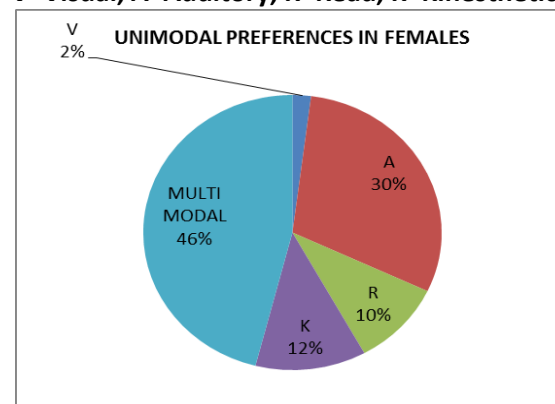


Of the female unimodal learners, 2% of the students preferred V, 30% of the students preferred A, 10% of the students preferred R, and 12% of the students preferred K. In contrast, males were evenly distributed in unimodal preference with 8 % of the students preferring A or K, 2% of the students preferred A, whereas 0% of the students preferred V.

Among the students who preferred bimodal in females (26%), 4% preferred V with A, and R with K each, while 10% preferred A with R, 8%

preferred A with K. Among bimodal male (50%), 22% preferred A with K, 2% preferred V with K, 6% preferred R with K, 16% preferred A with R, and 4% preferred A with V. Of the female students who preferred three modes of information presentation, some students preferred V, R, and K (2%), some students preferred V, A, and K (6 %), some students preferred V, A, and R (6 %), and some students preferred A, R, and K (4%). Of the male students who preferred three modes of information presentation some students preferred V, A, and K (12 %), some students preferred V, A, and R (8 %), and some students preferred A, R, and K (10%). Both the groups had 2% students who preferred all four modes V, A, R and K equally and were quadmodal.

Fig 2A: Unimodal preferences in females
V=Visual, A=Auditory, R=Read, K=Kinesthetic



Bimodal was the preferred style among male multimodal learners, whereas females had a variety of preferences.

Fig 2B: Unimodal preferences in males
V=Visual, A=Auditory, R=Read, K=Kinesthetic.

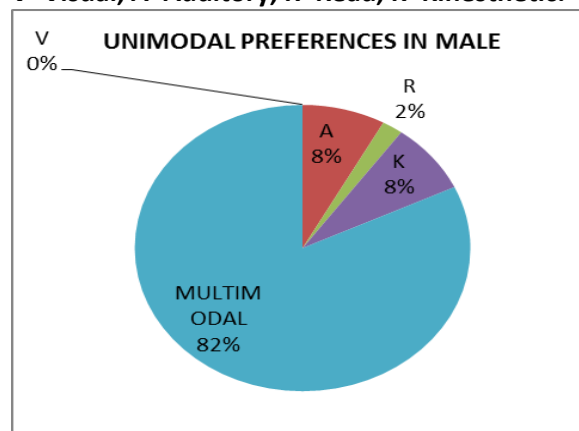


Fig 3A: Multimodal preferences in females
V=Visual, A=Auditory, R=Read, K=Kinesthetic

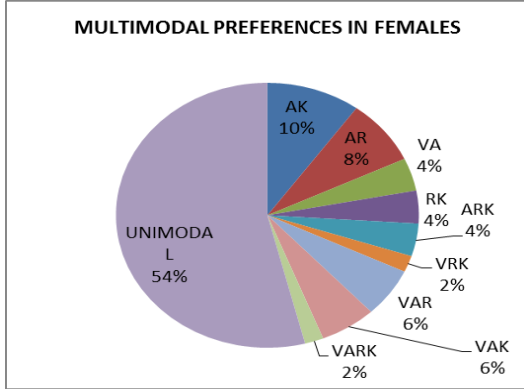
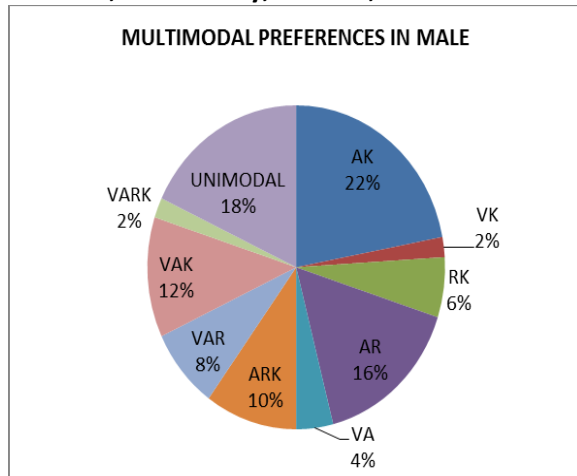


Fig 3B: Multimodal preferences in males
V=Visual, A=Auditory, R=Read, K=Kinesthetic



Discussion: The purpose of the study was to assess gender differences in learning style preferences among undergraduate students. This study was performed as a follow up to Lujan and DiCarlo’s assessment of learning styles preferences among first-year medical students, which showed that among medical students, only 36.1% of the students preferred a single mode of information presentation. In contrast, most students (63.8%) preferred multiple modes of information presentation⁵. In that study, the authors suggested that gender differences in learning preferences be assessed. To address this important issue, we administered the VARK questionnaire to undergraduate students and asked students to voluntarily provide information. The responses were tallied and assessed for gender differences in learning style preferences. Importantly, 82 % of males but only 46 % of females preferred

multiple modes of presentation. This result in accordance to another study on undergraduate physiology majors students enrolled in a capstone physiology laboratory at Michigan State University¹³. Thus, in contrast to females, the majority of males preferred multiple modes of information presentation. Male students may adjust to the different teaching styles faced in a day or they may opt in and out of alternative strategies, such as being visual in cardiovascular physiology and reading/ writing in respiratory physiology, for example¹⁴.

In contrast, the majority of female students (54%) preferred a single mode of information presentation, either V, A, R, or K. Unlike male students, females preferred information to be presented in a single mode. Although female learners can use all of the sensory modes in learning, one mode is dominant and preferred. Some students, male or female, may prefer one of the modalities over the others so strongly that they struggle to understand the subject matter unless special care is taken to present it in their preference mode. The knowledge of student preferred learning styles is vital if we, as educators, can provide tailored strategies for individual students¹⁴. Knowing students preferred learning style also helps to overcome the predisposition of many educators to treat all students in a similar way¹⁴ as well as motivate teachers to move from their preferred modes to using others. In so doing, they can reach more students because of the better match between teacher and learner styles^{5,15, 16, 17, 18}.

The results of the VARK questionnaire should convince teachers to use multiple modes of information presentation. This may require instructors to stray from their own preferred modes of teaching and learn to use a variety of styles, which will positively affect learning.

In some cases, it may be difficult to tailor coursework to the individual learning styles of each student. However, in these situations, by being aware of their learning style, the students may contribute to their academic success by promoting self-awareness and their use of

learning strategies that work for their learning style. A gender-based preference in learning style is one area in which males and females are unique. It has been reported that males have a preference for rational evaluation and logic, whereas females use “elaborative” processing in which they tend to seek personal relevance or individual connections with the material being taught¹⁹. In addition, males tend to be more achievement oriented, whereas females are more socially and performance oriented²⁰. The genders also differ in their beliefs about what is most important to student learning, with females ranking social interaction with other students and self-confidence as higher than males²¹. Furthermore, males are likely to attribute their success in the classroom to external causes, such as teaching, whereas females generally see their success as being directly related to their efforts in the classroom²². This suggests that males tend to be more externally focused, but females tend to be more introspective and self-critical.

The VARK philosophy encourages a belief that everyone can learn if their preferences are addressed. In addition, VARK encourages teachers to respect differences and reject negative judgments about learners. VARK promotes the idea that students are able to learn in different ways, providing that the Method of teaching are appropriate to the student’s preferences.

VARK also has support among practitioners and encourages a range of teaching and assessment techniques. VARK encourages flexibility and imagination in designing resources and in changing environmental conditions. It changes the teachers focus as they begin to respond more sensitively to the different learning preferences of their students. VARK also encourages teachers to re examine their own learning and teaching styles.

Future directions. It has been established that there are a variety of learning styles present in the classroom, and, as such, there are some students that are not reached by the standard lecture format. Furthermore, this study demonstrated that there are gender differences

in learning styles such that males tend to be multimodal and females tend to be unimodal. Several issues still need to be addressed. In particular, does learning style preference correlate with performance? Does student knowledge of their learning style allow them to perform better by adapting the information to their own preferred modality while studying or by finding study partners that can present the material in an alternative manner? Do K-style learners have the advantage in hands-on laboratory courses? Do A-style learners excel in the standard lecture format? Importantly, how does the accommodating to learning preference really alter learning outcomes?

Conclusion: Student learning style preferences can be determined by the use of the VARK questionnaire, which can assist both the learner and educator in identifying individual student preferences in the manner in which information is presented. There is a significant difference in learning style preferences between males and females. As such, it is the responsibility of the instructor and the student to be aware of student learning style preferences to improve learning. As instructors, we need to assess and understand how to reach all students by understanding how to present information in multiple modes. We can help students more effectively; both in and out of the classroom, if we are aware of their learning style and can assist them in determining their preferences. As a student, it is vital to be self-aware of preferences to adjust study techniques to best fit each individual, even when the information and instruction provided does not match the preferred style.

It is important to note that the results do not suggest that there is an innate difference in aptitude between genders²³, nor is it promoting separation of genders in the learning process (i.e., separate science classes for males and females). This study asserts that males and females have difference preferences in learning style. As suggested by Lie et al. This actually supports mixed gender classrooms and study groups to allow both genders the opportunity to learn from each other.

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Comparison of Regional Variation Of Body Composition In Type 2 Diabetics And Matched Controls Of An Urban Area Of Gujarat, India Using Bio-Electrical Impedance Method

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Abstract: Background: Obesity and type 2 diabetes are closely related and as such both affect components of body composition which can be studied by various non-invasive tools available. We try to study regional body composition of type 2 diabetics in comparison to matched controls and to correlate differences observed if any. Method: A heterogeneous sample of 60 under treatment type 2 diabetics of either sex with known glycaemic and lipidaemic control and equal number of age and sex matched controls were taken from our city. After baseline assessment direct measurement was done by instrument Omron KaradaScan (Model HBF -510, Japan). Using principle of tetra poplar bioelectrical impedance analysis (BIA) we derive regional distribution of subcutaneous fat and skeletal muscle in both groups and compare them for statistical significance. Result: We found significantly more subcutaneous fat in all regions (mean values -trunk 27.30%, leg 36.63%, arm 39.36%) and significantly lesser mass of skeletal muscle in all regions (mean values -trunk 18.57%, leg 33.58%, arm 26.49%) in type 2 diabetics as compared to controls. Females had more subcutaneous fat in all regions as compared to males (average mean difference 10%) and lesser skeletal muscle in all regions compared to males (average mean difference 3%) with significance only for the previous and not the later parameter. Conclusion: BIA reveals that type 2 diabetics have excess subcutaneous fat in all body regions on expense of skeletal muscle with female disadvantage. Body composition analysis can be included as a strategy in managing metabolic derangements of type 2 diabetes.

Key Words: Bio-electrical impedance, body composition, regional distribution, subcutaneous fat, type -2 diabetes.

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Introduction: Type 2 diabetes is now on the verge of becoming pandemic in developing countries like India¹ and obesity has gained state of serious health related issue in South Asian countries.² Obesity is often the precursor of type 2 diabetes and its measures are important to regulate even after inception of the same. Regional distribution of fat especially that of trunk³, is important parameter to be considered in context of insulin resistance. There is a spectrum of Method available to assess body fat and muscle composition as simple as BMI and as advanced as MRI.⁴ Bio-electrical impedance analysis (BIA) is a simple, validated⁵, cost-effective fairly accurate and objective method to assess distribution of the same and it is really handy one for evaluating type 2 diabetics for whom managing optimum body composition is a part of therapeutic aim

and a measure of prognostic betterment. Still there is lack of awareness regarding this tool and parameters being measured by it in our country with no such study being reported from our region. By this study we try to evaluate regional distribution of subcutaneous fat and skeletal muscle in under treatment type 2 diabetics patients in comparison to matched controls.

Material and Method:

Study design:- Present cross sectional observational study was carried out from January 2013 to August 2013 in clinical research lab, department of Physiology, Government medical college, Bhavnagar, Gujarat.

Study sample:- Sample size of 60 for current population and prevalence of disease yield us

95% confidence interval keeping margin for error 5% as calculated by RaoSoft Sample Size calculator software.

Study subjects:-After getting approval from Institutional Review Board and informed consent from participants, the study was carried out in type 2 under-treatment ambulatory diabetics and matched healthy controls. Subjects were recruited from medicine OPD of a tertiary care teaching hospital attached to our college and from private OPDs.

Inclusion criteria- Case: - 60 Type 2 diabetics (34 males and 26 females) were undertaken in age group 30 to 80 years, not taking insulin, taking regular medicines, and having recent investigation for glycaemic or lipidaemic control. To increase heterogeneity we took cases with and without hypertension, with and without statin therapy, with or without family history of type 2 diabetes, coming from various socioeconomic statuses, doing work with varying degrees as to make a fairly representative sample of the population. Control: - We recruited 60 non-diabetic controls from the community who were matched by age, sex, socio economic status and intensity of work being done with cases.

Research method :- Subjects meeting inclusion and exclusion criteria were registered for study with initial assessment in the form of informed consent, personal history, medical history, anthropometric measurement and recent reports of glycaemic controls including FBS,PP2BS and Hb1Ac and lipidaemic control were taken.

Body composition measurement:-After entering age, gender and height taken by standiometer subject was allowed to stand on the instrument after its calibration. A digital, portable non-invasive instrument Omron KaradaScan (Model HBF-510,Japan) working on principle of tetra polar bioelectrical impedance analysis was used that passes electric current of 500 μ Amp at frequency 5 kHz to scan the whole body to derive regional body composition.

Statistical analysis: - The data was transferred on Excel spreadsheet and descriptive analysis was expressed as mean \pm standard deviation. All calculations were accomplished by Graph Pad InStat 3 software. We evaluated difference between both groups for baseline data, body composition parameters by student t test. Any observed difference was considered statistically significant with P value <0.05.

Result: Table 1 shows comparison of baseline data of case and control group showing that they are well matched in age, gender and height. However BMI was higher in diabetics than matched controls.

Table 2 shows comparison of regional distribution of subcutaneous fat and skeletal muscle between two groups. In general diabetics showed significantly higher subcutaneous fat and lower skeletal muscle mass as compared to controls which are evident for all regions. Table 3 shows effect of gender on body composition in ca group wherein females showed significantly more subcutaneous fat and less skeletal muscle than males.

Table 1: Baseline data of study and control group

Para meters	Case (n=66)	Control (n=66)	p value
Age	53.08 \pm 10.41	52.85 \pm 10.80	0.9045
Gender	M=34, F=26	M=34, F=26	
Height (cm)	160.18 \pm 8.48	159.07 \pm 6.16	0.4109
Weight (kg)	68.37 \pm 11.82	59.70 \pm 9.80	0.0001
BMI (kg/m ²)	27.65 \pm 6.98	23.91 \pm 3.39	0.0003

Table 2: Comparing regional distribution of subcutaneous fat(%) between case and control group

	Case	Control	p value
	Mean \pm SD	Mean \pm SD	
Trunk	27.3 \pm 7.53	22.86 \pm 6.88	0.0011
Leg	36.63 \pm 10.52	27.87 \pm 8.10	0.0001
Arm	39.36 \pm 11.80	29.02 \pm 9.21	0.0001

Table 3: Comparing regional distribution of skeletal muscle (%) between case and control group

	Case	Control	p value
	Mean±SD	Mean±SD	
Trunk	18.57 ±3.92	25.9 ±3.92	0.0001
Leg	33.58 ±9.04	37.48 ±8.91	0.0190
Arm	26.49 ±7.24	35.21 ±8.05	0.0001

Table 4: Comparing regional distribution of subcutaneous fat and skeletal muscle (%) between male (n=34) and female (n=26) cases

S/c Fat	Male	Female	p value
	Mean±SD	Mean±SD	
Trunk	24.73±8.13	30.15±5.62	0.0044
Leg	31.23±7.42	42.81±10.23	0.0001
Arm	32.75±10.22	46.91±8.56	0.0001
Skeletal Muscle	Male	Female	p value
	Mean±SD	Mean±SD	
Trunk	19.20±3.42	17.85±4.38	0.1871
Leg	34.89±10.62	32.09±6.67	0.2339
Arm	29.70±6.71	22.82±6.05	0.0001

Discussion: Out of 135 million diabetics around the world nearly one third is in India and it is projected to reach 80.9 million by the year 2025.⁶ It is further compounded by obesity that doubles the cost of management.⁷ For given BMI, South Asians have greater adiposity and visceral and ectopic adipose tissue accumulation.⁸ BMI, though used as a simple mean to define obesity, does not actually demarcate between fatty and fat free mass. Few studies have revealed more adverse fat distribution at BMI > 21 kg/m² in South Asians as compared to Caucasians in whom considerable dyslipidemia and dysglycaemia are not seen until BMI exceeds 30 kg/m².⁹ With this propensity it seems quite worthwhile to know body composition and body fat percentage in high risk obese subjects and type 2 diabetics. We found excess subcutaneous fat in all regions of body in type 2 diabetic as compared to matched controls in descending order of arm, leg, trunk. Lesser subcutaneous fat despite overall increase in body fat points that there is probably redistribution of fat from subcutaneous to visceral ectopic loci and

visceral fat amplification runs parallel to the increased subcutaneous fat. Increase in subcutaneous and visceral fat is often seen in pre-diabetes and a graded association is seen once the disease has occurred.¹⁰

Glycaemic control was seen in just 11 out of 60 and lipidaemic control was seen in 24 out of 60 cases with mean duration of diabetes being 7.5 years so it is obvious to look the results observed more cautiously as strict blood sugar control was not observed in most of the cases that is one of the feature of Indian diabetics.⁷ Diabetes is not merely a disease of disturbed glucose homeostasis and rather it is “more a disease of lipid than of carbohydrate”.¹¹ The phenomenon of ectopic fat deposition as seen in our case of obese diabetics is proven to be due to alteration of components of the immune system that damages adipose tissues, liver and pancreatic islets that ultimately leads to dyslipidemia and ectopic fat deposition¹², most of which is hormone insensitive. Similarly protein wasting is one of the most serious of all the effects of severe diabetes mellitus that can lead to extreme weakness as well as many derangements in the functioning of organs.¹³ The same immune alteration in type 2 diabetics that leads to fatty changes also induces activation of leucocytes, apoptosis and fibrosis that ends in muscle wasting and cachexia. Decreased skeletal muscle mass is also due to higher percentage of intra muscular adipose tissue (IMAT).¹⁴

On checking gender bias for body composition, it was evident that females have more subcutaneous fat in arms, legs and trunk and lesser muscle mass as compared to male diabetics. However, the gender difference for skeletal muscle was almost similar in diabetics as compared to control group. Asian women carry greater abdominal and visceral fat as compared to whites with similar overall obesity.¹⁵ The underlying explanation is (i) more waist circumference for a given level of BMI compared to men ¹⁶(ii) susceptibility to accumulate more abdominal adiposity after menopause. Second is a very valid reason as age of onset of diabetes is around

premenopausal period and the mean age of females on our study was 50 years.¹⁷ As it is evident from few previous studies^{18,19} that subcutaneous fat is more important than visceral fat as a predictor for insulin resistance it is easy to understand that females having more subcutaneous fat than males are at higher risk of metabolic disorder. Men tend to accumulate more adipose tissue in the abdomen while women tend to accumulate fat in the gluteal-femoral region, partly due to difference in androgen and/or oestrogen actions in vivo.^{20,21} We observed the same distribution pattern and that is one of the cause for female disadvantage in this regard.

It is obvious that type 2 diabetes poses a significant risk to the body composition and balance between fat and protein both in quantity and quality. Skeletal muscle atrophy associated with enhanced subcutaneous fat deposition is an unwanted outcome of the disease and severity of its progression correlates well with extent to which metabolic derangements are kept in check in type 2 diabetes. BIA method helps to know body composition in at risk persons for DM to prevent inception of disease as primary prevention monitor the therapy to guide appropriate interventions. In type 2 Diabetics, to keep metabolic abnormality in check as a mean of secondary prevention and to keep life threatening events minimum by awareness of patients and doctors about body composition. This simple but objective method can be used by practitioners and patients themselves to monitor body composition and therapy would be something beyond doing exercise, taking Oral hypoglycaemic agents, diet restrictions and having hypolipidaemic agents. At least one can monitors the exact change in body composition and patient care may be improved by this.

Conclusion: Type 2 Diabetics of our region, on analysing body composition by BIE, have more subcutaneous fat in all regions of body as compared to matched controls and decline in skeletal muscle mass. Females have more abnormal fat distribution than males. Monitoring of body fat distribution by simple

method of BIE offers a mean to be more precise in combating the challenge of treating type 2 diabetes patients.

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Sympathetic Response In Chronic Tension Headache After Rajyoga Meditation

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Abstract: Background: We aimed to investigate the effect of Rajyoga meditation on autonomic reactivity in chronic tension type headache patients by studying its impact on blood pressure and heart rate. Method: The study was conducted on 50 chronic tension type headache (CTTH) patients, who were on similar analgesics and muscle relaxant drugs. They were randomized into two groups- meditators (n=30; age 32.20 ± 1.88 years) and controls (n=20; age 34.65 ± 11.21 years). The meditators were taught Rajyoga meditation and practised for 20 mins /day, 7 d /week for 8 weeks. The control group did not practice any type of yogic exercises or relaxation techniques. Blood Pressure (BP) and Isometric handgrip (IHG) test were assessed at 0 week and after 8 weeks. Descriptive statistics of the mean, standard deviation were used. The data were analyzed using student 't' test. One way analysis of variance (ANOVA) was applied to find the significance. Result: The basal cardiac parameters viz heart rate and blood pressure were uniformly lower in meditators than non-meditators. On performing isometric handgrip test, non-meditators developed significant increase in blood pressure and heart rate during gripping than that seen in meditators. In meditators significant reduction in SBP, and DBP and HR were found during IHG test after 8 weeks of meditation practices as compared to baseline recording. Conclusion: Rajyoga meditation is effective in reducing BP in resting conditions in CTTH by decreasing the sympathetic reactivity. It is also found to normalize cardiovascular autonomic function in stressful conditions as proved by IHG test results. Rajyoga meditation is the simplest, economical, effective and applicable method that can be adopted by clinicians in CTTH patients as an adjuvant to drugs.

Key Words: Autonomic nervous system, Chronic Tension Type Headache, Rajyoga Meditation.

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Introduction: Tension type headache sometimes referred to as stress headache, is a bilateral, pressure like headache of mild-to-moderate intensity that can last from 30 minutes to 7 days and has only one accompanying symptom (e.g. nausea, vomiting, photophobia or phonophobia)¹. It is the most common type of primary headache and accounted for nearly 90% of all headaches and has been associated with chronic and episodic tension-type headache forms. In episodic Tension Type Headache there are less than 15 and in Chronic Tension Type Headache (CTTH) there are at least 15 attacks per month². The pathogenesis of CTTH is poorly understood. As the condition is mostly associated with the sympathetic nervous system, impaired functioning of sympathetic system is said to be the pathogenesis^{3, 4}.

Poor response of CTTH patients to traditional drug therapies calls for a multidimensional therapeutic approach. Psychosocial and other mind-body approaches and relaxation modalities like diaphragmatic breathing, deep

muscle relaxation, self-hypnosis and autogenic techniques like biofeedback, yoga and meditation offer useful options for reducing stress-related aspects of headache and for managing pain⁵. Spirituality and meditation has established its role in various psychosomatic problems⁶. Meditation produces specific neural activation patterns involving decreased limbic arousal in the brain, which in turn results in reduced stress and increased autonomic stability^{7, 8}. Some scientists have demonstrated the effects of meditation on parameters like Galvanic Skin Resistance (GSR) and EDR only⁹. Various types of meditations like integrative body-mind training (IBMT), Yogic asanas and mindfulness meditation have been used to study their effect on ANS¹⁰⁻¹². This study was done to investigate the effect of Rajyoga meditation on cardiovascular autonomic responses (BP & HR) in CTTH patients using isometric hand grip (IHG) test.

Rajyoga Meditation: It is a behavioral intervention primarily concerned with the mind.

This yoga (yoga of meditation) is associated with the organization of 'Brahmakumaris' and has its headquarters at Mount Abu Rajasthan, India. This organization has its ashrams throughout India and in other countries as well. In this form of meditation the individual sits in a relaxed & comfortable position with their eyes open, and with gaze fixed on a meaningful symbol (a light) & then uses visual or auditory images for concentration. Whenever the mind wanders away, it is brought back to the visual or auditory image, being used quietly & persistently. This helps one to proceed to "dhyana" or meditation¹³. At the same time they actively think positive thoughts about a Universal force pervading all over, as light and peace¹⁴. This technique requires considerable commitment and involves concentrated thinking but is simple to practice.

Material and Method: The present study was carried out in the department of Physiology, Sri Guru Ram Das Institute of Medical Sciences & Research Amritsar, Punjab, India. The protocol of the study was approved by the ethics committee of our institute. Fifty patients of CTTH aged 20-50 years of age were selected for study. CTTH was diagnosed by the criteria laid down by the International Headache Society for Chronic Tension Headache¹. These patients were undergoing treatment for CTTH in the psychiatry department of the same institute. The inclusion criteria was the presence of primary headache with duration more than 4 hrs a day and frequency of 15 or more days monthly for at least 6 months. Patients with headache less than 6 months, post traumatic headaches, headaches due to sinusitis, eyestrain, cervical spondylosis and severe depression were excluded from the study. All the patients were on a similar drug regime of analgesics and muscle relaxants. The methodology of the project and the need for regular follow up was emphasized to them. The subjects were divided into 2 groups, Group A-Meditators (n=30) & Group B -Non-Meditators or controls (n=20). The patients in both the groups were comparable regarding age, sex and social status. There were more females than males and more married people than unmarried

ones in both the groups. Blood pressure (BP) and heart rate (HR) were recorded in all subjects. Blood pressure was recorded using mercury sphygmomanometer (Pagoda, India) and heart rate was measured from the R-R interval of ECG using Lead II of Electrocardiograph machine (WIPRO GE Mac 600). Isometric hand Grip (IHG) Dynamometry was done all the subjects. On a sustained hand grip at 30% of maximum voluntary capacity for 15 sec, HR and BP were recorded just before the release of hand grip. Patients in Group A were taught Rajyoga meditation while Group B was not taught any kind of relaxation therapy. Rajyoga meditation was taught by the author herself who is a brahmakumari & is associated with Prajapita Brahmakumari Ashram, Amritsar for the last 20 years. After 8 weeks of follow up, BP and HR were recorded both in meditators and non-meditators before and during IHG test. The data obtained were subjected to appropriate statistical analysis. All the quantitative parameters between the two groups were compared using Student 't' test. P values detected smaller than 0.05 were considered as significant.

Study Design: Meditation was taught to Group-A subjects in a silent dimly lit room, in batches of 3-4 subjects per batch, between 10-1 pm. The group format increases the efficiency of patient education. Group support enhanced individual motivation and compliance. Meditation training was given with the help of pictures, diagrams and audio cassettes. A total of 8 lessons each of 45 minutes were given. 25 minutes were devoted to instruct them on the meditation technique and 20 minutes for performing meditation with guided commentary. Meditation was presented with the suggestion that this technique is powerful and regular practice can bring relief from pain in many cases. In this way a positive placebo effect was maximized. The Meditators were instructed to perform meditation for 20 minutes each day at their home either in morning or evening and to note about meditation practice in their daily diary. They were also given Brahmakumari's literature on positive thinking. Such material strengthened

the belief that meditation can have significant physiological effects. Eight such sessions, twice a week for 4 weeks, were given followed by once a week interview for next 4 weeks during which the method followed by the patients was checked and any queries relating to the methodology were answered. At this time patient's compliance to practice of meditation was also tested.

Isometric Handgrip Dynamometry: The subject was asked to sit comfortably in chair. Initially the subject was asked to exert maximal hand grip strength on hand grip dynamometer with dominant hand. First the maximum voluntary contraction (MVC) (Maximal isometric tension i.e. T max) is determined and then the subject was asked to exert 30 % of MVC for 3 minutes with dominant hand. The BP and Pulse Rate were measured in the non dominant hand at rest and just before the release of hand grip pressure. Maximum rise in BP and pulse rate during 30 % of MVC over the resting BP and pulse rate was noted. IHG test was repeated for 3 times for the reliability of result & subjective effort. Normal value i.e value of more than 15mmHg rise in diastolic BP is taken as normal. Less than 10 mmHg rise in diastolic BP is taken as sympathetic insufficiency. 10-15 mmHg is considered as borderline¹⁵.

Result: Fifty patients, comparable regarding age, sex, social status and marital status entered the study. 30 in Group A (Meditators) and 20 in Group B(non-meditators or controls). There were more females than males and more married people than unmarried ones in both the groups. The mean age of meditators was 32.20 ± 1.88 and non-meditators was 34.65 ± 11.21. The normal mean Systolic and diastolic BP in Group-A (118.00 ± 10.31 and 79.87 ± 7.70 respectively) was comparable to that of Group-B (117.30 ± 6.69 and 77.00 ± 8.07 respectively). The mean HR of the subjects in both the groups was also statistically non significant, 79.17 ± 9.59 in Group A and 77.20 ± 9.81 in Group B. The mean values of BP and HR readings during IHG in both the groups were statistically non-significant as shown in the table1. After 8 weeks of meditation and follow up of subjects in group

A, the mean value of systolic blood pressure in the meditators was 112.30 ± 7.98 and in the non-meditators, it was 117.00 ± 7.02. The 't' and 'p' values were statistically significant (t=2.195, p=0.033). Similarly, the diastolic BP in the meditators was 75.70 ± 6.27 and it was lower than the values in the non meditators, i.e. 78.87 ± 4.32. Here also 't' and 'p' values were statistically significant (t=2.118, p=0.039). But the difference in mean value of HR recorded in meditators after 8 weeks of meditation (75.87 ± 8.30) and non meditators (78.60 ± 8.46) was non-significant (t=1.132, p=0.263). When IHG test was done in both the groups after 8 weeks, the mean values of systolic BP and HR were statistically significant (p=0.036 and p=0.048 respectively).The difference in the mean value of diastolic BP during IHG between meditators who had practiced Rajyoga meditation for 8 weeks and non-meditators who did not follow any kind of relaxation technique, was highly significant (p<0.001) as depicted in Table 2.

Table 1: Changes in blood pressure and heart rate during IHG test before meditation in both groups

Parameter	Group A (Meditators) (n = 30)	Group B (Non-Meditators) (n = 20)	P value
Normal			
Systolic BP	118.00 ±10.31	117.30 ± 6.69	0.790 ^{NS}
Diastolic BP	79.87 ± 7.70	77.00 ± 8.07	0.212 ^{NS}
Heart Rate	79.17 ± 9.59	77.20 ± 9.81	0.485 ^{NS}
During IHG			
Systolic BP	136.60 ±11.52	132.00 ± 9.79	0.149 ^{NS}
Diastolic BP	95.53 ± 7.77	90.80 ± 9.59	0.061 ^{NS}
Heart Rate	84.73 ± 9.52	82.40 ± 9.79	0.405 ^{NS}

NS- Non Significant, S- Significant, HS- Highly Significant

Table 2: Changes in blood pressure and heart rate during IHG test after meditation in both groups

Parameter	Group A (Meditators) (n = 30)	Group B (Non-Meditators) (n = 20)	P value
Normal			
Systolic BP	112.30 ± 7.98	117.00 ± 7.02	0.033 ^S
Diastolic BP	75.70 ± 6.27	78.87 ± 4.32	0.039 ^S
Heart Rate	75.87 ± 8.30	78.60 ± 8.46	0.263 ^{NS}
During IHG			
Systolic BP	122.53 ± 7.54	128.10 ± 10.69	0.036 ^S
Diastolic BP	82.27 ± 3.81	89.10 ± 8.14	<0.001 ^{HS}
Heart Rate	79.60 ± 8.04	84.50 ± 8.85	0.048 ^S

NS- Non Significant, S- Significant, HS- Highly Significant

Discussion: This study aimed at investigating the effect of Rajyoga on sympathetic reactivity in chronic tension headache patients. The study consisted of two groups; control (CTTH patients on analgesics and muscle relaxant drugs) and meditators (CTTH patients on similar drugs plus Rajyoga meditation). Both study and control groups were comparable in terms of their age, height, weight, resting heart rate and resting blood pressure. The study group showed significant reduction in systolic, diastolic BP in meditators after a short session of 8 weeks of regular practice of Rajyoga meditation. Our results are in agreement with the findings of Patel and North and Blackwell et al^{16, 17}. In our study HR did not show significant reduction after meditation. Similar findings were reported by English and Baker that transcendental meditation reduced blood pressure but did not reduce heart rate¹⁸. Meditation is associated with a blunted sympathetic activity as is shown by a reduction in the heart rate after regular meditation. Similar trends in the heart rate were noted in other studies¹⁹⁻²¹. Non significant change in normal HR in meditators in our study could be attributed to the fact that they had undergone meditation only for a short period of 8 weeks. The control group showed no significant changes in any of these parameters.

During IHG test, the rise in SBP and HR was found to be statistically significantly lower where as DBP showed a highly significant fall in meditators after 8 weeks of meditation than in non-meditators. Variations in DBP are a more sensitive and specific to diagnose autonomic disorders. Our study is in agreement with Desh Deepak et al and Vempati and Telles, that meditation by modifying the state of anxiety reduces the stress induced sympathetic overactivity, resulting in lowering of the diastolic blood pressure and the heart rate. It makes the person relaxed and thus decreases the arterial tone and the peripheral resistance^{22, 23}

Conclusion: It can be concluded that Rajayoga meditation may affect the autonomic activity significantly by reducing sympathetic activity but the effects require a long term continuation of the technique. Changes in autonomic activity might help in reducing psychosomatic disorders and general well being of an individual. This study undoubtedly seems to bridge the path between spiritual and scientific world. The overall effect of Rajyoga meditation is to bring a state of parasympathetic dominance and demonstrates the control over the uncontrollable i.e. Autonomic Nervous System. Further studies are suggested on larger sample size and longer duration of meditation with some more biochemical and stress related variables.

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Effect Of Anemia On Premenstrual Syndrome In Adolescent Girls

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Abstract: Background: Medical definitions of PMS (Pre Menstrual Syndrome) are limited to a consistent pattern of emotional and physical symptoms occurring only during the luteal phase of the menstrual cycle that are of "sufficient severity to interfere with some aspects of life. A number of medical conditions are subject to exacerbation at menstruation which leads the patient to believe that she has PMS, while the underlying disorder may be some other problem, such as anaemia, hypothyroidism, eating disorders and substance abuse. The aim of the study is to find the effect of anaemia on severity of symptoms of PMS. We would like to formulate a screening test to differentiate if the patient is having PMS or the symptoms are just an exacerbation of anaemia. Method: For this we have taken 40 females of age group 16-20 who have reported symptoms of PMS. Haemoglobin of each subject was measured and a questionnaire containing 15 symptoms were given to each one of them and asked to fill the severity of symptoms. During Period A at least 4 days before menstrual period and the first couple of days of starting of menses and Period B during rest of the month. The students in anaemic group were given dietary and iron supplements for 2 months and were again asked to fill the questionnaire. Result: The severity of symptoms of PMS in anaemic group (9.1, S.D. 0.91) is found to be more than non-anaemic group (12.3, S.D. 0.86). Increase in symptoms severity was 127% among girls with anaemia while in non-anaemic group was 58% from period B to period A. After supplements for 2 months to anaemic subjects decrease in severity was profound in period B. In subjects whom the increase in severity from period B to A was less than 100%, experienced 73% decrease in severity score after supplements. Conclusion: Many symptoms of anaemia and PMS are similar. Anaemia can lead to increase in severity of PMS. In some girls anaemia can be confused with PMS. We observed that subjects having anaemia, symptoms were present throughout the month. Decrease in severity of symptoms after supplements suggest anaemia as an aggravating factor in PMS. Lesser the increase in symptoms from period B to A, more are the chances that the symptoms are caused due to anaemia rather than PMS. This can be used as a screening method to prevent misdiagnosis of PMS.

Key Words: PMS (Pre Menstrual Syndrome), Anaemia, Screening, Iron supplements

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Introduction: Premenstrual syndrome (PMS) is a cyclic recurrence of distressing somatic and affective symptoms in the luteal phase of menstrual cycle and in the few days (1- 3 days) of the next follicular phase. The most important somatic symptoms are feeling overwhelmed, food craving, insomnia or hypersomnia, headache, pelvic pain and discomfort, breast tenderness, joint pain, bloating, and the most common and distressing affective symptoms are irritability, anxiety, depression, mood swing, hostility, poor concentration, confusion, social withdrawal and interpersonal conflicts¹⁻³

The significant appearance of these symptoms starts from the teen years and worsen through the process of aging^{4,5}. During the childbearing age, up to 40% of women have some form of PMS. Related studies show that about 60% of

adolescent girls suffer from PMS^{6,7}. Emerging of PMS symptoms during the teen years complicate the process of puberty and will affect their interpersonal relationships, social and educational performance in a negative way, resulting in poor self-esteem and a sense of dissatisfaction and inadequacy⁸.

More than 200 different symptoms have been associated with PMS, but the three most prominent symptoms are irritability, tension, and dysphoria (unhappiness)⁹. Common emotional and non-specific symptoms include stress, anxiety, difficulty in falling asleep (insomnia), headache, fatigue, mood swings, increased emotional sensitivity, and changes in libido. Formal definitions absolutely require the presence of emotional symptoms as the chief complaint; the presence of exclusively physical

symptoms associated with the menstrual cycle, such as bloating, abdominal cramps, constipation, swelling or tenderness in the breasts, cyclic acne, and joint or muscle pain—no matter how disruptive these physical symptoms are—is not considered PMS.

A number of medical conditions are subject to exacerbation at menstruation, a process called menstrual magnification. These conditions may lead the patient to believe that she has PMS, when the underlying disorder may be some other problem, such as anaemia, hypothyroidism, eating disorders and substance abuse. While these symptoms are often blamed on PMS, headaches, trouble concentrating, lack of energy and grumpiness might actually signal a different health problem

Symptoms of anaemia may include fatigue, decreased energy, weakness, shortness of breath, light-headedness, palpitations (feeling of the heart racing or beating irregularly), and looking pale. Apart from this anaemia, can affect mental health and mood swings. More recently, haemoglobin (Hb) concentration was observed to be significantly related to depression and fatigue in mothers despite the fact that they were of high socioeconomic status¹⁰. This observation is consistent with a general association between improved iron status and the ability to concentrate as well as a reduction in fatigue with iron therapy.

So through this study we would like to evaluate the effect of anaemia on PMS and to formulate a screening test to differentiate if the patient is having PMS or the symptoms are just an exacerbation of anaemia.

Materials and Method: The study was conducted among girls studying in BPT at Govt. Physiotherapy college, Ahmedabad. We have taken 60 girls in age group 16-20 and detailed menstrual history was taken. Patient having history of depression, thyroid disease, eating disorders or substance abuse were excluded. Out of them 40 were found to have symptoms of PMS on the diagnostic criteria of University of California at San Diego⁴. i.e. At least one of the following affective and somatic symptoms during the five days before menses in each of

the three previous cycles. Affective symptoms such as depression, angry outbursts, irritability, anxiety, confusion, social withdrawal and somatic symptoms as breast tenderness, abdominal bloating, headache, swelling of extremities. The symptoms relieved from days 4 through 13 of the menstrual cycle.

Haemoglobin of each subject was measured using Hemocue (AB Leo Diagnostics, Helsingborg, Sweden) which is a simple bedside method. The subjects were divided into anaemic and non-anaemic on the basis of their Hb content. Non Anaemic group (18 subjects) with Hb content more than 10gm/dl and anaemic group (22 subjects) with Hb less than 10gm/dl.

All the subjects were asked to fill a self reported questionnaire containing 15 symptoms and were asked to fill the severity of symptoms as 0-3 with 0 as none, 1 as mild (doesn't interfere with activity), 2 as moderate (interfere with the activity but is not disabling), 3 as severe (disabling) during two different periods in menstrual cycle. Period A from 4 days before menstrual period to first couple of days of starting of menses and Period B during rest of the month. The symptoms must have been present in at least 3 of the last 6 cycles.

All the responses were tallied and responses in all 15 questions were added. The students were classified as having mild, moderate or severe PMS on score less than 15, 15-30 and more than 30 respectively.

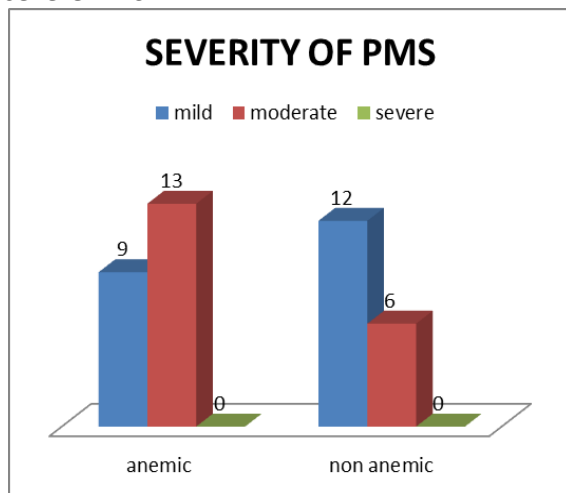
The students in anaemic group were given dietary and iron supplements for 2 months and were again asked to fill the questionnaire.

The responses were tallied and the test was found to be statistically significant using unpaired t test ($p=0.0001$).

Result: The average age in non-anaemic group was (18.2 ± 0.89) and anaemic group was (18.1 ± 0.91) . The Hb concentration in subjects not having anaemia was (12.3 ± 0.86) and in subjects with

anaemia was (9.1 ±0.91). The subjects were divided on the basis of score obtained in the questionnaire as having mild , moderate or severe PMS on score less than 15,15-30 and more than 30 respectively In the anaemic subgroup out of 22, 9 subjects had mild PMS while 13 had moderate PMS. Whereas in non-anaemic subgroup 12 out of the 18 subjects had mild PMS and 6 had moderate PMS. None of the subjects in our study showed signs of severe PMS (Fig 1).

Fig 1: No. of subjects with mild, moderate and severe PMS



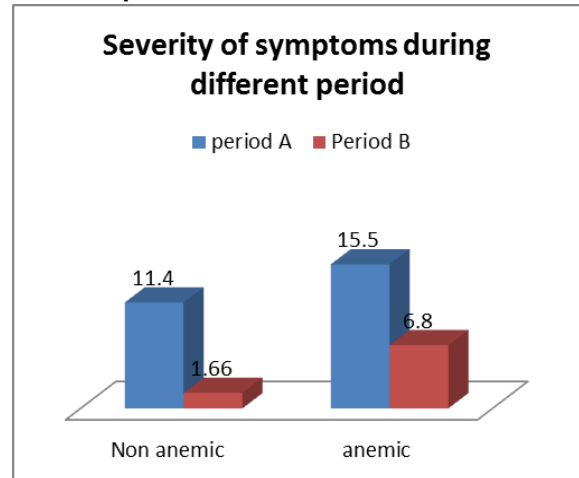
If we compare the severity of symptoms during Period A that is 4 days before menstrual period to first couple of days of starting of menses and Period B during rest of the month we found that severity score during period A was (11.4±4.3) and (15.5±3.9) in non-anaemic and anaemic subjects respectively. While during Period B it was (1.66±1.3) in non-anaemic and (6.8±2.1) in anaemic subjects. (Fig 2)From here increase in severity of symptoms from Period B to Period A was calculated by formula

$$\% \text{ increase} = \{(\text{Score in Period A} - \text{Score in Period B}) / \text{Score in Period B}\} \times 100$$

In anaemic group % increase in severity was 127% and in non-anaemic group was 586%.In the anaemic group on the basis of increase in symptom from Period B to Period A the subjects were categorized into three groups, group A with increase less than 100%(5 subjects) , group B with increase between 100- 200% (14

subjects) and group C with increase more than 200% (3 subjects).

Fig 2: Severity of symptoms during during different period



After dietary and iron supplements for 2 months to subjects in anaemic group response were tallied. Decrease in symptoms severity score was calculated by formula

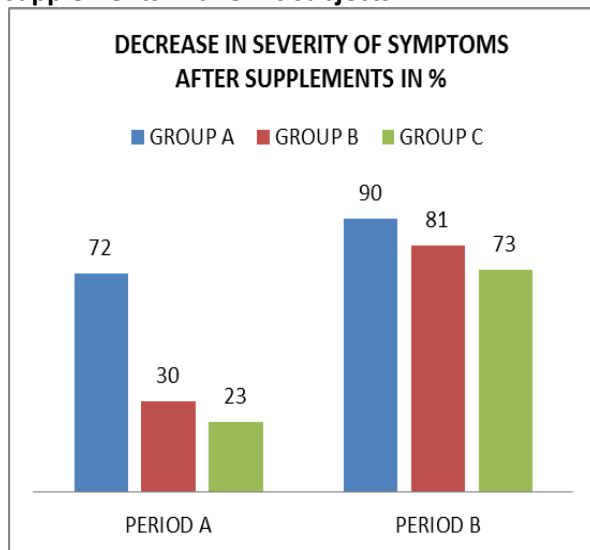
$$\% \text{ decrease} = \{(\text{Score before supplements} - \text{Score after supplements}) / \text{Score before supplements}\} \times 100$$

There was a lot of improvement in severity of symptoms during period B with 90% decrease in severity in group A, 81% in group B and 73% in group C. During period A that is during 4 days before menstrual period to first couple of days of starting of menses the decrease in severity in group B and C were 30% and 23% respectively but in group A 3 out of 5 subjects did not report any affective or somatic symptoms in their last cycle and decrease in severity score was 72%.(Fig 3)

Discussion: Many of the symptoms of PMS are very similar to those of anaemia, and anaemia itself can act as an exaggerating factor for PMS. The severity of symptoms in the anaemic subjects was higher than the severity of symptoms in the non-anaemicsubjects. But the increase in severity from rest of the cycle to that in the luteal phase was much higher in non-anaemicsubjects (586%) than anaemic subjects (127%) suggesting that non anaemic subjects

were having sparse symptoms in period B of the menstrual cycle, but in anaemic subjects the symptoms were prominent throughout the cycle both in period A and period B. So anaemia tends to cause symptoms in the subject similar to PMS and sometime subject can be confused with having PMS while the symptoms are just due to anaemia.

Fig 3: Decrease in severity of symptoms after supplements in anemic subjects



Iron and dietary supplements is required to improve Hb in anaemic patients. On giving dietary and iron supplements for 2 months increase in Hb was found in the anaemic group. After intervention symptoms in period B were reduced considerably in all the subjects having anaemia suggesting that the symptoms in period B were mainly due to effect of anaemia. In period A subjects whose increase in symptoms severity from period B to A was less than 100% showed decrease in symptoms by 73% with 3 out of 5 showed no symptoms of PMS after intervention while in subjects whose increase in symptoms severity from period B to A between 100- 200% and more than 200% showed decrease in symptoms only by 30 and 23% respectively. This data suggest that lesser the increase in symptoms from period B to A, more are the chances that the symptoms are caused due to anaemia rather than PMS.

The etiology of PMS remains unknown and may be complex and multifactorial. The role of

ovarian hormones is unclear, but symptoms often improve when ovulation is suppressed.¹¹ Changes in hormone levels may influence centrally acting neurotransmitters such as serotonin,¹² but circulating sex hormone levels are typically normal in women with PMS. Some evidence suggests that the disorder is related to enhanced sensitivity to progesterone in women with underlying serotonin deficiency.^{13, 14, 15} This mechanism may not explain all cases, because some patients do not respond to treatment with selective serotonin reuptake inhibitors (SSRIs).¹⁴

Recent studies of developmental iron deficiency suggest that transporters for serotonin, and norepinephrine are decreased.¹⁶ This may cause decrease serotonin level in iron deficiency anaemia and cause symptoms of PMS in some subjects.

Conclusion: The most systematically studied treatments have been the elimination of hormonal fluctuations with ovulation suppression treatments or the “correction” of neurotransmitter dysregulation with antidepressant or anxiolytic medications. Other treatments include putative vitamin or mineral deficiencies & symptomatic treatment.

Currently SSRI such as Fluoxetine, Sertraline etc. are more opted as choice for management of PMS. Such drugs have lot of unnecessary side effects. So if a screening method is formulated on the basis of increase in PMS symptoms severity from rest of the cycle to luteal phase it might become easy to differentiate that the symptoms are caused due to PMS and if anaemia is an aggravating factor or anaemia is a root cause of the symptoms and rationale treatment can be given accordingly.

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Platelet Aggregability And C - Reactive Protein In Male Smokers

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Abstract: Background: Cigarette smoking is major risk factor for many illnesses including cardiovascular diseases. Smoking is known to have adverse effects on endothelial function. This leads to thrombotic episodes by enhancing platelet aggregation. Raised C-reactive protein can be a predictor for future risk of athero-thrombotic events. In this study pro-thrombotic activity was studied in smokers in form of platelet aggregability and serum C-reactive protein. Method: Platelet aggregability was measured by method given by O'Brien and C-reactive protein was measured by rapid latex agglutination test in male smokers consuming minimum 5 cigarettes per day for more than 3 years. Result: Platelet aggregability was found significantly increased in smokers. C-reactive protein levels were also found raised in smokers. Conclusion: Increased platelet aggregability in smokers could be due to endothelial injury and increased sympathetic activity. Increased C-reactive protein could be due to chronic inflammation in lungs and damage to endothelium.

Key words: Platelet aggregability and C-reactive protein.

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Introduction: Cigarette smoking, a major risk behaviour adversely affecting public health, has reached epidemic proportions. WHO estimates that there are about 100 million smokers in the world representing about one third of the global population aged 15 years and over. The vast majority of the smokers are in developing countries.¹The history of smoking dates back to as early as 5000–3000 BC when the agricultural product began to be cultivated in South America; consumption later evolved into burning the plant substance either by accident or with intent of exploring other means of consumption.

Smoking is generally five times higher among men than women, however the gender gap declines with younger age.²Smoking is not only associated with lung cancer but also linked to cardiovascular diseases, chronic respiratory diseases and stroke. The risk of developing cardiovascular diseases (CVD) increases with length and intensity of exposure to cigarette smoke. Overall, smokers have a 70% greater risk of mortality from CVD than non-smokers.³

Pro-thrombotic effects of smoking are well documented which include increased circulating levels of fibrinogen, endothelial dysfunction, platelet activation and platelet aggregation. Thus the adverse prognostic effects of smoking may relate not only to increased risk of developing atherosclerosis but also to increased risk of occlusive thrombosis and myocardial infarction.⁴

Recently, acute phase reactants such as C-reactive protein (CRP), serum amyloid A, IL-6, and IL-1 have been correlated with the development of athero-thrombotic events. C-reactive protein, in particular, is proving to be a strong, independent prognostic indicator for the development of future athero-thrombotic events. Platelet aggregability and CRP concentrations are known to be affected by smoking.⁵ So present study was planned to see the effects of smoking on platelet aggregability and C-reactive protein.

Material and Method: The study was a cross-sectional type of study and was conducted in 100 young males from the staff members of medical college and hospital in the age group of 40-50 Yrs. The study was carried out between August 2012 to December 2012 after obtaining permission from the institutional ethical committee.

The study groups consisted of 50 healthy males who were smoking minimum 5 cigarettes per day for more than 3 years. The control group consisted of 50 age matched non-smoker males.

Inclusion criteria for selection of subjects of study group were:- Males of 40 to 50 years of age, history of smoking minimum 5 cigarettes/day for more than 3 years & having normal body mass index (BMI). Exclusion criteria for the subjects were:- subjects

undergoing regular exercise, subjects on medications such as statins, glitazones, fibrates, niacin, clopidogrel, aspirin, iron/vitamins supplements, subjects having history of any major disease such as ischemic heart disease, kidney or liver disease, hypertension, diabetes mellitus, dyslipidemia, malignancy, venous thrombosis, systemic or pulmonary embolism, congenital hemorrhagic disease, thrombocytopenia etc.

Written consent was taken from all the subjects after explaining the nature of the study to them. Detailed medical history was taken and thorough clinical examination was carried out to rule out presence of any disease.

Fasting blood samples were collected from both the groups from antecubital vein under all aseptic precautions. In order to avoid the effect of diurnal variations on platelet aggregability and C-reactive protein, the time of collection of blood was kept constant between 9 am to 11 am. Platelet aggregability was measured by method described by O'Brien et al as it is practicable and reliable.⁶ Qualitative estimation of C - reactive protein was done by rapid latex agglutination test.⁷ In this test, if sample showed agglutination, it was considered as a positive test indicating that C-reactive protein concentration equal or greater than 6mg/L.

Results were compared by using paired 'Z' test. SPSS software version II was used for statistical analysis.

Result: Table 1 showed demographic profile of subjects involved in the present study. Our study population is anthropometrically matched.

Table 1: Demographic distribution of subjects

Parameters	Control group	Study group
	Males	Males
Age(Yrs) Mean ± SD	44.9±3.43	46.5±3.55
Height (cms) Mean ± SD	166.45±7.82	167.83±8.26
Weight (Kgs) Mean ± SD	67.21±8.95	68.71±8.26

Table 2: comparison of platelet aggregability in males in control and study group.

Parameters	Control Group (N=50)	Study Group (N=50)	p Value
Platelet Aggregability (Adsorbance) Mean ± SD	0.023±0.15	0.087±0.15	<0.0001*

* Statistically Significant

Table 2 shows comparison of platelet aggregability in males in control and study group. There is statistically significant increase in platelet aggregability in males of study group (p value<0.0001).

Table 3: Percentage (%) of subjects having increased C-reactive protein levels

Parameter	Control group (n=50)	Study group (n=50)
Increased CRP levels (> 6 mg/L)	8%	78%

Table 3 Shows that increased CRP levels are seen in higher Percentage (%) of subjects in study group as compared to control group.

Discussion: Cigarette smoking contributes to several diseases including cardiovascular diseases by being both prothrombotic and atherogenic. It predisposes the individual to several clinical atherosclerotic events like peripheral vascular diseases; acute coronary syndromes and stroke.⁸ The association of smoking with cardiovascular disease is nonlinear. Smoking as little as 1-4 cigarettes per day confers almost threefold higher risk of dying from coronary heart disease as compared to non-smokers.⁹

The present study was undertaken to see the effects of cigarette smoking on platelet aggregation and C-reactive protein in healthy male adults. We have found statistically

significant increase in platelet aggregability of smokers as compared to non-smokers.

The effect of cigarette smoke on blood coagulation and on different body systems have been an object of investigation. Findings similar to ours were observed by Bliden et al. They found that there was increase in platelet aggregation in smokers.¹⁰ Saba and Mason et al reported enhancement of ADP induced platelet aggregation by addition of nicotine to human platelet-rich plasma.¹¹ Bordia et al has also shown that platelet aggregation was markedly increased after smoking and when treated with garlic oil showed inhibition of platelet aggregation.¹²

But few studies have found no correlation between platelet aggregation and cigarette smoking.^{13,14,15,16,17}

Platelet aggregation can be stimulated in vitro by a number of agonists that affect platelet receptors, including ADP, epinephrine, collagen and thrombin. The cellular events leading to platelet aggregation are mediated by the binding of fibrinogen to the glycoprotein (GP) IIb/IIIa receptor of platelets as a final common pathway.¹⁸ Cigarette smoke contains over 4,000 known harmful components including nicotine, tar, ammonia, carbon monoxide, free radicals and other gaseous products which exert a negative effect on the platelet function and augment platelet aggregability. Normally platelets are in quiescent state but after endothelial injury due to cigarette smoke they might be getting activated. After activation, morphologically platelets undergo conformational change and adhere to each other by surface integrins GP IIb/IIIa forming larger aggregates. Activated platelets are known to facilitate the coagulation cascade and the formation of fibrin through release of coagulation factors including thrombin formation on the platelet surface.¹⁸ There is also an increase in sympathetic activity due to nicotine of cigarette smoke. It is known to be a sympathomimetic chemical that promotes the release of catecholamines which increase platelet aggregation.¹⁹

We have also found increased CRP levels in higher percentage of subjects in study group as compared to control group. Many other studies have also shown similar findings. Ohsawa et al found an elevation in CRP levels in smokers than non-smokers which was attributed to detrimental effects of tobacco smoke on tissues.²⁰ Mahrukh S et al also found raised CRP as well as complements like C3, C4 in smokers. They have attributed it to activation of monocytes and complement recruitment, resulting in the secretion of inflammatory cytokines which could further lead to release of CRP from liver in the blood.²¹ Aral et al have also noted similar observations.²² National Health and Nutrition Examination Survey (NHANESIII) study has confirmed that cigarette smoking contributed significantly to low-grade systemic inflammation and led to reduced lung function. It was associated with elevated CRP, fibrinogen and blood leukocytes, contributing to higher levels of systemic inflammation in susceptible individuals such as smokers.²³ Sin et al found high levels of CRP in smokers having chronic obstructive pulmonary disease.²⁴ A study by Pinto-Plata et al also supported the same fact²⁵. Loughlin et al studied the association between cigarette smoking and CRP in adolescent girls and boys and found a positive relationship. They also showed a linear association of CRP with the number of cigarettes smoked per day.²⁶

Few studies have shown conflicting results showing no correlation of CRP levels with smoking such as a study done by Haket al.²⁷

Inflammatory changes in the bronchial epithelium due to exposure to cigarette smoke could have led to increased C-reactive protein levels among cigarette smokers. Also, the toxins present in cigarette smoke might also contribute to increased C-reactive protein levels. C-reactive protein is an acute phase reactant released from liver which has been shown to tilt the balance of endothelial health towards a proatherogenic and thrombotic state.¹⁹

Conclusion: Increased platelet aggregability in smokers could be due to endothelial injury and

increased sympathetic activity. While increased C-reactive protein levels in smokers could be due to chronic inflammation in lungs and damage to the endothelium. It appears that for a given scenario, increased platelet aggregability and increased C-reactive protein levels are the risk factors for thrombotic episodes in future. It is known that majority of the adverse health effects of smoking can be reversible. So there is an urgent need to sensitize smokers about its health hazards so that disease burden due to smoking on society in general could be brought down.

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Study Of Relation Between Motor Nerve Conduction Velocity And Height In Healthy Individuals

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Abstract: Background: Nerve conduction velocity is being used as a widespread measure of diagnosis of nerve function abnormalities. Dependence of nerve conduction parameters on intrinsic factors like age and sex, as well as extrinsic factors like temperature is well known. Lateralization of various cerebral functions like speech, language, visuospatial relations, analysis of face, recognition of musical themes and use of hand for fine motor movements have also been studied. The aim of this study is to compare the nerve conduction velocity of different subjects with different height using median nerve and find out whether there is any difference in relation between motor nerve conduction velocity and height. Method: The study was carried out in students of B J Medical College by the use of standard 2 channel physiograph. Comparison of motor nerve conduction velocity between subjects of different height was done under equation of Pearson correlation. Result: There are several factors which affect nerve conduction velocity. Some skills like music, sports activities are also due to hemispheric difference. Age and sex affect nerve conduction velocity. Here we compare the relation between height and motor nerve conduction velocity. On comparison of motor nerve conduction velocity of median nerve with different height of the subjects the study shows that there is significant decrement in nerve conduction velocity with increase in height of subjects. Conclusion: From the results we can conclude that there is inverse correlation between height and nerve conduction velocity of subjects.

Key Words: Height, Nerve conduction velocity, Median nerve

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Introduction: Nerve conduction study has emerged as a major tool for diagnosis as well as prognosis of nerve function disorders¹. Intrinsic factors like age and sex, as well as extrinsic factors like temperature on nerve conduction are well known². Various cerebral functions like speech, language, visuospatial relations, analysis of face, and recognition of musical themes and use of hand for fine motor movements have also been studied with lateralization. Handedness and nerve conduction have also been studied well³. There are some evidences available for comparison of height and nerve conduction velocity. Further studies are required to establish correlation between height and nerve conduction velocity. Here this comparison is done in total of 50 subjects.

Materials and Method: Selection of subjects was done from 50 male healthy, medical students with. 25 students are left handed and remaining 25 are right handed. The study was

done under ethical standard of institution with permission of ethical committee.

Criteria for selection of subjects:

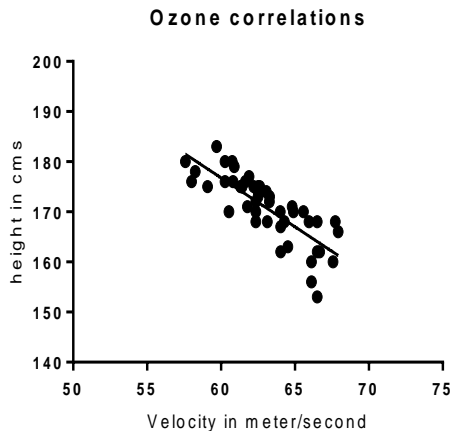
- 1) Age group:- 16 to 30 years
- 2) BMI:- 20 to 25⁴(normal)
- 3) No history of injury to upper limbs, spinal cord, brain.
- 4) Absence of abnormal signs over limbs (tingling, numbness, pain in limbs, tremor, ataxia, muscle weakness, wasting of muscles).
- 5) No known history of neuropathy, neuromuscular disorders, muscle disorders.
- 6) No history of familial neural, muscular or neuromuscular disorders.
- 7) No history of Leprosy, Arthritis.

If the answer of each question is yes than subject can be included in the study⁵.

Tools for testing and procedure: A standard 2 channel physiograph having RMS EMG EPMK II one of latest software in the study of nerve conduction was used for measurement. Subjects were acclimatized to standard room

temperature (26⁰C +/-2⁰C) for 10 minutes⁶. After that the procedure was performed under following settings, For motor nerve conduction sensitivity: 2-5mV/mm, Sweep speed: 2-5ms/mm, Filter: 2-5 Hz (low frequency), 10 KHz (High frequency)⁷. Supra maximal stimulation is used for motor nerve conduction studies. Median Nerve of both the sides is first stimulated at distal point (wrist) then at proximal point (elbow). The action potential is recorded and difference between distal and proximal latencies is obtained. Distances were measured by a standard measure tap. Motor NCV is calculated in meter/second by the formula Distance between two stimulated point divided by difference in latent periods. Motor nerve conduction velocity of both sides were obtained nearly equal. Average of both sides for Motor NCV is considered and further calculation was done.

Result: In comparison of motor nerve conduction velocity and height in 50 normal individuals it is seen that there is inverse relationship between these two parameters by the equation of correlation⁸.



No. Of subjects	Average Height	Average motor NCV	Correlation R	Result
Right Hand	171.1 +/- 18	62.91 +/- 6	-.8036	Inverse correlation
Left Hand	171.1 +/- 18	62.06 +/- 6	-.7813	Inverse correlation

P value < 0.001

The graph clearly suggests that, as the height of individual increases the velocity of motor nerve conduction decreases showing the inverse relationship between these two parameters.

Results were presented by the equation of Pearson correlation sequence. P value less than 0.05 was considered as significant.

Discussion: We are very aware about the involvement of nerves in various metabolic diseases like Diabetes as well as other neuropathies. But before that we should know normal physiological factors affecting the nerve and its conduction. As we know nerve conduction velocity is affected by many known factors such as Age, sex, handedness etc. Also degree of Myelination, fibre diameter and internodal distance has important role in affecting the nerve conduction velocity⁹. Genetic factors as well as some peripheral factors (biological¹⁰ and environmental¹¹) may be involved. Similar results were found in a study conducted by Reinisch JM et al where he found diethylstilbestrol does affect the nerve conduction velocity in males. Coren shown in his book advances in psychology that certain environmental and biological factors affect the conduction velocity in healthy individuals. In one study at Dept of Physiology, B. P. Koirala Institute of Health Sciences Ghopa Camp, Dharan, they found that the height showed significant correlation with nerve conduction study parameters for the motor nerves and few sensory nerves¹².

They say diagnostic Conclusion which were made from the data without making correlation with the height may be invalid for patients who are taller or shorter than average individuals. In the study they also correlated distal latencies and amplitude of CMAP, found positive relationship with height. It should be considered while developing standard/reference normative data for different nerves. In another study done by Takano K, Kirchner F negative correlation between height and maximum nerve conduction is seen in both sexes¹³. They tested ulnar nerve of both the sides in more than 650 medical students and

found statistically significant higher nerve conduction velocity in shorter individuals than taller ones. They also got slightly higher conduction velocity in females than males. However with regards to its relation to height males have higher nerve conduction velocity than females. In a study done by Bodofsky E, Tomasio A, Campellone J they established negative correlation between nerve conduction and height (axon length)¹⁴. According to them Ulnar Motor Nerve Motor Conduction Velocity appears to be inversely proportional to the square root of height, which further supports our study that motor nerve conduction velocity is affected by height of individual. Maria T. Gadia, MD, Norihiko Natori MD, Laura B. Ramos MD have examined associations between height, quantitative sensory, motor nerve conduction and clinical indices of diabetic peripheral neuropathy in 100 adult diabetic patients (25 to 70 years). The peroneal and posterior tibial motor nerve conduction velocity were inversely related to height¹⁵. Here we are trying to establish relationship between the height and nerve conduction velocity.

Textbook of practical physiology by pal GK suggested similar results . The reason behind comparison is that there may be longer tapering of nerve in the distal part of the nerve in taller individuals¹⁶. This tapering may reduce the thickness of the nerve as we go distally. Also there may be chance of thinner myelination as we move distally in the nerve. On comparison of distal latencies with height it is seen that as the height increases distal latency also gets longer ($r=0.8543$, $Pvalue<0.01$). It shows impulse conduction takes longer time to travel through the distal part of the nerve which also supports to our result and the reason may be due to tapering and poor myelination at distal end. We know clearly that two most important factors affecting the nerve conduction velocity are myelination and thickness of nerve. Myelination causes to the impulse to be conducted faster. Lesser the myelination lesser will be velocity of nerve conduction. Also, as the thickness of the nerve increases conduction of impulse from the nerve gets faster. The

relationship should be established with further studies.

Conclusion: As per the results obtained in our study and in the light of the above discussion it can be concluded that there is inverse correlation between height and nerve conduction velocity of subjects.

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Effect Of Body Fat Percentage On Maximum Ventilatory Volume (MVV) In Young Adults Of Indian Population

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Abstract: Background: Obesity impairs quality of life by causing various hazardous effects on respiratory functions of an individual along with other medical complications. The objective of the study was to evaluate effect of body fat percentage on MVV in young adults of Indian population. Method: 120 students of 18-25 years age group who had no lung disease were recruited. Their age, sex, height, weight was recorded. Students with BMI 18.5- 24.9 kg/m² constituted control group and students with BMI 25.0 -29.9kg/m² constituted study group. Skinfold thickness was calculated using 4-site method (biceps, triceps, subscapular and suprailiac) with the help of Skinfold Caliper. Body fat percentage was calculated by using Durnin and Womersley method. MVV was recorded by computerised spirometry. The statistical analysis was done using appropriate tests. Result: The study group presented with lower values of MVV than control group. Moreover MVV was having strong negative correlation with body fat percentage. Conclusion: The effect of body fat percentage on MVV indicates that obesity affects pulmonary mechanics of an individual.

Key Words: Body fat percentage, Durnin and Womersley method, Maximum Ventilatory Volume (MVV)

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Introduction: In the present era of modernization and globalization, developing countries like India is facing obesity as important health problem. Besides the genetic predisposition, adoption of sedentary lifestyle, lack of regular physical exercise, excessive intake of junk foods, stress of competitive world has made the environment conducive to the development of obesity¹. Most popular index to compare body composition of people and to categorize them as obese and non-obese is the Body mass index(BMI). Although BMI is the major index in evaluating obesity but direct measurement of body fat and its distribution is more important². Moreover the effects of obesity on ventilatory parameters may depend on both the distribution and size of excess adipose tissue³. The deleterious effects of obesity on pulmonary functions led to various complications.

MVV is also known as maximum breathing capacity (MBC). It indicates the maximal volume of gas that can be breathed per minute by maximal voluntary effort. MVV is an important measure of respiratory muscles strength and endurance. The current study looks into the association of body fat percentage with MVV in

normal weight and overweight M.B.B.S. students. So that the subjects who are at high risk can be identified. This will help to plan and execute preventive measures to prevent negative effects on health and quality of life. Overall the study depicts effect of obesity on pulmonary mechanics of an individual.

Materials and Method: The present study was undertaken in young adults of 18 - 25 years medical undergraduate students from a well known tertiary hospital Mumbai. The proforma and plan of the study were submitted to the local Ethics Committee and were approved before undertaking this study. The plan and purpose of study were explained to students. Then every student signed informed consent. 120 medical undergraduate students of age 18-25 years including both males and females participated in this study. All students were normal without any symptoms. Participants with known history of any respiratory disease, heart disease or major surgery done, any neuromuscular disorder or skeletal muscle abnormalities were excluded.

The study was conducted using equipments: weighing machine, measuring tape, Skinfold

Caliper and computerized PFT machine. Age (years), sex and anthropometric parameters (height (cm) and weight (kg) were noted. Weight was measured using a weighing machine whose least count was 0.5 kg. Height was measured using a measuring scale whose least count was 0.1cm. BMI was then calculated using Quetlet's index as: $BMI = \text{weight (kg)} / \text{Height (metre)}^2$

Participants were classified depending upon BMI as:

Control group: 18.5 – 24.9 kg/m² and
Study group: 25.0 – 29.9 kg/m²

In both groups each constituted 60 students having 30 males and 30 females in that individual group. Skinfold measurement method was most widely used body composition testing method for assessing percent body fat. Skinfold parameters measured were biceps (mm), triceps (mm), subscapular (mm) and suprailiac (mm). All these parameters were measured using skinfold caliper (make Anand Agencies) whose least count is 0.1mm. Skinfold caliper is a device which measures skinfold thickness with underlying layer of fat. All measurements were taken on right side of body while standing erect. The participants were instructed to keep shoulder and arm muscles relaxed during the test. All measurements were done on healthy, undamaged, uninfected dry skin. The skinfolds were picked up between the thumb and index finger of left hand and lifted up.

The caliper was held in right hand and pressure plates were applied perpendicularly 1 cm above the fingers holding the skinfold tightly and allowing the pressure of the caliper alone to be applied to the skinfold. The reading was taken 2 seconds after the caliper application in mm. The grip was maintained throughout the measurement. Minimum of three measurements were taken at each site with atleast 2 min interval to allow the tissue to restore to its uncompressed form.

Midpoint between tip of acromion process and tip of olecranon process keeping elbow in

extended and relaxed position was identified using a measuring tape. At this midpoint vertical fold was raised on anterior aspect of arm for biceps skinfold. For triceps skinfold procedure is same except fold was raised on posterior aspect of arm. Subscapular skinfold measurement was taken on the oblique fold just below the bottom tip of scapula.

Suprailiac skinfold measurement was taken on slightly oblique fold just above the crest of ileum in the midaxillary line just towards front from side of waist. The average of three readings at a particular site represented the accepted value for that site. The sum of accepted values at all four sites represented the final skinfold score which was entered into a table given by Durnin and Womersley for calculating body fat percent⁴.

The evaluation of maximum ventilatory volume was performed by computerized PFT machine manufactured by MEDGRAFICS (CPFS/D USB Med Graphics preVent™ Pneumotach). The participant was asked to sit comfortably in a chair. Each participant had been explained about the test in detail. They were also shown how to perform the test with sufficient trials. For recording maximum voluntary ventilation (MVV), the participant was asked to inhale and exhale deeply and rapidly as possible for 15 seconds and then calculated for one minute. Three efforts were done and the best effort was taken into consideration according to standard norms⁵. The readings for MVV were expressed as L/min.

Result: The results for MVV and Body Fat Percentage were tabulated. The data entry was done in MS-EXCEL programme and analysis was done by SPSS-IS statistical software version 19.0 for windows. For statistical analysis, the data were submitted to 'unpaired t' test. So that comparison of MVV in study and control group was obtained. Compared data was expressed as Mean ± SD. Statistical significance was indicated by 'P' value < 0.05. For finding correlation between body fat percentage and MVV, Pearson's correlation test was applied.

Table 1: Study variables in comparison between study and Control groups

Parameter	Male		Female	
	Control	Study	Control	Study
Age(years)	19.80±1.79	20.17±1.90	19.37±1.00	19.43±1.30
Height(cm)	170±7.43	163±8.44	159±6.95	158±5.07
Weight(kg)	61.60±6.71	70.72±8.41	53.30±6.65	66.40±5.31
BMI(kg/m ²)	22.52±1.95	26.52±1.09	22.02±1.89	26.18±0.74

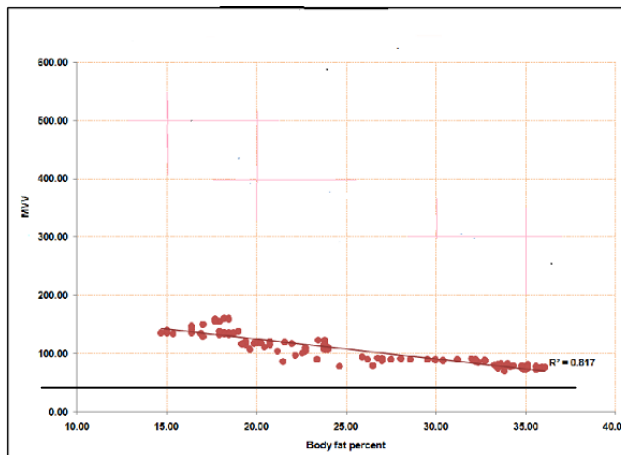
Table 2: Comparison of skinfoldthickness(4-sites in mm),Body Fat% and MVV between control & study groups

Parameter	Male		Female	
	Control	Study	Control	Study
Biceps	9.77±1.17	11.30±2.00	13.10±2.09	19.53±1.50
Triceps	11.23±1.55	15.50±2.10	14.30±2.29	21.60±1.60
Subscapular	11.20±1.32	15.57±2.50	16.37±4.41	23.17±2.20
Suprailiac	12.30±1.84	17.30±2.58	17.37±4.60	24.67±3.47
Body fat%	17.43±1.21	21.42±1.70	29.08±3.03	34.40±3.05
MVV (L/min)	143±10.52	113±6.77	88±2.66	77±3.01

Table 3: Correlation of Body Fat %with MVV in males and females

Body fat percentage		PFT-MVV
Female (60)	Pearson Correlation	-0.702
	Sig. (2-tailed)	3.99E-10
Male (60)	Pearson Correlation	-0.707
	Sig. (2-tailed)	2.63E-10

Fig 1: Scatter Diagram showing correlation of body fat% with MVV



Discussion: Quantitative distribution of body mass provides the initial framework for the description of man’s nutritional status⁶.The fat content of the human body influences morbidity and mortality of individuals. MVV test evaluates the respiratory endurance. The impaired respiratory muscle function has been possibly related to fatty deposits, overstretched diaphragm, decreased isokinetic skeletal muscle endurance^{7,8,9,10,11,12,13}. Apart from strength of the respiratory muscles, factors that affect MVV are respiratory compliance and the airway resistance. Obesity is characterized by combination of effects on lung and chest wall compliance^{14,15}.Lung compliance is decreased due to reduced distensibility of extrapulmonary structures, increased pulmonary blood volume, closure of dependent airways and increased alveolar surface tension^{14,15,16}.The increased adiposity around ribs, diaphragm and abdomen leading to limited movement of ribs as well as decreased total thoracic and pulmonary volume pulling chest wall below its testing level cause reduction in chest wall compliance¹⁷. Also decreased respiratory compliance, intrinsic structural changes, thickening of airway wall combinely contribute to airflow limitation resulting in lower MVV in obesity^{10, 18}. Obesity is associated with adipokines causing systemic

inflammation that result in the impaired lung function^{19, 20, 21, 22, 23}.

Conclusion: The findings of study indicate that measure of body fat percentage affects dynamic lung volumes which are evidenced by changes in MVV in overweight adults. But these changes were not significantly causing obstructive or restrictive disorder in overweight adults. Thus obesity affects pulmonary mechanics of an individual. Limitation of study is measurement of inspiratory and expiratory pressures at different lung volumes. Although many studies regarding effect of obesity on pulmonary functions have been done from time to time, still we have not succeeded in bringing about curative measures. So the main importance now lies in identifying subjects at risk as means of preventive measures.

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Serum Level Of Iron And Transferrin In Normal And Anemic Pregnant Women

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Abstract: Background: Iron deficiency anemia is a major health problem in our country especially in pregnancy. For accurate diagnosis of iron deficiency anemia we require accurate indicators based on which treatment can be given. Purpose of this study is to prevent unnecessary iron overload by accurate diagnosis in pregnancy as excessive iron can lead to oxidative damage. Method: Serum level of Iron and transferrin and total iron binding capacity and % saturation of transferrin were estimated in 70 women in their I, II and III trimester of pregnancy. Only healthy subjects (without infective, metabolic, and degenerative disease) on clinical examination were selected. The women were divided into three groups according to their hemoglobin level in normal, mild anemic and moderate to severe anemia. Result: In normal group serum iron levels were within normal range in all trimester, whereas in anemic groups serum iron level were lower. Serum transferrin level was raised in III trimester in all the groups and also raised in I and II trimester in severe anemic group. TIBC was increased with decreased in serum iron level. % saturation of transferrin was lowered with lowered hemoglobin level. Conclusion: Our study shows iron level can be well correlated with haemoglobin level but transferrin level cannot be well correlated. But % of transferrin saturation can be a better indicator than transferrin.

Key Words: pregnancy, anemia, serum iron, transferrin, % saturation of transferrin

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Introduction: Iron deficiency anemia is the most prevalent problem in developing countries. It accounts for 57.9% in pregnant women and 56.2% in women in reproductive age¹. During pregnancy hemodynamic changes lead to expansion of blood volume up to 50% and increase in red cell mass up to 20% which results in haemodilution. Because of haemodilution low concentration of hemoglobin often misdiagnosed as anemia². As a sequence it leads to useless administration of haematinics. The study was designed to correlate other parameters with hemoglobin concentration and for finding the best indicator of iron deficiency anemia unaffected by haemodilution.

Material and Method: 70 women in their 1st, 2nd and 3rd trimester of pregnancy were selected from obstetrics and gynecology antenatal outpatient department irrespective of level of anemia and nutritional status. Any infective, metabolic or degenerative disease detected on clinical examination was exclusion criteria. Approval of ethical committee of medical college and informed consent was taken from participants in study. Patients were called at laboratory at 9:00 a.m. with empty stomach. A thorough clinical examination was done and body weight, height, period of gestation and nutritional status were noted. Venous samples were collected and

analyzed for hemoglobin, serum iron, serum transferrin, and TIBC and % saturation of transferrin.

Women taken in study were between 18-36 years in age, weight between 40-60 kg, height ranged from 136-159 cms, body surface area between 1.23-1.67m² and arm circumference between 22-25.6 cms. The parity was between 1-4. Women were divided into three groups.

Group A- Normal (Hb above 10 gm %)

Group B- Mild anemia (Hb between 8-10 gm %)

Group C- Moderate and severe anemia (Hb below 8 gm %)

Statistical analysis- Mean with standard deviation of different parameter was compared with level of haemoglobin in different trimester.

Result: In group A Hb > 10 gm % s. iron, s. transferrin, TIBC, % saturation of transferrin were not significantly different in different trimesters of pregnancy as seen in table I,II,III,IV. In group A serum iron level was highest within normal average value as seen in healthy person about 120 µg/dl. In group B and C women with anemia serum iron level was significantly lower than group A being

lowest in group C. Serum iron level correlated well with Hb concentration.

Table 1: Serum iron level in during different trimesters of pregnancy and its relation with level of anemia.

Hb gm %	Serum Iron µg/dl mean ± SD		
Trimester	1 st	2 nd	3 rd
>10	106 ±23.13	121.6 ±47.90	140.8 ±55
8-10	64.67 ±21.7	49.64 ±14.63	51.29 ±11
<8	24.66 ±2.3	29.66 ±10.44	28.33 ±9.9

Fig 1: Serum Level Of Iron In Different Groups

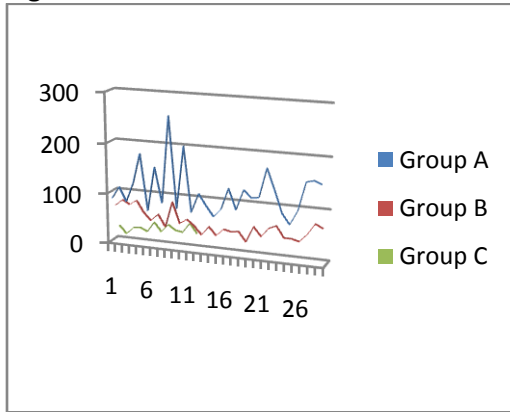


Chart show clear relation with haemoglobin being highest in normal group and lowest in severe anemic group.

Serum transferrin: Serum transferrin level was increased in third trimester of pregnancy in all groups. Serum transferrin level was also raised in 1st and 2nd trimester in group C with severe anemia.

Table 2: Serum transferrin level during different trimester of pregnancy and its relation with level of anemia.

Hb gm %	Serum transferrin g/dl mean ± SD		
Trimester	1 st	2 nd	3 rd
>10	2.51±0.43	2.72±0.99	3.57±0.72
8-10	2.95±0.95	2.87±0.20	3.48±0.50
<8	3.40±0.18	3.81±0.62	3.58±0.64

Fig 2: Showing serum level of transferrin in different groups.

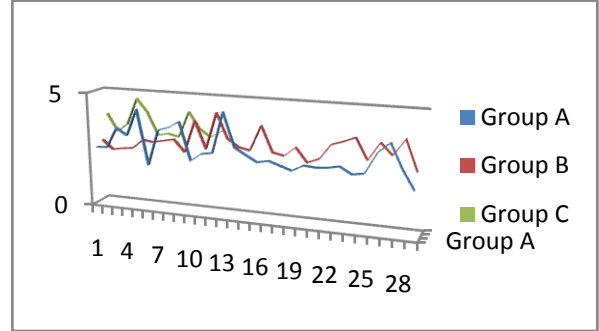


Chart does not show clear relation with haemoglobin in different groups like serum iron level.

Total iron binding capacity: Total iron binding capacity was increased with decreased serum iron level. Although they do not always show linear relationship to iron store.

Table 3: serum TIBC level during different trimester of pregnancy and its relation with level of anemia.

Hb (gm %)	Serum TIBC µg/dl mean ± SD		
Trimester	1 st	2 nd	3 rd
>10	435.11±8 1.15	481.68±4 8.5	511±85.8
8-10	483.75±6 1.26	524.7±62. 05	615.27±8 5
<8	581±111. 94	538±64.7 1	717±309. 9

% saturation of transferrin: % saturation of transferrin is normally 30%. In group A Hb> 10gm%, % saturation ranges from 25 to 28.47. Lower level 13.81 was observed in 1st trimester in women of group B Hb between 8-10 gm% and in same group % saturation fell significantly in 2nd and 3rd trimester. In severe anemia % saturation was very low being only 4.3, 5.3, and 5.32 respectively during 1st, 2nd and 3rd trimester of pregnancy thus leaving a vast unsaturated or latent iron binding capacity. It can also be well correlated with Hb as serum iron. % saturation of transferrin can be the better index of anemia with iron then transferrin.

Table 4: % saturation of transferrin in different trimester of pregnancy and its relation with level of anemia

Hb gm%	% saturation of transferrin mean \pm SD		
	1st	2nd	3rd
>10	25 \pm 8.83	24.76 \pm 8	28.47 \pm 12.5
8-10	13.81 \pm 5.3 1	9.77 \pm 3.7 8	8.64 \pm 2.78
<8	4.3 \pm 0.48	5.30 \pm 1.3 2	5.32 \pm 4.6

Thus results shows better correlation of hemoglobin with serum iron and % saturation of transferrin then that of serum level of transferrin.

Discussion: From the observation table of the study it may be seen that in group of pregnant women included in study, % saturation of transferrin with serum iron was lower than normal, indicating a deficiency of Iron even when Hb level was >10gm%.

According to WHO expert group anemia is considered to exist when serum iron level is < 50 μ g/dl. According to Bengamint al.³, iron deficiency anemia was considered to exist during pregnancy when serum iron level was < 50 μ g/dl.

Thus in present study in the group C subjects the decrease in Hb was not due to hydration but was due to anemia. Decrease in serum iron could be correlated well Hb level in the results also as shown in the graph above; with mild and severe anemia in group B and C decrease in serum iron was greater.

Pregnancy is a major drain on the limited iron reserve of young women. Each pregnancy results in average loss to the mother of 680mg of iron, equivalent of 1300 ml of blood. An additional iron must be available to support the expanded blood volume during pregnancy.

Prorated over the full term pregnancy, the iron requirement amounts to approximately 2.5 mg/day. In IIIrd trimester it rises as much as 3.0 to 7.5 mg/day. These amounts are greater than those that can be absorbed from even the best diets;

stores may be insufficient to meet them. For this reason early diagnosis of anemia and iron supplementations is frequently as a component of prenatal care⁴.

Other finding in present study was increased level of serum transferrin concentration in late pregnancy, IIIrd trimester. The increase in transferrin concentration in serum is not produced by administration of estrogen to normal women⁵, so it is likely that the elevated steroid level in pregnancy accounts for this elevation. It may represent an increased rate of production for its functional capacities along with no change in its degradation rate⁶.

The turnover (half-clearance time) of transferrin bound iron is very rapid-typically 60 to 90 minutes. Because the overwhelming majority of iron transported by transferrin is delivered to the erythroid marrow, the clearance time of transferrin-bound iron from circulation is affected most by plasma iron level and activity of erythroid marrow. When erythropoiesis is markedly stimulated, pool of erythroid cells requiring iron increase and clearance time of iron from circulation decrease⁷.

In I Ird trimester erythropoiesis markedly, so the pool of erythroid cells requiring iron increases considerably in third trimester which leads to clearance time from the circulation to decrease. This may be the probable reason for this raised concentration of serum transferrin in late pregnancy.

Serum transferrin concentration was raise in early pregnancy also in severe anemic subjects group C in the study but no explanation is found about and contrary explanation is there, it seems that in severe anemic state rate of synthesis of transferrin is less in liver⁸. The half clearance time of iron in presence of iron deficiency is as short as 10 to 15 min; this value reflects the limit of iron delivery as function of cardiac output going to the bone marrow⁶.

Apte and lyenger¹¹ demonstrated that during pregnancy iron absorption increased from a mean of 7 to 30 and further to 33 percent at gestation

weeks 8-16, 27-32, respectively, using the chemical balance method, the absorption of iron was better among those with low percent transferrin saturation than in women with high percent transferrin saturation. As much as 58 percent of 30 mg of dietary iron ingested per day could be absorbed by an iron deficient full term pregnant woman. However, the magnitude of the difference in iron absorption between non pregnant and pregnant Indian women is striking even when the same balance method is used. This study shows the greatly increased demands of iron in pregnancy and increased absorption according to need in iron deficient women⁹.

In study to evaluate liver iron stores in different countries it was observed that Indian values ranked amongst the lowest in females due to the stress of pregnancy and lactation. The anemia of pregnancy is most likely manifestation of latent iron deficiency¹⁰.

Deficiency of dietary iron exaggerated in late pregnancy by rise in requirement up to 3.0 to 7.5 mg/day. These amounts are greater than those that can be absorbed from even the best of diets, and stores may be insufficient with daily Indian diet to meet them. For these reason iron supplementation is the major components of prenatal care⁴.

Conclusion: Serum iron level can be well correlated with haemoglobin concentration with decrease in haemoglobin concentration in accordance there is also decrease in serum iron level. But serum transferrin level is not showing any parallel or dependent result as iron with haemoglobin concentration. Its level increased in late pregnancy in all groups irrespective of anemic status. So it cannot be taken as a better index of anemia. However % saturation of transferrin shows decrease with decrease in haemoglobin concentration and serum iron level. So it can be a better index then transferrin. Thus serum iron and % saturation along with haemoglobin concentration can be used to diagnose iron deficiency anemia in early stages. And with early

accurate diagnosis we can prevent its consequences by administration of haematinics. We can also prevent faulty administration of haematinics by excluding physiological haemodilution which is misdiagnosed as anemia which can cause oxidative damage.

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A Comparative Evaluation Of Pulmonary Functions In Athletes, Yogis And Sedentary Individuals

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Abstract : Background: Lung function parameters tend to have a relationship with lifestyle such as regular exercise and non-exercise. Hence the present study was under taken to assess the effects of exercise in athletes and yogis on respiratory system and compared with sedentary group. Aim & Objective: To compare the differences in pulmonary function among the athletes, yogis and sedentary group. Method: A total of 300 subjects comprising athletes, yogis and sedentary were assessed for pulmonary function test. The parameters used as determinants of lung function were predicted percent of means of FVC, FEV1, FEV3, PEFR, FEF 25-75%, FEV1/FVC ratio and MVV recorded as per standard procedure using RMS Medspiror. Result: Pulmonary Function Profile was analyzed and compared among the study groups. In our study the athletic group was having higher predicted percentage of mean value of FVC, FEV1, FEV3,PEFR,and MVV as compared to yogis and sedentary group. Yogis were having higher lung function values as compared to sedentary group and higher values of FEF25-75% and FEV1/FVC ratio than athletic group. Conclusion: All pulmonary function parameters were higher in athletes and yogis than in the normal sedentary control individuals. This study suggests that regular exercise has an important role in determining and improving lung functions.

Key Words: Athletes, Pulmonary Function, Sedentary, yogis

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Introduction: Now-a-days, more persons are interested in physical fitness than any time before. Bufferalo health study concluded that pulmonary function is a long-term predictor for overall survival rates in both genders and could be used as a tool in general health assessment.¹ Hence it becomes essential to achieve more efficient lung function as a preventive measure. Sedentary lifestyles could be associated with less efficient pulmonary function. Involvement in certain physical activities or sports could help in respiratory muscle strengthening and improvement in pulmonary function. It is claimed that yoga practices improve general health and fitness. Yoga is a science practiced in India over thousands of years. In recent times medical fraternity is much attracted towards yoga. Yoga practice mainly consist of Asana (posture- a particular position of the body which contributes to steadiness of body and mind), Pranayama (to control the breathing in a superior and extra-ordinary way to get maximum benefits) and meditation. It produces consistent physiological changes and have sound scientific basis. Yogic exercises have been found to be beneficial for better maintenance of bodily functions, even in normal healthy subjects. In this study we have compared

pulmonary function of people with sedentary life styles, athletes and yogis to see if athletes and yogis have better pulmonary function than people with sedentary life styles; and if so, how they differ amongst themselves with respect to various spirometric parameters.

Materials and Method: This study carried out in year 2009-12 with the approval of PG Board for non clinical sciences, PGIMS,Rohtak in the department of physiology,MAMC,Agroha,Hisar. Spirometry was conducted on athletes from defence personals of Indian army; yogis from Patanjali sewa samiti,Hisar and sedentary life style subjects were selected from the medical staff at MAMC, Agroha. Spirometry was conducted on 300 randomly selected subjects from those fulfilling the inclusion criteria in each category. Those failing to perform the test successfully were rejected and replaced by another randomly selected subject. The readings were taken in standing position using RMS MEDSPIROR based on ATS recommendations. Time of testing was 4.00 pm to 6.00 pm; mean temperature was 35°C. Subjects in the study were aged 26 to 35 years.

Definitions : Sedentary lifestyle was defined as per center for disease control and prevention,

as no leisure-time physical activity, or activities done for less than 20 minutes or fewer than 3 times per week. Athletes were defined as marathon runners running at least 2 km daily since last 6 months. Yogis were defined as subjects practicing asanas and pranayama for at least 1 hour daily since 6 months. Asanas and sukshmyayam (Surya namaskar, Vajrasana, Mandookasana, Vakrasana, Bhujangasana, markatasana, Naukasana, Shavasana etc.) for 15 minutes and Pranayama was done for about 45 minutes in early morning, sitting on the floor, in Padmasana and included steps namely Bhastrika, Kapalbhati, Anulomvilom, Bahypranayam, Bhramri, Ujjai, Udhgeeth pranayam and Pranav dhyam. "Smoker" was defined as per center for disease control and prevention as those who have smoked more than 100 cigarettes in their lifetime and currently smoke.²

Inclusion criteria :

1. Non obese individuals, as in non-obese men there is no much effect of body weight on FVC values.³
- 2 . Consent to participate in the study

Exclusion criteria :

1. Smokers
2. American Thoracic Society (ATS) questionnaire suggestive of any active respiratory disorder.⁴

Statistical analysis: Statistical analysis was done using SPSS version 16. Parameters analyzed were in the form of percentage of the predicted for the age, sex, height and weight – Forced Expiratory Volume in 1 second (FEV1) ,

Forced Vital Capacity (FVC), Peak Expiratory Flow Rate (PEFR), FEV1/FVC and Forced mid Expiratory Flow rate (FEF 25–75%). One way analysis of variance was used to see if the groups differ in any of the parameters. Post Hoc test for equality of variance were used to assess normality and Post-hoc Dunnett T3 test was used for between groups comparison.

Result: Comparison of lung function parameters across activities is shown in Fig. 1. The groups differed significantly in FVC (P=.001), FEV1 (P=0.001), FEV3 (P=.001), PEFR (P=.001), FEV1/FVC (P=.001) and MVV (P=.001). The highest mean FVC (101.22%), FEV1 (106.67%), FEV3 (104.44%), PEFR (95.28%) and MVV (95.34%) were observed in athletes. Highest FEF 25-75% (93.11%) and FEV1/FVC (109.08%) were found in yogis. Lowest values were observed amongst sedentary individuals respectively.

Comparison of athletes with sedentary workers revealed significantly higher FVC (P=.001,95% CI;6.8;16.7), FEV1 (P=0.001, 95% CI; 13.03; 24.46), PEFR (P=.001,95% CI;23.10;38.93), FEV1/FVC (P=0.042, 95% CI; .15; 11.38) and MVV (P=.001,95% CI;3.48;17.75) parameters amongst the athletes. Comparison of yogis with sedentary workers revealed significantly higher FEV1 (P=0.039, 95% CI;.23;12.32) and PEFR (P=0.001, 95% CI: 5.43;21.20) amongst yogis. Lung functions of athletes were significantly higher than yogis except for FEF 25-75% insignificantly and FEV1/FVC which was significantly higher amongst yogis.

Table 1: Anthropometric data of participants (mean± SD)

Para- meter	Sedentary n=100	Athlete n=100	Yogi n=100	F-value	p-value
Age (years)	30.26±2.90	30.30±2.61	29.86±2.98	.735	NS
Height (cm)	170.07±8.06	171.16±4.46	169.11±8.44	2.022	NS
Weight (kg)	66.96±11.24	67.12±4.99	63.90±12.28	3.271	NS
BMI (kg/m ²)	23.09±3.16	22.89±1.57	22.26±3.67	2.182	NS
BSA (m ²)	1.77±.17	1.79±.08	1.73±.19	3.69	NS

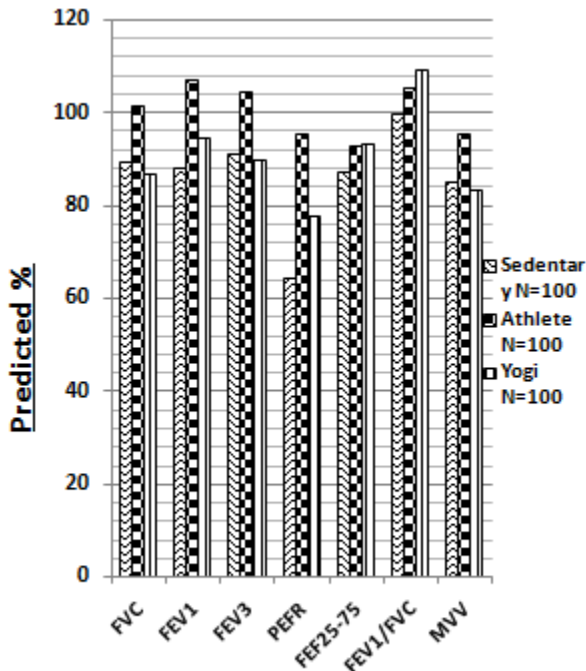
NS= not significant; <.05 * = significant

Table 2: Predicted percent of means of Lung function parameters in athletes, yogis and sedentary individuals (mean± SD)

Parameter (predicted %)	Sedentary n=100	Athlete n=100	Yogi n=100	F-value	p-value	Between group comparison (p-value)		
						A-S	A-Y	Y-S
FVC	89.38±15.55	101.22±13.43	86.80±16.08	26.062	.001**	.001**	.001**	NS
FEV1	87.92±20.67	106.67±11.58	94.20±14.25	35.75	.001**	.001**	.001**	.039*
FEV3	90.70±15.82	104.44±13.26	89.53±16.44	29.601	.001**	.001**	.001**	NS
PEFR	64.26±27.86	95.28±17.34	77.58±17.10	53.046	.001**	.001**	.001**	.001**
FEF25-75%	87.06±35.75	92.84±23.14	93.11±19.73	1.591	NS	NS	1 NS	NS
FEV1/FVC	99.42±21.58	105.19±8.62	109.08±9.69	11.18	.001**	.042*	.009**	.001**
MVV	84.72±20.03	95.34±21.82	83.22±16.19	11.492	.001**	.001**	.001**	NS

A= athlete; S= Sedentary; Y= Yogi; SD= standard deviation; NS= not significant; ≤.05 * = significant; ≤.001 **= highly significant

Fig 1 : Lung function parameters in athletes, yogis and sedentary individuals



Discussion: Physical inactivity and low cardio-respiratory fitness are recognized as important causes of morbidity and mortality. It is generally accepted that people with higher levels of physical activity tend to have higher levels of fitness and that physical activity can improve

cardiorespiratory fitness. Buffalo health study revealed FEV1 as an independent predictor of overall long term survival rates and could be used as a tool in general health assessment.¹ Pursuing a physical activity or sport which could help in achieving efficient lung function especially FEV1 is an essential preventive strategy in this busy age when prevalence of sedentary life style is increasing and so are the associated lifestyle disorders. The results of the present study showed that those performing yoga and athletic activity regularly had higher lung function parameters as compared to those with sedentary life styles. Significantly higher values were observed for FEV1 and PEFR. Significantly higher MVV in athletes which is advantageous for physical work capacity.⁵ Robinson and Kjeldgaard also have reported increased MVV with running training.⁶ The results discussed above clearly indicate that athlete had higher values of lung functions compared of the controls, thereby confirming that regular exercise has a facilitating effect on the lungs. Similar results have been obtained by other workers in this field. The possible explanation for this could be that regular forceful inspiration and expiration for prolonged periods during running, leads to the

strengthening of the respiratory muscles, both voluntary and involuntary. This helps the lungs to inflate and deflate maximally. This maximum inflation and deflation is an important physiological stimulus for the release of lung surfactant and prostaglandin into the alveolar spaces thereby increasing the lung compliance and decreasing the bronchial smooth muscle tone respectively.^{7,8,9} Ringqvist suggested that changes in airway resistance serves as a major stimulus for respiratory muscle hypertrophy. Since airway resistance is related inversely and curvilinearly to lung volumes, then airway resistance will be reduced when subjects breathe at high lung volumes.¹⁰ Pyorala et al pointed out that endurance athlete maintain lower and deeper rhythms of breathing, both at rest and at exercise than compared to normals.¹¹

It has been shown in previous studies that beneficial effects of yoga become established between 6 to 12 weeks.¹² The subjects in our study were yoga practitioners with more than 24 weeks of daily yoga practice. Pranayam, a yogic practice has beneficial effects on respiratory efficiency. It includes various exercises like bhastrika, kapalbhati etc. which involve forceful inspiration to Total Lung Capacity (TLC) and forceful exhalation to residual volume, and all maneuvers are done through nostrils, which offer resistance by means of decreased cross sectional area and turbulence. Breathing through one nostril in Anulomvilom pranayama further increases the resistance. The effects of resistance training on skeletal muscle are well documented.¹³ Higher peak expiratory flow rates and FEV1 could be explained due to better strengthening of respiratory muscles in yogis. Skeletal muscle control many crucial elements of aerobic conditioning including lung ventilation. Repeated inspirations to TLC and breath holdings as done during pranayam can lead to increase in the maximal shortening of the inspiratory muscles which has been shown to improve the lung function parameters.¹⁴ The findings of the present study can also be explained on the basis of better functions of respiratory muscle strength, improved thoracic

mobility and the balance between lung and chest elasticity which the athletes and yogis may have gained from regular exercise. Hence regular physical activity causes many desirable physiological, psychological and physical changes in the individual.

Conclusion: Both athletes and yogis had significantly better lung functions as compared to sedentary workers. People with sedentary lifestyles had lowest pulmonary function parameters. Sedentary life style is also associated with higher incidence of obesity, and development of restrictive lung function and cardiovascular morbidity. In this busy age people should try to be involved in such physical activities or sports with better health yield for the time spent. We recommend that sedentary workers should adopt yogic exercises for improving their health. Apart from the preventive value of yoga there is emerging realization of its benefit as a complementary therapy in therapeutic and rehabilitative medicine.^{15,16}

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Serum Lipid Profile In Sickle Cell Disease Patients In Raipur District, Chhattisgarh

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Abstract: Background: The sickle cell disease is commonest monogenic disorder in India, affects all the major organs of the body. In India the rates of cardio vascular disease (CVD) among urban population have risen continuously and the major risk factor includes lipid abnormalities. Lipid metabolism may be altered in sickle cell disease patients hence present study was carried out to compare the serum lipid profile in sickle cell disease patients (HbSS) with normal person (HbAA) Method: A cross sectional study was done in 34 HbSS patients and age and sex matched normal 31 HbAA controls. Total Cholesterol (TC), High Density Lipoprotein (HDL), Low Density Lipoprotein (LDL), Triglyceride (TG) and Very Low Density Lipoprotein (VLDL) estimation was done. Mean, Standard deviation, Students T test analysis were used for analysis of results. Result: Mean value of TC, HDL and LDL were insignificantly lower than normal controls whereas TG and VLDL were insignificantly higher in both gender. Conclusion: Less degree of hemolytic stress leads to blunted rate of erythropoiesis which in turn is associated with an insignificant reduction in plasma lipids and lipoproteins. It appears that lipid profile in patients with sickle cell anemia poses an uncertain threat for coronary vascular disease.

Key words: Sickle cell disease, Hypocholesterolemia, Total cholesterol, Cholesterol

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Introduction: Although advances in supportive therapies have greatly increased the life expectancy of individuals with sickle cell disease in technologically advanced countries, the morbidity and mortality of this disorder remain high. Sickle cell disease is an inherited hemoglobinopathy occurring in many parts of the world including Indian sub-continent¹. In India it is prevalent in tribal population and in Chhattisgarh the highest frequency of the sickle cell gene occurred among the Scheduled Tribes and Scheduled Castes and Other Backward Classes².

The cause of SCD is an A – to - T transversion in the codon for amino acid composition 6 in the Beta hemoglobin gene. Because of this mutation, a Valine residue replaces the normal Glutamic acid (glu6val) and HbS Beta-globin chains are substituted for normal HbA beta-globin chains^{3,4}. In the deoxygenated state, the solubility of sickle cell hemoglobin (HbS) is decreased and, therefore, it precipitates as bundles of long fibers causing sickling of red cell. During oxygenation de-sickling occurs, but some cells become irreversibly sickled cells and do not regain the normal red cell shape. The cell membrane becomes fragile due to the constant reversal of sickling and de-sickling phenomenon and is eventually lysed. The homozygous state

has been defined as an incapacitating disease in which the hematological and several biochemical parameter values are abnormal⁵.

Cardio Vascular Disease (CVD) is the world's leading killer accounting for 29.2 % deaths of the total number of global deaths in 2003. It is postulated that serum lipid profile, that is a group of tests on cholesterol and its linked lipoproteins is used as an indicator for development of CVD in SCD patients. Out of all the fractions, multistep development of atherosclerosis is related to high levels of LDL-C and TG whereas decreased levels of HDL- C.

For above reason plasma lipid profile TC, HDL, LDL, TG and VLDL is evaluated in SCD patients to provide contributory information for concurrent occurrence of CVD which is an important cause of mortality in these cases.

Materials and Method: Study Design: After ethical clearance from Pt. J. N. M. Medical College, Raipur, a cross sectional study was carried out along with the mobile unit of sickle cell project in Raipur District Chhattisgarh following informed consent. The 34 subjects homozygous sickle cell disease patients having haemoglobin (HbSS) from 15 to 35 years were taken for study and compared with age and sex

matched controls. These subjects and controls were evaluated for sickling by solubility test in mobile unit & positive test results were confirmed for Trait (HbAS) or Disease (HbSS) by performing Hemoglobin Electrophoresis.

Blood sample collection: In all subjects, 5 ml of overnight fasting venous samples are collected from all subjects from which 3 ml is collected in plain bottles & allowed to clot for estimation of lipid profile and 2 ml in EDTA bottles for Hb electrophoresis by cellulose acetate.

Estimation of Lipid profile: The plasma lipid profile was measured by Automated method by the iLab 650 Automated Machine. The iLab 650 Automated Machine measured serum lipid profile - TC, and TG concentration by enzymatic assay, HDL-C by calorimetrically. In the iLab 650

automated machine the calculation of VLDL- C was done by $VLDL-C = \text{Triglyceride} / 5$ and LDL - C calculation by the following Friedewald Equation $LDL-C = TC - HDL-C - (TG / 5)^6$.

Statistical analysis: The result were expressed as mean \pm standard deviation and student T test was used to calculate the level of significance. A p-value of 0.05 or less was considered statistically significant.

Result: Table 1 showed the level of lipid profile in sickle cell disease and controls. The mean plasma Total cholesterol, HDL-C and LDL-C were insignificantly ($p > 0.05$) lower than their normal matched controls. Mean value of serum TG and VLDL-C were insignificantly higher than normal matched HbAA person.

Table 1: Concentrations of Lipids in the serum of Men and Women with Sickle Cell Disease and Controls

Parameters	Males			Females		
	SCD (n* = 23)	Controls (n = 17)	p-value	SCD (n = 11)	Controls (n = 14)	p-value
Total cholesterol (mg/dl)	162.52 \pm 16.65	165.59 \pm 21.27	p>0.05	169.73 \pm 13.24	174.57 \pm 20.99	p>0.05
HDL-cholesterol (mg/dl)	33.35 \pm 4.43	34.47 \pm 3.24	p>0.05	32.64 \pm 4.82	37.00 \pm 3.37	p>0.05
LDL-cholesterol (mg/dl)	103.83 \pm 15.45	107.53 \pm 19.36	p>0.05	112.55 \pm 13.41	114.57 \pm 19.75	p>0.05
Triglyceride (mg/dl)	125.61 \pm 34.30	117.29 \pm 30.39	p>0.05	123.55 \pm 19.49	121.07 \pm 18.69	p>0.05
VLDL (mg/dl)	25.35 \pm 6.75	23.47 \pm 6.06	p>0.05	24.64 \pm 3.88	24.21 \pm 3.77	p>0.05

Data expressed as mean and SD, *Number of Subjects,

Discussion: Some of the workers have shown that the plasma total cholesterol of SCD, was significantly lower in comparison to normal control^{5,7,14}.

It has been postulated that the hypocholesterolemia in SCD might be due to increased cholesterol utilization and decreased circulation. Hemolytic stress could be

associated with a significant reduction in plasma lipid concentration^{8,9}.

Metabolism of lipids and lipoproteins is being altered in patients with sickle cell anemia. Decreased red cell volume in these patients leads to increased plasma volume and dilution of plasma constituents including lipids and lipoproteins^{11,13}, or the down regulation of cholesterol biosynthesis^{10,15}, which occurs through the rate-limiting enzyme of β -

hydroxymethyl – glutaryl - CoA reductase or decrease dietary intake of cholesterol^{10,11} or decrease activity of lecithin: cholesterol acyltransferase (LCAT)¹⁰.

Another suspected cause was increase in the rate of exchange between plasma cholesterol and RBC membrane cholesterol¹⁶. Increased hepatobiliary excretion of cholesterol and bile salts, increased conversion of cholesterol to bile salts, decreased reabsorption of cholesterol and bile salts in the small intestine, and down regulation of cholesterol biosynthesis pathway was put forward the explanation for hypocholesterolemia in SCD¹⁵. In an another explanation for the reduced cholesterol concentration in hemolytic anemia could be either due to liver function abnormalities or due to decrease endogenous production^{11,13}. It is also proposed that hypocholesterolemia in SCD might be induced by HbS gene¹².

A possible explanation for the statistically insignificant decrease of plasma cholesterol and other parameters in this study design is probably lower level of hemolytic stress because SCD cases are on steady state. There is markedly derangement in levels of Hb and erythropoietin. As a result of above findings there is decreased rate of erythropoiesis which is the main factor for increased cholesterol utilization.

In previous work and established projects the cholesterol levels were significantly low because cholesterol was utilized in excess in erythropoietic activity. However it is also hypothesized that cholesterol is largely conserved by entero-hepatic circulation, at least in healthy symptomless individuals. RBCs membrane is synthesized by recycled cholesterol from hemolysed RBCs.

Due to fore mentioned causes it can rightly be explained why there is less decrease in levels of plasma cholesterol and there is no statistically significance in plasma TC, HDL, LDL, Triglyceride and VLDL in SCD cases as a result of low levels of hemolytic burden and blunted erythropoiesis.

For the study we have concluded that levels of triglycerides is elevated but there is associated decrease in the levels of TC, HDL and LDL fractions. Though lipid monitoring is an important guide to cardiac markers but past work and studies offer an uncertain explanation regarding genetic protection offered by HbS gene against occurrence of CVD in some races and population and positive association of increased TG and LDL leading to risk of CVD in SCD cases.

Conclusion: Finally to recollect the result there is decrease in levels of TC and LDL and there is also associated decrease in HDL and increase in TG levels all of which are not significant. So we can say that there is uncertain threat for development of CVD.

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A Sensory Nerve Conduction Study of Sural Nerve Among Leprosy Patients

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Abstract: Background: Leprosy neuropathy is characterized by initial involvement of the small nerve fibers, later followed by involvement of the large fibers, when routine nerve conduction studies become abnormal. Sural nerve is main sensory supplying of the foot. Mostly, ulcer occurs in foot due to neuropathy of lower limb which is most early & neglected complication of lower limb among leprosy patients. Early assessment of Sural nerve is more important in leprosy. The results of Nerve Conduction Studies are closely parallel to the structural abnormality of Nerve. Aim:-To assess the sensory nerve conduction study parameters of the Sural nerve in cases of clinically manifest leprosy with or without nerve damage. Method: To increase the diagnostic yield, we applied the Antidromic SNCS near nerve technique to the Sural nerve of 42 leprosy patients. Result: Sural Nerve was not detected by NCS in 11(26.19%) Leprosy patient out of 42. This may be due to conduction block. Mean Latency of Bilateral Sural nerve was prolonged and SNCv was reduced. That represented demyelinating type of Neuropathy of Sural Nerve. Conclusion: Demyelinating neuropathy of Sural Nerve is more common than Axonal Neuropathy in Leprosy cases. Total nerve conduction block might be developed in early stage. Axonal Neuropathy may develop with or without conduction block. To better understand the neurophysiology and physiology of leprosy and to increase the accuracy and precocity of the diagnosis, it will be necessary to investigate patients in the very early stages of the disease and to correlate these findings with the corresponding nerve pathology.

Key Words: Sensory Nerve Conduction Study, Leprosy, Sural Nerve

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Introduction: The main target of Mycobacterium Leprae is the peripheral nerve¹. Neuropathy is the hallmark of the leprosy diseases as the three Physiological functions of nerves- motor, sensory or autonomic may equally affected but usually the sensory component is the earliest and the most severely affected². Sensory neuropathy is far more common than motor neuropathy². Neuropathy associated with leprosy is Small Fibre Neuropathy/ Diffuse Sensory Neuropathy due to direct invasion of the Nerve trunks by the bacillus³. The small nerve fibers conducting pain and temperature sensations are affected significantly before the large myelinated fibers that conduct vibration sense, position sense, and motor impulses^{4,6}. NCV study is used mostly to diagnose the neuropathy which can be degenerative or demyelinating. The results of NCS are closely parallel to the structural abnormality of Nerve^{4,5}. NCSs consist of stimulating a peripheral nerve and recording the response elsewhere on contiguous nerve or from a skeletal muscle innervated by the nerve. Sural nerve is main sensory supplying of the

foot and mostly ulcer occurs due to neuropathy of lower limb. So early assessment of Sural nerve are more important in leprosy. Selective sequential involvement of the nerve fibers impairs the detection of leprosy neuropathy at the initial stages of the disease by neurophysiological evaluation since routine nerve conduction studies only record potentials originating from fibers wider than 7 mm in diameter^{7,8}.

Materials and Method: The permission was taken from Institutional Review Board (IRB) and Human Ethics Committee before starting this study. Leprosy patients were enrolled from the leprosy clinic held on every Friday at Department of Skin & V.D. This study was carried out at EMG/NCV Lab at Department of Physiology.

Participants: The present study was carried out in 42 Leprosy patients of newly diagnosed or on treatment cases.

Preparation of Subjects and Precautions:

Subject was informed about this study in local language with written Subject Information Sheet. Informed Written Consent was taken in the presence of subject relative. All leprosy subjects taking medication was informed to take regular morning dose. Subject Informative, Anthropometric data (age, height and weight), brief clinical history, vital data and examination, personal history, family history was taken according to standard protocol.

This study was taken between 9am to 1pm in air conditioned Lab and Room temperature was keep at around 25°C. Patients were asked to avoid prior application of topical creams as these may increase skin resistance to the applied current. The skin surface temperature was in all cases between 31°C to 34°C. Participants' skin surface was kept clean with spirit swab and let them to become dry to avoid any error before placing electrodes on upper limbs. Earthling should be kept in position as it passes extra current to the earth. Supramaximal stimulation (up to 50 mA) was used to stimulate Sural nerves for sensory recording

Instrument: RMS Aleron EMG/NCV EP II MARK 401: 4 channels instrument was use for this study. This machine is manufacture by RECORDERS & MEDICARE SYSTEMS (P) LTD. Settings Filters for sensory recording are LFF = 20Hz, HFF= 2 kHz and Sweep Speed for SNCS was 2ms/ division

Terminologies and Technique for electrode placement and recording of Sural Nerve Sensory Studies for type of Stimulus⁹:

Supra-maximal Stimulation for Sensory recording: Stimuli are those that do not produce any further increase in the response and a stimulus delivered at approximately 20-30% above maximal intensity is supra-maximal threshold.

Antidromic Stimulation: Propagation of an impulse in the direction opposite to physiologic conduction. The basic technique of antidromic SNCS involved the active recording electrode

and reference electrode are mounted 4 cm apart over the Sural Nerve on lateral aspect of foot near lateral malleolus. Antidromic evoke response can be recorded with surface stimulus 14, 18 cm proximal to the active electrode, distal to the lower border of gastrocnemius at the junction of middle and lower third of leg during the recording, the leg should be relaxed and lateral position is convenient.

The most reproducible results are obtained when stimulating over 14 cm & 18cm distance. A nerve action potential produced produce by the electrical stimulation of the afferent nerve may be recorded over peripheral sensory nerve in a number of areas. The response obtained is called Sensory Nerve Action Potential.

Latency: It is "time interval b/w the onset of the stimulus and the initial deflection of the response." It is measured in milliseconds.

Amplitude: It is measured from baseline to peak to peak. It is measured in µV.

Conduction Velocity: Speed of propagation of an action potential along a nerve is called conduction velocity. When the latency is measured to the peak of the SAP, an average conduction of the group Ia fibers are obtained rather than the CV of the fastest fibres. It is measured in m/sec.

CV = distance between stimulus and recording electrode / onset latency.

Fig 1: Electrode placement for Sural Nerve Sensory Nerve Conduction study at 14 cm distance.



Table 1: References Values of Sural nerve conduction (SNCS) for this study

	Latency(ms), (Range)	Amplitude (µV) (range)	NCV(m/sec), Mean ±SD
Kimura (14cm)a	2.4 – 3.0	12.9-28.9	54.8±15.3
Kimura (18cm)a	3.4 – 4	12.2 – 25.6	NA
Mishra &Kalita(b)	2.83 – 4.0	18.0 -30.5	50.9 ±5.4
Di Benedetto	2.27±0.43	23.7±3.8	46.2±3.3
Waniapel et al	3.7±0.3	18.9±6.7	41.0±2.5

a=61 individuals, age 11-74 years (average 40), onset latency, b=30 individuals (60 limbs), age 11-57 years (average 36), onset latency, base to peak amplitude;

Result: This study was conducted among 42 leprosy patients. 14 patients of paucibacillary and 28 patients of multibacillary were diagnosed base on their clinical presentation and serological or biopsy examination.

In Paucibacillary group, 4 patients were tuberculoid leprosy, 3 patients were Borderline tuberculoid Leprosy with Pure Neural Leprosy and 7 patients were Borderline tuberculoid Leprosy.

In Multibacillary group, 11 patients were of lepromatous leprosy, 12 patients of Borderline Lepromatous Leprosy with pure neural leprosy and 5 patients were of Borderline lepromatous Leprosy. Out of the multibacillary, 4 patients have trophic ulcer on foot and one patient has ulnar abscess. They were also divided in subgroup like Newly Diagnosed cases (n=31) and Old cases or on treatment cases (n=11), Smear positive cases (n=19) and Smear negative cases (n=23).[Table-3]

Table 2: Anthropological measurement of Leprosy Cases (n=42)

Age	Male	Female	Ht (m)	Wt(kg)	BMI
39.93	26	16	1.59	53.74	21.27

Table 3: Leprosy cases classify as their presentation (n=42)

Smear +Ve	Smear-ve	New Case	On treatment	PB	MB
19	23	31	11	14	28

PB- Paucibacillary, **MB-** Multibacillary

All the data were enter in Microsoft Excel sheet. The mean and SD taken with the Help of Graph pad InStat software and Student t- test and ANOVA were applied to for statistical significance. P-value < 0.05 shows as significance of the values. Both of Sural Nerve was not detected in 11(26.19%) Leprosy patient out of 42 leprosy patients. This might be due to conduction block.

Table 4: Comparision of Sural Nerve Values between Leprosy patients and reference values

	Latency(ms) (Range)	Amplitude (µV) (range)	NCV(m/sec) Mean ±SD
Kimura (14 cm)a	2.4 – 3.0	12.9-28.9	54.8±15.3
Kimura (18cm)a	3.4 – 4	12.2 – 25.6	
Mishra &Kalita(b)	2.83 – 4.0	18.0 -30.5	50.9 ±5.4
Present Study values of bilateral sural nerve (n=31)			
RtSural Nerve (14cm)	5.99±2.56	37.73±25.27	25.60±9.85
Left Sural Nerve (14cm)	5.27±2.22	38.73±27.07	25.80±13.78

Above table 4 shows bilateral sural nerve have prolonged latency with reduced SNCV among leprosy patients. In smear positive leprosy cases, conduction block was higher as 8 out of

19 patients have not detected sural nerve bilaterally, whereas in smear negative cases, 3 out of 23 leprosy patients hvae not detected sural nerve. This present the effect of smear positivity on conduction block.

Table:5 Comparison of Sural Nerve Conduction studies Values (Mean±SD) between Paucibacillary (n=11) and Multibacillary (n=20) Leprosy patients.

	Paucibacillary	Multibacillary	P-value
Rt Sural Nerve			
Latency(ms)	5.56±2.40	6.22±2.68	0.5036
Ampli. (µV)	64.76±62.11	53.67±55.30	0.6192
NCV(m/sec)	23.40±11.04	22.16±9.41	0.7439
Rt Sural Nerve			
Latency(ms)	5.70±2.24	5.04±2.24	0.4342
Ampli. (µV)	64.01±44.67	60.33±64.55	0.8681
NCV(m/sec)	24.72±11.49	24.84±15.18	0.9809

Table 6: Variation of values among smear +ve (n=11) and smear-ve (n=20) leprosy cases

	Latency(ms) Mean ±SD	Amplitude (µV) Mean ±SD	NCV(m/sec) Mean ±SD
Smear +ve Rt Sural N	6.41±3.23	42.22±23.18	20.47±9.34
Smear -ve Rt Sural N	5.75±2.17	35.26±26.59	23.77±10.16
Smear +ve Lt Sural N	5.12±2.32	36.80±23.24	19.30±8.23
Smear -ve Lt Sural N	5.35±2.23	39.79±29.48	27.82±15.40

Table 7: Variation of values of newly diagnosed (n=23) and On treatment (n=8) leprosy cases

	Latency(ms)	Amplitude (µV)	NCV(m/sec)
Newly Diagno. Rt Sural N	6.20±2.43	60.14±64.18	21.76±10.05
On treat. Rt Sural N	5.37±3.0	50.81±30.19	25.01±9.49
Newly Diagno. Lt Sural N	5.15±2.31	72.68±59.67	26.30±15.04
On treat. Lt Sural N	5.61±2.07	39.79±38.05	20.47±8.63

Discussion: In leprosy patients, it is important to recognize that, nerve damage may occur with or without symptoms from the very beginning of infection². There is considerable evidence to suggest that the peripheral nervous system plays an important role in day to day activity³.

The Neuronal status of leprosy patients can be evaluated by Nerve Conduction Study, one of the most reliable Neuropathy assessments Tests⁴. Distal Latency, Amplitude of SNAP and Sensory Nerve Conduction are the parameters of Antidromic Sensory Nerve Conduction Study of bilateral Sural nerve were evaluated in both the groups in this study.

By applying student t-test to the values and ANOVA analysis, p value was <0.05 shows statistically significance of difference of values.

Antidromic Sensory Nerve Conduction Study was done for Bilateral Sural Nerve at stimulus of

14 cm distance for active electrode. As per table no. 4, The Mean values of Right Sural Nerve Distal Latency (ms) 5.99±2.56 whereas in Left Sural Nerve distal Mean latency (ms) were 5.27±2.22, the Mean values of Right Sural Nerve Distal Amplitude (µV) was 37.73±25.27 whereas Left Sural Nerve Distal Amplitude (µV) were 38.73±27.07, the values of Right Sural Nerve SNCV (m/sec) was 25.60±9.85 whereas in Left Sural Nerve SNCV (m/sec) were 25.80±13.78. All values were differing from the reference values.

Shefner et al.¹⁰ applied the near nerve technique to patients with peripheral neuropathy and found that in 31% of them the only electrophysiological abnormality present was an abnormal late component of the SNAP,

demonstrating the efficacy of this technique in the study of potentials arising from nerve fibers ranging from 3 to 6 mm diameter, that are not recorded in routine nerve conduction studies^{11,12}. Considering that in the initial phases of leprosy there is a predominant involvement of unmyelinated fibers, following impairment of small myelinated nerve fibers^{2,12}, we decided to investigate the nerve conduction of sural nerve only as it specifically carrying sensation of lower limb and most deformities occur to lower limb. To increase the diagnostic yield of nerve conduction studies in early Diagnosed leprosy cases, it results in early treatment, the best measure to avoid the feared consequences of leprosy neuropathy, including painless ulcerations, and muscle atrophy and weakness¹³.

Recently, Marques et al.^{8,11} applied the near nerve technique to study the sensory fibers of the median nerve in newly diagnosed leprosy patients. Unfortunately, the median nerve is not accessible to biopsy, preventing morphological analysis in those cases with detected neurophysiological abnormalities. This is not the case for the sural nerve, an exclusively sensory nerve whose morphology has been extensively studied in peripheral neuropathies, including leprosy.

In this study, 11 Leprosy patient had no SNAP was recorded, suggesting complete axonal degeneration or conduction block of all nerve fibers of Sural nerves.

The abnormalities found in the main component were relatively homogeneous, always suggesting axonal loss, a finding already reported by many authors^{5,8-16}, but is not in perfect agreement with the proposed physiology of this neuropathy since Schwann cells are the first to be involved by the bacilli^{17,18}. This theoretically implies that demyelination should be the first abnormality detected, as was reported by Tzourioet al.¹⁹ for the superficial radial nerve from recently diagnosed patients.

As an affected nerve may function normally in leprosy²⁰, it is possible that all patients studied in this series had advanced disease, even those with mild manifestations. If this assumption is true, we may be studying nerves that show a significant degree of axonal degeneration, regeneration and even remyelination. The definitive understanding of all these findings and assumptions will probably be reached with the evaluation of patients in the very early stages of the disease, studied not only distally but also at the topography where the initial attack occurs, and with studies analyzing both morphology and electrophysiology.

Conclusion: Demyelinating neuropathy of Sural Nerve is more common than Axonal Neuropathy in Leprosy cases. There is also chance that lead to total conduction block later or might be developed in early stage also. To better understand the neurophysiological status of leprosy and especially of lower limb and to increase the accuracy of the diagnosis; it is to be necessary to investigate patients in the very early stages of the disease and periodically. Smear positive case are more prone to develop the conduction block than smear negative cases.

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Endurance Capacity In College Sport Girls-A Comparative Study

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Abstract: Background: A comparative study of endurance capacity between sports and normal college girls and to show the importance of sports in physical fitness among college students. Method: The present study was carried out in 120 college girls, Ambajogai. The cases (60 girls) were involved in sports like football, hockey, volleyball etc. and the controls (60girls) were not involved in sports. The parameters compared between cases and controls are -1) breath holding test, 2) 40 mmHg endurance test 3) maximum voluntary contraction by handgrip dynamometer 4) VO_2 max by using Harward step test and Astrand Ryhming nomogram. Result: All above parameters were significantly increased in sports girls than controls by applying 'Z' test. Conclusion: Endurance capacity is statistically increased in sport girls than normal. Hence, we suggest here that students should get involve in sports and it should be made a compulsory subject in colleges. So that students develop mental and physical health to overcome stress in education.

Key words: Astrand Ryhming nomogram, Endurance test, Handgrip dynamometer, VO_2 max

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Introduction: German Philosophy states that 'Build more playgrounds, not hospitals'¹. In western countries, the department of sports create awareness about how early participation in sports and physical education can help to inculcate healthy lifestyles. We need to know that all the wealth and knowledge in the world would be of no use if tomorrow you are on your death-bed due to poor health. So through sports, all youths are encouraged to acquire knowledge, develop positive attitude and abilities to maintain health and well being throughout their life.

In this modern era, more popularity of television, movies, computers and video games leads to sedentary lifestyle among youths. Stressful academics and physical inactivity increases depression, suicidal tendencies, heart diseases, diabetes mellitus, obesity and cancer in college students.

Introducing youth to sports is very important. Sport is essential not only for physical and mental fitness, but it helps in education for introducing values such as dedication, discipline and responsibility. Providing opportunity for our students to experience sports during their school days is an investment in our future society. The main objective of sports is to develop physical, psychological health and a spirit of tolerance. Today, millions of girls are engaged in some sort of sports or physical fitness endeavour. Many studies

were carried out in males and urban population, but few in rural and females. However, the purpose of this study was designed to highlight the importance of sports in college girls for physical fitness.

Materials and Method: The present observational study was carried out in 120 college girls of age group between 18 to 22 yrs at Dept of Physiology, SRTR Govt. Medical College, Ambajogai.

The study was approved by institutional ethical committee SRTRGMC, Ambajogai. Cases and controls were selected as per the following criteria. Cases: 60 college girls, involved in sports like football, hockey, basketball and volleyball since 2 to 3 yrs, played games 1 to 2 hrs per day for 4 to 5 days in a week.

Controls: 60 girls from same colleges, not involved in sports and any other physical activity. The study was carried out during proliferative phase of menstrual cycle of girls.

Physical examination of all the subjects before the start of procedure was done by taking consent. Girls suffering from pulmonary, heart diseases and other illness were excluded. All the procedures were followed in accordance with the ethical standards of the committee on human experimentation of the institution in which the experiments were done.

Procedure: (1) Breath Holding test: Sit quiet for 5 min. Take a full, but not too deep breath. Hold it with mouth and nostrils closed. Note time in seconds. (2) Flack's mercury manometer (40mmHg endurance) test: Ask the subject to take deep inspiration. Ask her to close her nostrils and blow into the mercury manometer to raise the mercury-pressure to a level of 40 mmHg. The cheek should not be blown. Maintain the level of 40 mmHg and note the time in sec. Watch for the pulse. It should not increase until the breaking point. (3) Maximum voluntary contraction²: Ask the subject to hold the handgrip dynamometer with the help of right hand, with the upper arm dependent and forearm held horizontally on the side arm of chair. MVC was measured in kg by brief contraction of handgrip of less than 3 sec. duration. Three successive readings were taken with rest of 1 min between each test. The best reading was taken. (4) Maximal oxygen consumption (Vo_{2max})³: It was calculated by using step test technique and Astrands Ryhming nomogram. The subject was asked to step up and down 33 cm high bench 22 times per min for 5 min. The rate was adjusted with the help of metronome. The pulse rate for one min. immediately after exercise was noted. This was matched with weight of the subject using nomogram to obtain Vo_{2max} .

Result:

Table 1: Comparison of breath holding test in between sport and control girls

Parameter - Breath Holding test (sec)	Mean ± S.D.	'z' value	'p' value
Cases (n=60)	59.19 ± 13.49	6.04	P<0.05
Controls(n=60)	38.04 ± 8.04		

There is statistically significant increase in breath holding time in sport girls than normal college girls by applying Z test.

Table 2: Comparison of 40 mmHg endurance test in between sport and control girls

Parameter- 40 mmHg endurance test (sec)	Mean± S.D.	'z' value	'p' value
Cases (n=60)	49.42 ± 11.10	6.12	P<0.05
Controls (n=60)	32.33± 5.73		

There is statistically significant increase in 40 mmHg endurance test in sport girls than normal college girls by applying Z test.

Table 3: Comparison of Maximum voluntary contraction test in between sport and control girls

Parameter MVC(kg)	Mean ± S.D.	'z' value	'p' Value
Cases (n=60)	43.57± 6.63	2.53	P<0.05
Controls (n=60)	34.23± 5.47		

There is statistically significant increase in Maximum Voluntary Contraction in sport girls than normal college girls by applying Z test.

Table 4: Comparison of Vo_{2max} in between sport and control girls

Parameter Vo_{2max} (lit/min)	Mean ± S.D.	'z' value	'p' Value
Cases (n=60)	3.04± 0.40	3.25	P<0.05
Controls (n=60)	2.50± 0.35		

There is statistically significant increase in Vo_{2max} (lit/min) in sport girls than normal college girls by applying Z test.

Discussion: The group of exercises involved in sports like football, Hockey, Basketball and volleyball are flexibility, aerobic and anaerobic exercises. Flexibility exercises such as stretching improve range of motion of muscles and joints. Aerobic trainings such as running focus on increasing cardiovascular endurance. Anaerobic exercises such as sprinting increase short term

muscle strength³. A type of circuit training in these sports which build both strength and endurance⁴. Breath holding time and 40 mmHg endurance training are related to respiratory efficiency and used as a rough index of cardiopulmonary reserve. These tests have definite and direct relation with vital capacity. Dryer, Wittich and Peabody noted that physical training increases vital capacity by 30%⁵. In sports, much of the improvement in pulmonary function is attributable to strengthened respiratory musculature. These become more efficient reducing the oxygen costs for breathing. These muscles improve respiratory efficiency and minimize respiratory work at given exercise intensity⁶. So, breath holding time and 40mmHg endurance test are significantly more in sport girls than controls (Table 1&2).

Maximum voluntary contraction is determined by strength of muscle which relates to muscle cross sectional area³. Costill and Coyle demonstrated an increase in muscle fiber area that has undergone physical training⁷. Growth of muscle primarily resulted from an enlargement of muscle fibers and increase in number assumed due to fiber splitting⁸. During sport exercise muscles undergo hypertrophy due to increase in no. of myofibrils, mitochondria, ATP, phosphocreatine, stored glycogen and fat⁹. One of the primary benefit from exercise is the ability to increase muscle recruitment. This is an example of increased "mind-muscle" connection that becomes possible through regular training of sports. Hence, Maximum voluntary contraction is significantly higher in sport girls as compared to controls (Table 3). Sports scientists use VO_{2max} as the best measure of aerobic power. VO_{2max} is a maximal rate of oxygen consumption in ml/kg/min. VO_{2max} of marathoner is about 45% more than untrained person. During sports, girls underwent aerobic exercise, performed at moderate levels of intensity for extended periods of time. It strengthens heart and respiratory muscle efficiency, increases RBC count for transport of oxygen and O_2 diffusing capacity at lung⁹. Hence, VO_{2max} of sport girls is higher than controls (Table 4).

Conclusion: Endurance capacity is more in sport girls than normal girls. Now a days, physical

inactivity is seen among students due to sedentary lifestyle which may lead to many mental and health problems. Hence, we suggest that students should get involved in sports and it should be made a compulsory subject in colleges. Enter the world of sports and games, a world beyond the pages of books.

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Association Of Heart Rate And Blood Pressure With BMI In Children

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Abstract: Background: As childhood obesity is a single marker of the child at risk for development of various non-communicable diseases later in life, we have conducted a cross sectional study of 2000 school going children from age group 7-11 years to find the prevalence of obesity & its association with heart rate & blood pressure. Method: Schools were selected based on simple random sampling method. Prevalence of childhood obesity was calculated based on BMI using NCHS guidelines. Resting Blood Pressure (B.P) was determined using mercury manometer with appropriate sized cuffs, by auscultatory method. Heart rate was recorded in each child after 5 min of rest for 1 minute and comparison was done between normal and obese children. In those children who were categorized as overweight and obese. Result: The prevalence of over-weight and obesity was 15.5% and 8.1% respectively. Overall, males were slightly more obese than Females. We found 303 overweight children with 5.6% hypertension among them and 12.34 % incidence of hypertension in 162 obese children. The incidence of hypertension in normal children was 0.78%.The mean heart rate in normal, overweight & obese children were 97.37, 100.54, & 106.71 respectively. Conclusion: The fact that obese children have higher cardio-vascular risk factors like hypertension and increased heart rate when compared to non obese children has been reinforced by the present study. These children are at a higher risk of "childhood onset of adult diseases". Thus, timely intervention will result in decreased adulthood morbidity and mortality due to obesity in these children.

Key Words: Childhood obesity, BMI, Hypertension, Heart rate

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Introduction: The WHO refers Obesity as a global epidemic because of rapid increase in the number of overweight and Obese individuals in last 20 years¹ Overweight and Obesity in children and adolescent is defined by CDC and American medical association as BMI between 85-95centile and BMI > 95thcentile respectively for children aged 2-18 years². Excess body fat negatively affects child's health and wellbeing. Overweight and obesity represent a rapidly growing threat to the health of population in an increasing number of countries³ & now they are so common that they are replacing more diseases as the most significant causes of ill health in children⁴. Childhood obesity is a single marker of the child at risk for development of various non-communicable diseases later in life.

The co-morbidities of obesity includes coronary heart disease, hypertension, stroke and certain types of cancers, NIDDM, gall bladder disease, dyslipidemia, osteoarthritis, gout and pulmonary diseases including sleep apnoea⁵. Some of the other disorders would include liver diseases, early puberty and menarche, eating disorders such as anorexia and bulimia, skin infections and asthma

and other respiratory problems⁵ In addition the obese suffer from social bias, prejudice and discrimination on the part, not only of the general public but also of health professional and this may make them reluctant to seek medical assistance⁵. Obese children are often sufferers from teasing by their peers. Some are harassed or discriminated by their own family. This may lead to low self esteem and depression⁶.

Arterial hypertension is significantly related to overweight and obesity. Their correlation may be traced in childhood. Recent studies show that the prevalence of childhood hypertension is increasing and increasing rates of hypertension are largely attributable to the childhood obesity epidemic⁷. The fundamental cause of obesity epidemic are sedentary life style; high fat and energy dense diets, both resulting from changes taking place in society and the behaviour patterns of communities; as a consequence of increased urbanization and industrialisation and the disappearance of traditional life style. While there is evidence that certain genes have an influence on BMI and body fat⁸. The present study is conducted in children in age group 7 to 11 years belonging to

schools in Kolhapur city to determine the prevalence of childhood obesity.

As childhood obesity can lead to high blood pressure and heart disease; so in present study, heart rate and blood pressure is determined in obese children to assess the cardiovascular function. So that, the necessary steps can be taken to prevent the childhood onset of adult diseases.

Aim : To study, the correlation between BMI and HR, BP in Children of age group 07-11 years

Objectives:

1. To study the prevalence of obesity in school going children aged 07-11 years
2. To study the Heart rate and blood pressure in obese children age group 07-11 years
3. Correlation of Heart rate, Blood pressure and BMI in children, age group 07-11 years.
4. To predict the cardiovascular risk in obese children and to counsel them to prevent it.

Materials and Method: A cross sectional study was conducted in 5 schools of Kolhapur city after taking clearance from Dr. D. Y. Patil Medical College ethical committee and permission from authority of schools. Children between the age group of 7-11 years were included.

Children diagnosed to be obese due to endogenous causes on clinical examination were excluded. The age of the children was obtained from the school records. The height was measured by making the child to stand upright, barefoot on the ground with heels, buttocks and shoulder touching the wall and head in Frankfurt plane.

The height was measured using sliding stadiometer (Johnson and Johnson) with an accuracy of 0.1mm. Weight was recorded using spring balance (bathroom scale) calibrated to 0.5kg accuracy.

Body Mass Index (BMI) was calculated based on the formula- $BMI = \text{Weight in kg} / \text{Height in m}^2$ Children were categorized based on BMI as per National Centre for Health Statistics guidelines⁹ with respect to their age and sex.

CATEGORY BMI

Normal 5th – 85th percentile
Overweight 85th – 95th percentile

Obese > 95th percentile

Resting Blood Pressure (B.P) was determined using mercury manometer with appropriate sized cuffs (covering 2/3rd of right arm) , by auscultatory method in right arm supine after a 5 minute resting period. Systolic B.P was determined by the onset of “tapping” Korotkoff’s sounds (K1) and Diastolic B.P, as the disappearance of the Korotkoff’s sounds (K5) as per Update on 1987 Task force report, National high blood pressure education programme committee.¹⁰

For each subject B.P was recorded. Children with a systolic or diastolic B.P >90th centile but < 95th centile with respect to their age, sex and height were classified as having Pre-hypertension. Children with systolic or diastolic B.P >95th centile with respect to their age, sex and height were designated as having Hypertension as per Update on 1987 Task force report, National High blood pressure education programme coordinating committee¹¹. Heart rate was recorded in each child after 5 min of rest for 1 minute and comparison was done between normal and obese children. In those children who were categorized as overweight and obese, cardiovascular risk factors were analyzed by Tukey Test.

Result & Discussion: Over-weight and obesity represent a rapidly growing threat to the health of population in an increasing number of countries. Indeed, these are now so common that they are replacing the traditional diseases as the most significant causes of ill health.

The age group included in the study was between 7-11yrs. Here, the prevalence of over-weight and obesity was 15.5% and 8.1% respectively. Overall, males were slightly more obese than Females this may be partly due to the fact that males were more in number as then females in our study sample.

Study done by Subramanyam.V.et al in 1998 at Chennai included 610 girls and found 9.67% overweight and 6.23% obese.

Study done by Kapil¹² et al in 2001-2002 at delhi included 870 children and found a incidence of

7.4% Obese. Study done by Khadilkar V.V. et al¹³ in 2004 at Pune included 1128 boys and found an incidence of 19.9% overweight and 5.7% Obese and found an incidence of 17.7% overweight and 4.99% obese children.

In our study done in Kolhapur found an incidence of 15.15% overweight and 8.1% Obese ,which correlates with above studies.

This may be due to fact that in India, the available studies were done in metro cities, where there was total adoption of western culture, availability of fast food centers and sedentary lifestyle behaviors. The schools selected in the previous studies were

on the basis of school fees of approximately Rs.1000 to 2000 per month. western culture has grown rampantly in last Kolhapur, being a major city in western Maharashtra where the traditional cultures and practices are still prevalent but adaption to decade with availability of number of fast foods like Burger, pizza etc.

Hence the prevalence of overweight and obesity has correlated with other studies done in metro cities. The prevalence of obesity in America and other developed countries is much higher as shown in table no.1. As in developed countries children has more sedentary lifestyle and more availability of fast foods.

Table 1: Prevalence of Obesity in children in various studies

Study done by	Age Group (Yrs)	Total	BMI criteria	Prevalence of obesity	
				Overweight	Obese
1) G. Kapoor et al, Delhi (1991)	11-18	253	> 25 – Overweight > 30 – Obese	-	2.7%
2)Subramanyam.V et al, 1998. Chennai	10-15	610 (Girls)	85th -95th centile – Overweight > 95th centile – Obesity	9.67%	6.23%
3)NHANES 1999-02. United States	6-19	4018	85th -95th centile – Overweight > 95th centile – Obesity	31%	16%
4)Kapil U et al (2000-2001), Delhi	10-16	870	25 – Over weight > 30 – Obese	24.7%	7.4%
5)NFI 2002, Delhi	4-18	5000	> 25 – Over weight > 30 – Obese	27.3%	1.7%
6)Khadilkar V.V. et al,2004. Pune	> 10-15	1228 (Boys)	> 25 – Over weight > 30 – Obese	19.9%	5.7%
7)Ambily.G.Unnithan et al,Kerala(2008)	10-15	3886	85-95- over weight >95- Obese	17.73	4.99%
Present study	7-11	2000	85-95- over weight >95- Obese	15.15%	8.1%

The relationship between BMI & hypertension cannot be characterized by threshold effect but indeed represents a continues relationship. The prevalence of hypertension increases progressively as BMI increases from 5th centile to 95th centile. Others studies have shown that prevalence of hypertension in normal children varies from 0.04% to 4.52%. Gupta et al¹⁴studied 3861 children with age group 5-15 years and found 292 obese children of which

3.4% had hypertension and 0.16% hypertensive children were non obese.

Verma et al¹⁵studied 2560 children with age group 5-15 years and found 131 obese children of which 13.7% had hypertension and 0.04% hypertensive children were non obese.

Scrof J.M. et al¹⁶studied 5102 children at Housten USA, with age group 10-19 years and

found 1020 obese children of which 10.7% had hypertension and 2.6% hypertensive children were non obese.

Table 2: Incidence of pre hypertension and hypertension in obese and non obese children in our study

		Pre hypertension	Hypertension
Normal	1535(76.75%)	13(0.84%)	12(0.78%)
Over weight	303(15.15%)	23(7.54%)	17(5.6%)
Obese	162(8.1%)	18(11.11%)	20(12.34%)

Another study done by Mohan B et al¹⁷ in 2004 at Ludhiana included 2397 children with age group 11-17 years .He found 217 overweight children with 15.33% hypertension among them and 43.1 % incidence of hypertension in 58 obese children. The incidence of hypertension in normal children was 4.52%. The incidence of hypertension in his study was higher probably because the group include was pre-adolescent and adolescent.

Another study done by Boyd G.S et al¹⁸ included 497 obese children in 2004 at Philadelphia found an incidence of 6.8% pre-hypertension and 27.9% hypertension In the present study we included 2000 children with age group 7-11 years .We found 303 overweight children with 5.6% hypertension among them and 12.34 % incidence of hypertension in 162 obese children. The incidence of hypertension in normal children was 0.78%.

Table 3: Mean heart rate in normal, over weight and Obese children

	Mean heart rate	SD
Normal	97.37	11.11
Over weight	100.54	10.32
Obesity	106.71	9.48

Several studies proved that Obesity leads to increased sympathetic activity and decreased activity of parasympathetic system. This leads

to increased risk for cardiac dysfunction in adulthood as it causes increased heart rate and Hypertension.

Yalcini et al¹⁹. reported data indicating no differences in sympathetic activity but reduced parasympathetic nervous system activity between Obese and normal weight.

Rabbia et al²⁰. Showed that children who were recently Obese had significantly increased sympathetic activation, but children who had been Obese for 4 years were no different than healthy controls, which suggests that the duration of obesity might be a factor explaining the differences seen in studies assessing sympathovagal balance.

As the BMI increases, there is increase in sympathetic activity leading to increase in heart rate and blood pressure.BMI is directly proportional to obesity. Hence, in obesity there is increase in heart rate and blood pressure.

In our study there was a similar finding that heart rate increases as one moves from normal weight to overweight and then to Obese. The previous study and the present study shows that there is a positive correlation between BMI and Blood pressure and Heart rate. With an increase in BMI the Blood pressure increases and also there is an increase in Heart rate. This is due to increase sympathetic activation.

Thus, in obese children there is risk of hypertension which can lead to cardiac disease in future. If the obesity is prevented in early childhood this risk can be eliminated. So, if we regularly calculate BMI in children they can be advised to reduce BMI with application of different measures to prevent future cardiac disease.

Conclusion: Childhood obesity is in increasing trend from past 20 years in both developing and developed countries.The prevalence of childhood obesity in school children in Kolhapur city is 8.1% .

Heart rate and Blood Pressure were increased in overweight and Obese children as compared to normal children.The fact that obese children

have higher cardio-vascular risk factors like hypertension and increased heart rate when compared to non obese children has been reinforced by the present study. These children are at a higher risk of “childhood onset of adult diseases”. Thus, timely intervention will result in decreased adulthood morbidity and mortality due to obesity in these children.

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Hyperhomocysteinemia As A Risk Factor For Atherosclerosis In Chronic Kidney Disease

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Abstract: Background: The role of Hyperhomocysteinemia (HHomocysteine) as a risk factor for atherosclerosis in Chronic kidney disease (CKD) has gained much interest worldwide. The primary objective of the study was to ascertain the association between serum homocysteine levels and GFR. Method: This case control study was done in stage 3, 4 and 5 of CKD (cases= 63 ,controls =21) to assess the association between Serum homocysteine (S.Homocysteine), Serum creatinine (S.Cr), Glomerular Filtration Rate (GFR) and Carotid intima media thickness (CIMT). Result: Statistical analysis using ANOVA and Pearson's correlation revealed a significant association between S.Homocysteine and stages of CKD ($p=0.00$), S.Homocysteine and GFR ($p=0.00$, $rsq=0.3686$) S.Homocysteine and CIMT ($p=0.002$, $rsq=0.1429$) and CIMT and CKD ($p=0.00$). Conclusion: On the basis of these observations, it was concluded that HHomocysteine exists in CKD and that it produces atherosclerosis. Hence early screening and treatment for HHomocysteine and atherosclerosis should be done in CKD to prevent cardiovascular diseases.

Key

Words: Homocysteine (Homocysteine), Hyperhomocysteinemia (HHomocysteine), Chronic Kidney Disease (CKD), atherosclerosis, Glomerular Filtration Rate (GFR), Carotid intima media thickness (CIMT).

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Introduction: Chronic kidney disease (CKD) is an important chronic disease that affects the world¹. It is a clinical human model of accelerated atherosclerosis and there is increased cardiovascular morbidity and mortality in CKD patients². Despite the high prevalence in CKD, the traditional risk factors (old age, hypertension, diabetes mellitus, dyslipidaemia and physical inactivity) fail to entirely account for the progression of atherosclerotic diseases. Unique renal related risk factors like HHomocysteine contribute to the high risk of atherosclerosis in CKD³.

CKD patients have an excess prevalence of mild to moderate HHomocysteine (85-90%) and HHomocysteine has been independently linked to Cardiovascular diseases in CKD in many recent prospective observational studies³. This study was done with the objective of finding the correlation of Homocysteine values with renal function and extent of atherosclerosis in CKD patients.

Material and Method:

Study design: This case control study was done at Nephrology outpatient department Government Medical college Hospital, Trivandrum, Kerala, India. The 63 cases

belonged to stage 3, 4 and 5 of CKD, 21 cases in each group, belonging to either gender and of 25-65 years of age. Cases with diabetic nephropathy and proteinuria of >1 gm were excluded. CKD included those patients with kidney damage for ≥ 3 months with structural or functional abnormality or a GFR of < 60 ml/min/1.73m² for >3 months with or without kidney damage. GFR of 30-59 ml/min/1.73m² is CKD stage 3, GFR of 15-29 ml/min/1.73m² is stage 4 and GFR of <15 ml/min/1.73m² is stage 5. Age and sex matched controls were selected from healthy kidney donors attending the nephrology clinic. Those donors who volunteered to participate were free of overt CKD, Coronary artery disease, Diabetes mellitus and hypertension. The protocols were submitted to and approved by Human Ethical Committee of Medical College, Thiruvananthapuram.

MATERIALS:

- A) Blood parameters :- Blood samples were taken for S.Homocysteine (serum homocysteine), S.creatinine, blood urea nitrogen and S.albumin estimation.
- B) Glomerular Filtration Rate (GFR)
- C) Carotid Intima Media Thickness (CIMT)

1.Homocysteine estimation: Homocysteine is a thiol-containing amino acid produced by the intracellular demethylation of methionine. Homocysteine assay was done using Axis Homocysteine Eia Fhomocysteine 100 Kit. Assay principle :Axis® Homocysteine Enzyme Immunoassay (EIA) is an enzyme immunoassay for the determination of Homocysteine in blood. Protein-bound Homocysteine is reduced to free Homocysteine and enzymatically converted to S-adenosyl-L-homocysteine (SAH) in a separate procedure prior to the immunoassay. The enzyme is specific for the L-form of homocysteine, which is the only form present in the blood.

Reduction: Homocysteine, mixed disulfide and protein-bound forms of Homocysteine in the

sample are reduced to free Homocysteine by use of dithiothreitol (DTT).

Enzymatic conversion: Homocysteine in the test sample is converted to S-adenosyl-L-homocysteine by the use of SAH hydrolase and excess adenosine.

The following solid-phase enzyme immunoassay is based on competition between SAH in the sample and immobilized SAH bound to the walls of the microtitre plate for binding sites on a monoclonal anti-SAH antibody. After removal of unbound anti-SAH antibody, a secondary rabbit anti-mouse antibody labelled with the enzyme horse radish peroxidase (HRP) is added. The peroxidase activity is measured spectrophotometrically after addition of substrate, and the absorbance is inversely related to the concentration of Homocysteine in the sample.

REAGENTS

Kit components	Solution	Cap code	Component description	Volume
Reagent A	Assay bufferer	A	Phosphate bufferer,sodiumazide	54ml
Reagent B	Adenosine/DTT	B	Adenosine/dithiothreitol,citric acid	3.5ml
Reagent C	SAH-hydrolase	C	Recombinant S-adenosyl-L-homocysteinehydrolase, trisbufferer, glycerol,methylparaben	3.5ml
Reagent D	Enzyme inhibitor	D	Merthiolate,phosphate bufferer	55ml
Reagent E	Adenosine deaminase	E	Adenosine deaminase ,phosphate bufferer,sodiumazide,BSA,phenol-red dye	55ml
Reagent F	Anti-SAH antibody	F	Monoclonal mouse anti-S-adenosyl-L-homcysteineantibody,BSA, merthiolate	25ml
Reagent G	Enzyme conjugate	G	Rabbit anti mouse antibody enzyme conjugate,BSA,horseradish peroxidase,blue dye	15ml
Reagent H	Substrate solution	H	n-methyl-2-pyrrolidon,propyleneglycol	15 ml
Reagent S	Stop solution	S	0.8 M sulphuric acid	20 ml
Bufferer Wash	Wash bufferer	W	Phosphate bufferer, merthiolate, tween 20,BSA	60 ml
CAL-1 To CAL 6	Calibrators	1-6	S-Adenosylhomocysteine (2,4,8,15,30,50µmol/l) in bufferer with preservative	6×1.5 ml
Microtitre Strips	Microtitre strips		Coated with S-adenosyl-L-homocysteine	12×8wells

Additional requirements : Plastic or glass tubes for pre-treatment of samples, pipettes/ multipipettes 25 µL, 100 µL, 200 µL and 500 µL or 8 channel multipipette for 100 µLand 200 µL, Volumetric flask 50 mL and 600 mL, Incubator,

37 °C, Washer and reader (450 nm) for microtitre plates.

Preparation and Storage of Kit Components Components were refrigerated at 2 - 8 °C. All bottles were stored upright and tightly

capped. The sample pre-treatment solution was made by mixing Reagent A, B and C.

The solution which is stable for one hour had to be freshly made for each run. The Wash buffer was diluted (1+9) with distilled water before use. The prepared wash buffer was stable for 4 weeks when stored at room temperature (18-25 °C). Reagent D and H were stored in dark bottles to avoid exposure to light. The microtitre strips were kept dry, i.e. in the sealed bag with drying capsules, and stored refrigerated. Equilibration for a minimum of two hours was required to reach room temperature (18 - 25 °C). The strips were left in the bag during equilibration. Only the necessary number of microtitre strips were kept in the frame during the run. Unused strips were kept in the sealed bag with drying capsules. Exposure of the kit to temperatures exceeding 37 °C was avoided to prevent the denaturation of the enzymes.

Specimen Collection and Preparation: EDTA-plasma was used with the Axis® Homocysteine Enzyme Immunoassay (EIA). EDTA-plasma samples were put on ice immediately after drawing. EDTA plasma samples may be kept on ice for up to 6 hours prior to separation by centrifugation. Complete mixing of thawed samples was done before use. Plasma samples could be stored for 12 weeks at 2 - 8 °C, for up to 3 weeks at room temperature (18 - 25 °C).

Procedure: All solutions and microtitre strips were equilibrated to room temperature before use.

Sample pre-treatment procedure: Sample pre-treatment solution was made up no more than 1 hour prior to the start of the assay. Volume needed per 10 samples: 4.5 mL REAGENT A + 0.25 mL REAGENT B + 0.25 mL REAGENT C. All the reagents were then mixed. Calibrators and samples/controls in plastic or glass tubes were diluted as follows: 25 µL calibrator / sample / control + 500 µL sample pre-treatment solution were mixed well. They were incubated for 30 minutes at 37°C (The tubes were covered with parafilm during incubation). 500 µL REAGENT D was added and mixed well. It was incubated

for 15 minutes at 18-25°C. 500 µL REAGENT E was added and mixed well. It was incubated for 5 minutes at 18-25°C.

Microtitre plate procedure 25 µL diluted calibrator / sample / control was pipetted from step 4 into the wells of the SAH-coated microtitre strips. 200 µL REAGENT F was added to each well. It was incubated for 30 min at 18-25°C. The enclosed lid was used during all incubations. It was washed manually 4 times with 350 µL of diluted Wash buffer (BUF WASH + purified water). After washing, the wells were emptied onto paper towels. 100 µL REAGENT G was added to each well and incubated for 20 min at 18-25°C. It was washed 4 times with 350 µL of diluted Wash buffer (BUF WASH + purified water). After washing, the wells were emptied onto paper towels. 100 µL REAGENT H was added to each well and incubated for 10 min at 18-25°C. 100 µL REAGENT S was added to each well. The wells were shaken and reading taken at 450 nm. A logistic curve fit was used for preparing the calibration curve and calculation of unknown samples.

Estimation Of Glomerular Filtration Rate (GFR): Glomerular filtration rate was calculated using the Modification of Diet in Renal study equation (MDRD) as recommended by the National Kidney Foundation Kidney Disease Outcome Quality Initiative (KDOQI). The MDRD Equation is as follows :-

$$GFR (ml/min/1.73m^2) = 170 \times (Scr)^{-0.999} \times (Age)^{-0.176} \times (\text{Serum Urea N})^{0.370} \times (Alb)^{0.318} \times (0.762 \text{ if female}) \times (1.180 \text{ if black})$$

The cases with GFR of >15 to <60 ml/min/1.73 m² were selected for the study.

Carotid Intima Media Thickness Study After taking informed consent and relevant history, high resolution After taking informed consent and relevant history, high resolution ultrasonographic examination of the common carotid arteries was carried out with 6 - 12 MHz linear probe in GE VOLUSON PRO machine. Patient was placed in supine position with neck slightly extended; head was placed away from the examination site. Intima-media complex

thickness was measured at 1 - 1.5 cm proximal to the carotid bulb in longitudinal plane. The area under study had to be free of plaque. Scanning of both side arteries was performed in anteroposterior projections and to obtain a better image, sound wave was adjusted perpendicularly to the arterial surface of the posterior wall of the vessel, yielding two parallel

echogenic lines which corresponds to lumen-intima and media-adventitia interfaces. The distance between the lines was taken as the combined thickness of the intima and media (IM complex).

STATISTICAL ANALYSIS: Statistical analysis was done Using ANOVA and Pearson's correlation.

Table 1 : Mean value of variables in each group

Stage Of CKD	Age (Yrs)	Weight (Kg)	S.Creatinine (µmol/L)	GFR MI/Min/1.73m2	S.Homocysteine (µmol/L)	CIMT (Cm)
CONROLS						
Mean	46.00	70.43	79.98	86.67	11.06	.055
SD	10.43	6.98	10.26	13.70	1.72	.006
CKD 3						
Mean	41.57	63.43	168.80	39.29	25.76	.090
SD	10.98	13.39	30.73	9.59	9.33	.021
CKD 4						
Mean	45.00	51.38	287.09	21.71	38.86	.099
SD	11.70	6.54	58.35	5.16	13.49	.031
CKD 5						
Mean	45.67	52.52	744.66	8.57	49.19	.109
SD	13.89	6.87	319.21	3.59	13.54	.031

Fig 1: S.Homocysteine Values Of Cases And Controls (µmol/L)

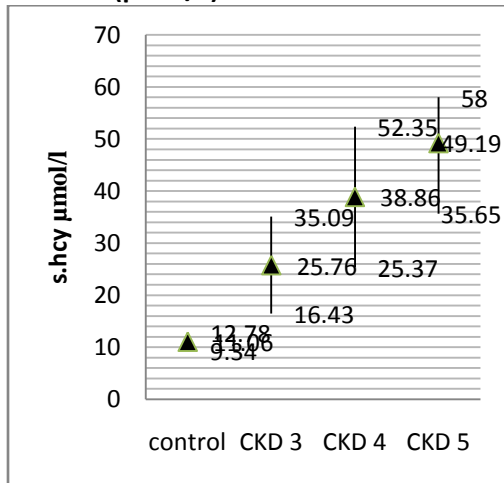


Fig 2 : Carotid Intima Media Thickness Of Cases And Controls (Cm)

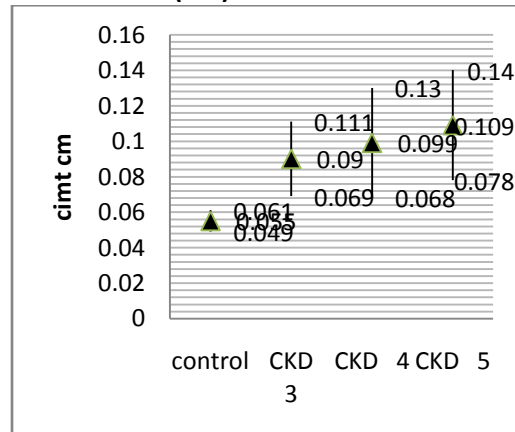


Table 2: Association Between S.Homocysteine And GFR In Cases

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.607 ^a	.369	.358	12.45261

a. Predictors: (Constant), GFR

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	5522.286	1	5522.286	35.612	.000 ^a
	Residual	9459.110	61	155.067		
	Total	14981.396	62			

a. Predictors: (Constant), GFR

b. Dependent Variable: S.HCY

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	53.389	3.013		17.721	.000
	GFR	-.662	.111	-.607	-5.968	.000

a. Dependent Variable: S.HCY

Table 3: Association Of S.Homocysteine And CIMT

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.378 ^a	.143	.129	.02693

a. Predictors: (Constant), S.HCY

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	.007	1	.007	10.167	.002 ^a
	Residual	.044	61	.001		
	Total	.052	62			

a. Predictors: (Constant), S.HCY

b. Dependent Variable: CIMT

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	7.300E-02	.009		8.085	.000
	S.HOMOCYSTEINE	7.014E-04	.000	.378	3.189	.002

a. Dependent Variable: CIMT

Result & Discussion: Serum Homocysteine and CKD: In this case control study , the mean value of the S. Homocysteine in the controls is found to be 11.06+1.72 µmol/L. The S. Homocysteine value increases significantly across the stages of CKD – 25.76+9.33 µmol/L in stage 3, 38.86 +13.49 µmol/L in stage 4 and 49.19 + 13.54 µmol/L in stage 5 (Table 1, Fig 1) . ANOVA of S. Homocysteine between cases and controls as well as between the groups of cases is significant at **p value = 0.000**. The above results are consistent with the

previous studies , which date from 19/7/94 , that hyperhomocysteinemia is associated with CKD. Arnadottir et al⁵, Chauveau et al⁶, Hultberg et al⁷, Cleveland clinic studies⁸, Litaoruan et al⁹, Samuelsson et al¹⁰ and Wilcken et al⁴ consistently found a significant association between hyperhomocysteinemia and CKD. Various reasons has been cited in many review articles for this significant association .

Arteriovenous studies in normal rat and human kidneys show that Homocysteine is normally filtered, reabsorbed and metabolized by the kidney. Hence only minimal levels of Homocysteine is normally excreted in urine. In CKD, the metabolism and filtration is altered, leading to HHomocysteine¹¹. Retained uremic toxins inhibit extrarenal Homocysteine metabolism by inducing transsulfuration defects¹².

Genetic polymorphisms of C677T also determine the Homocysteine levels in CKD. Certain studies report that HHomocysteine is the cause rather than the consequence of CKD¹².

Serum Homocysteine and Glomerular Filtration Rate

Rate : In this study, serum homocysteine shows a significant negative linear relation with GFR ($p=0.000, rsq=0.3686$) (Table 2, Fig 3). This relation is consistent with the previous studies from various parts of the world. This significant relation suggests that kidney plays an important role in plasma Homocysteine handling. GFR values estimated from Serum creatinine or calculated creatinine clearance is consistently and inversely correlated with plasma Homocysteine levels.

Certain studies suggest that the relation between S.Homocysteine and GFR is because of creatinine, from which GFR values are estimated. But, studies which estimated GFR by other Method (serum creatinine, Creatinine clearance, plasma iohexol clearance, ⁵¹Cr –EDTA clearance or plasma Cystatin C) have shown that declining renal function is associated with high Homocysteine levels. This inverse relation extends from normal to End stage renal disease and to hyperfiltrating diabetic nephropathy¹¹.

Some studies suggest that HHomocysteine causes intrarenal arteriosclerosis or arterial hyalinosis, resulting in reduced renal perfusion pressure. This leads to focal or global glomerulosclerosis, tubular atrophy and interstitial fibrosis. This can also be the reason for a negative relation of S.Homocysteine with GFR^{11,12}.

Carotid Intima Media Thickness And CKD:

In the present study, the mean CIMT increase with progress in Stages of CKD. In the controls the

mean value is $0.055 \text{ cm} \pm 0.006$, $0.090 \pm 0.021 \text{ cm}$ in stage 3, $0.099 \pm 0.031 \text{ cm}$ in stage 4, $0.109 \pm 0.031 \text{ cm}$ in stage 5 (table 1, fig 2). ANOVA shows significant association between CIMT and CKD. ($p=.000$) (table 2) This association is consistent with previous studies done by Baptista et al¹³, Benedetto et al¹⁴, Bevc et al¹⁵, Kumar et al¹⁶, Ryuichi et al¹⁷ and Zoungas et al¹⁸.

The main reasons for the increased incidence of atherosclerosis in CKD are dyslipidaemia, oxidative stress, Hyperhomocysteinemia and raised markers of inflammation (CRP, fibrinogen and cytokines)².

Serum Homocysteine And Atherosclerosis.

In this study, Carotid intima media thickness, a marker of atherosclerosis, shows a significant positive linear relation with homocysteine values (table 3 FIG 3) ($p=0.002$, $rsq=0.1429$). This relation is consistent with most of the previous studies.

Several mechanisms have been postulated by which Homocysteine might cause atherosclerosis and atherothrombosis:

Homocysteine metabolism generates reactive superoxide radicals which cause endothelial injury. It promotes vascular smooth muscle proliferation by stimulation of the mitogen-activated protein kinase signal transduction pathway and DNA synthesis. Homocysteine promotes adhesion between neutrophil and endothelial cells. Homocysteine oxidizes LDL and promotes the cellular uptake of modified LDL¹⁷. Homocysteine induces the expression of TDAG51 which increases apoptosis and the risk of rupture of atherosclerotic lesions by decreasing its stability²⁰.

Conclusion: Mild to moderate hyperhomocysteinemia exists in CKD and Serum homocysteine shows a significant negative correlation with GFR. Carotid intima media thickness is significantly elevated in the groups of CKD and it shows a significant positive relation with S.Homocysteine.

This suggests that HHomocysteine in CKD is atherosclerotic and early detection of atherosclerosis can be done with carotid intima media thickness study. Along with the screening and treatment of other risk factors of

atherosclerosis in CKD, hyperhomocysteinemia should also be treated. Further experimental, biochemical, genetic and prospective follow up studies are required for understanding the pathophysiology and consequences of hyperhomocysteinemia in CKD.

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Sensory Nerve Conduction Studies In Non-Insulin Dependent Diabetes Mellitus (NIDDM) Patients Without Symptoms Of Peripheral Neuropathy And Healthy Volunteers: A Comparative Study

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Abstract: Background: NIDDM is one of the chronic diseases all over the world. Prevalence and incidence is highest in Asian countries. Diabetic Neuropathy is one of the commonest long term complications of NIDDM. Electro diagnostic tests can be used to detect diabetic neuropathy at an early stage (before development of the signs or symptoms of neuropathy). Nerve conduction study (NCV) is considered to be the most sensitive reliable noninvasive and objective means of investigations of diabetic polyneuropathy. Diabetic neuropathy is curable, and hence if detected, the proper treatment can be instituted in early stages, which again, can give rise to good outcome. As the peripheral nerve has the ability to regenerate, line of treatment can be planned. Aim & Objective: To use recent advancement of technology as a means of assessing the functional status of sensory fiber with particular emphasis upon the correlation between non-insulin dependent diabetes mellitus (NIDDM) and the degree of Neuropathy. Method: 50 diabetic & 50 non diabetic controls of comparable age & BMI were selected. Sensory nerve conduction velocity was measured by orthodromic stimulation with the help of the EMG-NCV recording machine, Neuroperfect plus of Medicaid systems. Result: Out of 50 randomly selected Diabetics, 20 cases showed attenuation of amplitude and slowing of conduction velocity. It suggests 40 percent of total cases are having Neuropathy. Conclusion: Nerve conduction studies can diagnose Diabetic Neuropathy at a very early stage even before symptoms & signs set in. Hence, NCS being simple, harmless, non-invasive and objective technique along with easy interpretation of results can be used routinely to obtain considerable information and evaluate the status of nerves in patients with NIDDM.

Key Words: Diabetic neuropathy, Sensory nerve conduction velocity, Nerve conduction study.

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Introduction: NIDDM is one of the chronic diseases all over the world. Prevalence and incidence is highest in Asian countries. Diabetic Neuropathy is one of the commonest long term complications of NIDDM. To examine the sensory nerves, proper clinical examination of sensory system & nerve biopsy & Electro diagnostic tests can be used to detect diabetic neuropathy at an early stage (before development of the signs & symptoms of neuropathy). Nerve conduction studies (NCS) are considered to be the most sensitive reliable non-invasive and objective means of investigations of diabetic polyneuropathy. It helps in evaluating the type & degree of abnormalities of the peripheral nerves. Specially demyelination diseases & focal compression of nerves. A decrease in amplitude in compound action potential (sum of all individual nerve action potentials) provides evidence of a reduction in the overall number of functioning axons. Slowing of conduction velocity is suggestive of peripheral nerve demyelination which may be diffuse as seen in demyelinating peripheral neuropathy or focal as in conduction block or

pressure palsies. NCS can differentiate between focal or diffuse & whether damage is principally axonal or demyelinating.¹

It establishes diagnosis quiet early than other diagnostic procedures because of its sensitivity to detect slowing of conduction of action potential in a nerve, which is an early indicator of peripheral neuropathy. Neurophysiologic studies supplemented the clinical examination by precisely localizing the lesion and characterizing the conduction abnormalities providing additional information, details and objectivity. They delineate a variety of conditions that may otherwise escape detection.²

Non-insulin dependent diabetes mellitus (NIDDM) is a generalized metabolic disorder usually developing with hereditary predisposition. Diabetes can manifest at any time of life but is more common after age of 40 years. Neuropathy is one of the complications of diabetes. 15 percent of patients with NIDDM have both symptoms and

signs of neuropathy but nearly 50 percent have either neuropathic symptoms or slowing of Nerve Conduction Velocity, before patient develops any sign^{2,3} Electromyography and Nerve Conduction Studies are the chief investigations for the detection of Peripheral Neuropathy. Evaluation of several parameters including latency, conduction velocity & amplitude is helpful in determining the types of fibre involvement. Mostly NCV determination is used compared to EMG for purpose of studying diabetic neuropathy due to following advantages:

1. It is easily obtainable.
2. It is painless and harmless.
3. It provides a good recording.
4. It is easily reproducible and sensitive.
5. It gives a clear recording with minimal disturbances.
6. Not much of amplification is required.
7. Early functional impairment of nerve in asymptomatic cases can be studied i.e. disorder affecting the nerves insufficient to produce clinical abnormality may be detected as decrease in Sensory NCV.
8. Useful as a tool of diagnostic, prognostic and follow up study of Neuropathy.⁴

Both motor & sensory nerves can be tested in NCS but sensory nerves are affected earlier than motor nerves. Orthodromic&antidromic stimulation give similar results but in antidromic result can be both due to stimulation of sensory & motor fibers so orthodromic should be preferred to have pure sensory NCS. Loss of myelinated fibers is the most prominent finding in the systemic neuropathy. Segmental demyelination and remyelination of remaining axons are seen in teased preparations. Unmyelinated fibres are also reduced in specimens. Under electron microscope, the basement membranes of intraneural capillaries are seen to be thickened and duplicated.⁵

Diabetic Neuropathy, in all of its varied forms, is the most common peripheral neuropathy associated with a particular disease. Diabetic Neuropathy is a curable and hence if detected early, the proper treatment can be instituted in early stages (i.e. before the development of clinical signs & symptoms), which again, can give rise to

good outcome. Not only that, in severe or well advanced cases, the treatment can promote myelination and even promote axonal regeneration, which can offer partial relief⁶.

The clinical applicability of Nerve Conduction Study was greatly advanced in 1948, when Hodes et al published their studies of a series of normal subjects and patients with peripheral nerve injury and hysterical paralysis. Although nerve action potentials are of much smaller amplitude than muscle potentials, they can be recorded quite readily if suitable electrodes are placed on the skin overlying the nerve. In clinical practice, both antidromic & orthodromic Method provide the same information. Also either sensory or motor nerves can be used.

The drawbacks of the sensory nerve conduction study are that: only the status of distal nerves can be evaluated. Only the velocities in the large fiber can be measured. These draw backs do not pose any serious problem, since in NIDDM, distal nerves with largest myelinated 'A' fibers are chiefly affected. The difference in reduction of SNCV of lower limbs is greater than that in upper limbs, showing that long nerves are comparatively more affected.⁷ Conduction abnormalities develop diffusely along the entire length of nerve but more in distal than the proximal segment. Proximal conduction delay is also seen suggesting radiculopathy.⁸

Aim & Objective: To assess the functional status of sensory nerve fiber, with particular emphasis upon the correlation between NIDDM and the degree of Neuropathy. And asses the alteration in the Sensory Nerve Conduction Velocity in Diabetics as compared to controls.

Method: Permission was taken through proper channel concerned hospital authorities. 50 diabetic patients without signs & symptoms of neuropathy above 30 yrs of age compared with 50 age & sex matched healthy volunteers. Written informed consent was taken. Performa was used to record personal data, state of diabetes control & ongoing treatment. Other causes of neuropathy ere ruled out by asking & seeing their reports. Then sensory system was thoroughly examined followed by

recording sensory nerve action potential by EMG-NCV recording machine, Neuroperfect plus of Medicaid systems. Skin surface is cleaned with spirit before placing the electrode using conductive jelly placed the electrodes. 4 electrodes were used. Electrical stimulator (stimulating electrode), & 3 recording electrode (active, reference & grounding) for recording potential changes. These electrodes are connected through preamplifier to the cathode ray oscilloscope (C.R.O.). We gave supramaximal stimulation with the help of stimulating electrodes & recorded action potential. We used sensory nerve to record the conduction velocity. Orthodromic conduction measured in which nerve is stimulated at a distal point & action potential is recorded proximally.

For ulnar nerve: - Place silver ring electrode (stimulating) one on the middle phalanx & other on the terminal phalanx. Apply 2 silver cup recording electrodes about 2-3cms apart proximal to wrist skin crease. Apply ground electrode between stimulating & recording electrode on the palm.

For median nerve:-The surface recording electrode was placed 3 cm proximal to the distal wrist crease and reference is placed at a distance of 3 cm proximally. For stimulating electrodes were placed at the second or third digits. Radial SNCV is commonly carried out in Superficial Radial Nerve. The stimulating electrode is placed in first web space and reference 3 cm distal. The recording electrode is placed 10-14 cm proximal to recording electrode at the lateral edge of radius. Superficial peroneal nerve:-Recording electrode is 10-15 cm proximal to the upper edge of lateral malleolus anterior to peroneus longus.

Sural nerve:-The surface electrode between lateral malleolus and tendoachilles was used to stimulate Sural Nerve & the recording electrode, distal to lower border of gastrocnemius at the junction of middle and lower third of leg. During the recording, the leg was kept relaxed and in lateral position that was convenient.

In all the nerves grounding electrode was kept between stimulating & recording electrode. Amplitude is noted, conduction velocity (mt/sec) is calculated using distance between stimulating &

recording electrode (mm) & onset of latency (msec).

This was done in 5 nerves of upper & lower limb

In upper limb:-Median Nerve, Radial Nerve, Ulnar Nerve

In lower limb:-Superficial Peroneal Nerve, Sural Nerve.

Result & Discussion: Majority of cases lie above 50 years of age. Hence comparable healthy volunteer groups with majority people from above 50 years of age were chosen.

Table 1: Distribution of Cases & control According to Age

Sr. No.	Age Range (in yrs.)	No of Cases			No of controls		
		M	F	% of total cases	M	F	% of total controls
1	30-40	2	1	6%	6	2	16%
2	41-50	8	2	20%	7	1	16%
3	51-60	25	1	52%	13	5	36%
4	>60	9	2	22%	9	7	32%

Table 2: Differences in Sensory Nerve Conduction Velocities with Duration of Diabetes

Sr. No.	Sensory Nerve Affected	Duration of Diabetes & SNCV (in m/s)		
		<5yrs.	5-10yrs.	>10yrs.
1	Median Nerve	52.1	45.2	40.2
2	Radial Nerve	52.6	42.2	41.2
3	Ulnar Nerve	50.2	47.8	47.2
4	Superficial Peroneal Nerve	47.2	40.2	25.6
5	Sural Nerve	46.2	42.2	40.2

It is evident that with the increase in duration of diabetes conduction velocity decreases. This finding is comparable with study done in zahedali et al⁷.

Table 3 shows 'p' Values are less than the level of significance of our study i.e. 0.05 , it can be concluded that there is significant decrease in Amplitude and conduction velocity of almost all sensory nerves in asymptomatic Diabetics as

compared to healthy volunteers. This finding is comparable to finding in study done by Zahedali et al⁷ and other study done by P Noel found the sensory nerve conduction velocity reduced compared to the control group.⁸

As the data was not normally distributed so non-parametric test (MANN-WHITNEY TEST) has been applied. In comparison to normal healthy volunteers, amplitude and conduction velocity range is significantly decreased in NIDDM cases in almost all the sensory nerves.

Table 3: Comparison of Sensory Nerve Conduction Studies:-Amp (in microvolts) & CV (in m/s), in Asymptomatic Diabetics and Healthy Volunteers in our Study

Sr.No.	Sensory Nerves Affected	SNCV	Controls (Mean±SD)	Cases (Mean±SD)	'p' Value
1	Median N	Amp	36.8±5.4	30.1±8.3	0.002
		CV	54.7±2.4	52.1±3.8	0.001
2	Radial N	Amp	14.7±9.6	9.1±4.6	0.003
		CV	55.5±2.5	53.3±4.3	0.008
3	Ulnar N	Amp	33.9±5.6	27.9±6.7	0.001
		CV	54.2±3.3	51.9±3.4	0.009
4	Superficial Peroneal N	Amp	3.6±1.5	2.7±0.7	0.002
		CV	48.7±1.4	45.2±4.7	0.001
5	Sural N	Amp	15.8±4.0	10.3±4.4	0.003
		CV	50.6±1.9	46.8±3.5	0.002

Table 4: Differences in Sensory Nerve Conduction Velocities: Amp (in microvolts) & CV (in m/s), according to Status of Diabetes Control

Sr. No.	Sensory Nerves Affected	SNCV	Poorly Controlled Diabetes (Mean±SD)	Well Controlled Diabetes (Mean±SD)	Mann Whitney test	'p' Value
1	Median N	Amp	22.5±6.2	33.9±6.4	61.5	<0.05
		CV	49.2±3.7	53.6±2.9	95.5	<0.05
2	Radial N	Amp	6.1±2.1	10.6±4.8	102.0	<0.05
		CV	50.6±3.4	54.7±4.0	111.5	<0.05
3	Ulnar N	Amp	22.5±5.7	30.8±5.3	89.5	<0.05
		CV	49.2±3.0	53.4±2.7	69.0	<0.05
4	Superficial Peroneal N	Amp	2.3±0.5	2.9±0.7	149.0	<0.05
		CV	41.5±4.6	47.3±3.3	63.0	<0.05
5	Sural N	Amp	7.5±1.7	11.7±4.7	87.0	<0.05
		CV	44.5±2.5	47.8±3.4	137.0	<0.05

Table 4 shows:-As 'p' Values are less than the level of significance of our study i.e. 0.05 , it can be concluded that there is significant decrease in Amplitude and conduction velocity of almost all sensory nerves in asymptomatic Diabetics as compared to healthy volunteers.

Sensory Nerve Conduction Velocity is lower in poorly controlled Diabetes in comparison with well controlled NIDDM. Diabetic status of the cases were decided by the level of fasting blood sugar & HbA1c.As the data was not normally distributed so non-parametric test (MANN-

WHITNEY TEST) has been applied. 'p' Value is <0.05, which shows the difference is highly significant. So SNCV depends upon severity of NIDDM. This correlates with the observation of swaroop et al.⁹ But study done by Lamontagne A, says that degree of electrophysiological involvement is same whether diabetes is well or poorly controlled.¹⁰ As NIDDM is more severe and poorly controlled (seen by FBS, PPBS & Hb1Ac of last month that was not within normal limits), the NCV is significantly reduced.

Table 5: Distribution of Cases According to Affected Nerve

Sr. No.	Nerve Affected	No. of Cases	% of Cases
1	Median Nerve	19	38%
2	Radial Nerve	13	26%
3	Ulnar Nerve	11	22%
4	Peroneal Nerve	24	48%
5	Sural Nerve	26	52%

Most common nerve affected in upper limb is Median Nerve while in lower limb is sural nerve. It is comparable with study done by Zahed Ali et al, in which they found nerves of lower limb are more affected than upper limb and also found that sural& median are commonly affected⁷.

Conclusion: As compared to healthy volunteers, asymptomatic diabetic patients show significant decrease in SNCV Studies. There is significant reduction in amplitude and conduction velocity of all the sensory nerves in asymptomatic diabetic patients as compared to healthy volunteers. Most commonly affected nerves are Median Nerve in upper limb and Superficial Peroneal in lower limb. As the duration of NIDDM increases, the Sensory Nerve Conduction Velocity decreases. If NIDDM is under control, then SNCV is slightly reduced. In poorly controlled NIDDM, SNCV is markedly reduced. NIDDM is one of the chronic diseases all over the world. Prevalence and incidence of NIDDM is highest in Asian countries. Diabetic Neuropathy is one of the commonest long term complications of NIDDM. In spite of the fact that Diabetes is more prevalent in higher income groups, higher rates of Neuropathy are seen in lower income groups, may be due to associated nutrient deficiencies. NCV studies can diagnose Diabetic Neuropathy at a very early stage even before clinical signs sets in. Hence, NCV being simple, harmless, non-invasive and objective technique along with easy interpretation of results can be used routinely to obtain considerable information and evaluate the status of nerves in patients with NIDDM. Nerve conduction studies may be effectively used to select the most beneficial therapy. Establishment of such Electro-diagnostic techniques in Department of Physiology can be recommended to bring new

direction and new opportunities to the subject with concept of CLINICAL-NEUROPHYSIOLOGY.

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A Comparative Study Of Computerized Spirometric Parameters Between Air Conditioner Users And Non Air Conditioner Users

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Abstract: Background: Nowadays Air conditioners are one of the luxurious needs of human being and their use has been increasing day by day. According to few studies, inhalation of cold dry air leads to alteration in pulmonary functions. The present study was aimed at considering whether intensive use of air conditioner affected pulmonary functions. Method: 50 male subjects having age group of 25-50 years and using air conditioners since at least last 6 months and for a minimum duration of 6 hours per day were selected for the study. 50 males of same age group who did not use air conditioners at all were taken as control. In all the subjects, computerized spirometric parameters were measured by SPIRO EXCEL. The parameters between both the groups were compared by applying unpaired t test. P value less than 0.05 was taken as statistically significant. Result: There was statistically significant reduction in PEFr (Peak Expiratory Flow Rate), FEF₂₅ (Forced Expiratory Flow at 25% of Forced Vital Capacity), FEF₅₀ (Forced Expiratory Flow at 50% of Forced Vital Capacity), FEF₂₅₋₇₅ (Mid Expiratory Flow Rate), and MVV (Maximum Voluntary Ventilation) in air conditioner users as compared to that in non air conditioner users. Conclusion: Intensive use of air conditioner may predispose to respiratory dysfunction in form of early small airway obstruction. However further studies including a large sample size is indicated for in depth evaluation.

Key Words: Computerized Spirometric parameters, Air conditioner users, Non air conditioner users

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Introduction: Nowadays Air conditioners are one of the luxurious needs of human beings. It is used in various fields such as hospitals, banks, colleges, offices, cinema theatres, vehicles, railways, food plazas, shopping malls etc.

Review of literature shows that inhalation of cold dry air for long period makes the airway smooth muscles more sensitive leading to alteration of pulmonary functions. It has been observed that hyperventilation of cold dry air causes bronchoconstriction in asthmatic patients.¹ Intensive use of air conditioner also increases the risk of atopic sensitization.^{2,3} Increased prevalence of IgG induced sensitization and hypersensitivity pneumonitis was reported in persons exposed to aerosol contaminated air conditioners.⁴ Hypersensitivity pneumonitis caused by bacteria, fungi and molds contaminating air conditioning systems had been also reported.⁵ A Japanese study showed that specific mite populations including Der p were higher in homes with ACs.⁶ The present study was aimed at considering whether intensive use of air conditioners affected pulmonary functions. Computerized Spirometry was used as it is a simple and useful test to identify and monitor respiratory impairment.

Material and Method: The present study was carried out at department of physiology Govt. Medical College, Bhavnagar after institutional review board approval.

50 male subjects having age group of 25-50 years and using air conditioners since at least last 6 months and for a minimum duration of 6 hours per day were selected for the study. 50 males of same age group who did not use air conditioners at all were taken as control.

Exclusion criteria: (1) Presence of any acute or chronic respiratory disease.(2) Smokers.(3) Use of AC on irregular basis.(4) Systemic illness which may directly or indirectly affect the respiratory system.

In all the subjects, after taking written informed consent, brief history and anthropometric parameters like age, height, weight were taken. Computerized spirometric parameters were measured by SPIRO EXCEL.

SPIRO EXCEL: Spiro excel is an instrument designed for lung function screening. The core of the system is the "intelligent" flow meter that, connected through the USB Cable, turns any personal

computer (laptop or desktop) into a complete pulmonary function testing lab. Spiro excel is designed in such a way that it is easy and simple to operate and gives highly accurate results. The system is composed of turbine flow meter, the measurement and elaboration device (light weight and ergonomic) and the communication cable by the software pack.

Spiro excel is a device that uses electronic and mechanical precision components and must be used in the following ambient condition,

- Temperature maintained between 5°C and 40 °C.
- Relative humidity less than 90 %.
- Absence of noxious smoke and excessive dust.
- Absence of any kind of heat and water source nearby.

COMPUTERIZED SPIROMETRIC PARAMETERS USING “SPIROEXCEL”:All the tests were recorded in sitting and relaxed position in chair with no any tight clothing which substantially restricts full chest and abdominal expansion.

Subjects were explained and demonstrated about the procedure to be performed. They were allowed to do enough practice, as lung volume depends on subject’s voluntary effort. Full series of tests takes time of about four to five minutes. The testing procedures were quite simple, non-invasive and harmless. Only three manoeuvres required to collect all data which are FVC (Forced Vital Capacity), SVC (Slow Vital Capacity) and MVV (Maximum Voluntary Ventilation).

For FVC manoeuvre, after nose clipping, subject was instructed to take maximum deep inspiration as much as possible and hold it ,then mouth piece was kept firmly in the mouth between lips so as to avoid escape of any air, then asked to blow out forcefully and as fast and long as much possible in the mouth piece and by doing this, value of FVC and its components were obtained.

For MVV manoeuvre, the subject was asked to perform inspiration and expiration as fast and as deep as possible in the mouth piece for minimum of 15 seconds with nose clipped. For SVC manoeuvre, the subject was asked to perform first three tidal respiration and one deep expiration and

deep inspiration followed by other three tidal respirations in the mouth piece with nose clipped. Following acceptability criteria were used for good quality results.

Statistical Analysis: The outcome of computerized spirometry was measured as mean ± SD for each of the parameters. The parameters between AC users and non AC users were compared by applying unpaired t test. P value less than 0.05 was taken as statistically significant.

Result: The anthropometric parameters of AC users and non AC users are shown in table 1. No statistical difference was observed between them on these parameters. Computerized spirometric parameters of AC users and non AC users are shown in table 2. The values of PEFR, FEF25, FEF50, FEF25-75 and MVV were statistically significantly decreased in AC users as compared to those in non AC users

Table 1: Anthropological parameters

	AC Users (Mean ± SD)	Non AC Users (Mean ± SD)	P value
Age (years)	33.42±5.82	35.7±6.31	0.0636
Height (cms)	169.6±5.97	166.78±8.58	0.0599
Weight (kg)	66.72±12.3	64.58±11.82	0.3781

Table 2: Computerized spirometric parameters

Parameters	AC Users (Mean ±SD)	Non AC Users (Mean±SD)	P value
FVC	3.17±0.42	3.39±0.72	0.0622
FEV1	2.71±0.52	2.83±0.72	0.3449
PEFR(L/S)	6.04±1.97	9.45±2.66	<0.0001*
FEF ₂₅₋₇₅ (L/S)	4.33±1.24	5.32±1.51	0.0005*
FEF ₂₅ (L/S)	5.84±2.06	8.76±3.01	<0.0001*
FEF ₅₀ (L/S)	4.89±1.42	6.16±2.14	0.0007*
FEF ₇₅ (L/S)	2.68±0.93	3.03±1.00	0.0726
FEV1/FVC(%)	85.83±12.3 9	84.89±17.1 4	0.7550
SVC(L)	3.46±0.71	3.49±0.93	0.8374
MVV (L/M)	45.95±25.40	66.87±21.56	<0.0001*

* = Statistically significant

Discussion: In the present study, there is definite impairment in PEFR, FEF₂₅, FEF₅₀, FEF₂₅₋₇₅ & MVV among AC users. Thus the results of the present

study show a predisposition of air conditioner users towards respiratory dysfunction. These findings correlate well with other such studies.

Farah Khaliq et al.⁷ found statistically significant decrease in PEFR, FEF₂₅, FEF₅₀, FEF₇₅ and FEF₂₅₋₇₅ among AC users as compared to non AC users. Yelam SB et al.⁸ found statistically significant decrease in PEFR, FEF₂₅, FEF₅₀, FEF₇₅, FEF₂₅₋₇₅ and MVV among AC users as compared to non AC users. R Babitha et al.⁹ found statistically significant decrease in PEFR, FEF₂₅₋₇₅ and FEV₁ among AC users as compared to non AC users. Laxmikant J Borse et al.¹⁰ found statistically significant decrease in PEFR, FEF₂₅, FEF₅₀, FEF₇₅ & FEF₂₅₋₇₅ among AC users as compared to non AC users.

PEFR is the maximum velocity with which air is forced out of the lung. PEFR depends on expiratory efforts exerted during forceful expiration as well as status of upper airways which are subjected to reflex bronchoconstriction. In present study PEFR was significantly decreased in AC users. This finding suggests involvement of the upper airways due to exposure to AC environment.

In the present study the values of FEF₂₅₋₇₅, FEF₂₅ & FEF₅₀ were significantly decreased in AC users. Decrease in these expiratory flow rates especially FEF₂₅₋₇₅ which is the flow rate over the middle half of forced vital capacity, in the presence of normal FEV₁ suggests early small airway obstruction.

In present study, MVV was also significantly decreased in AC users. This finding suggests decrease in breathing reserve.

According to Fontanneri et al.¹¹ Nasal inhalation of cold dry air causes activation of cold receptors or osmoreceptors in the nasal mucosa and activation of these receptors induces protective bronchoconstrictor responses. According to Beasley R et al.¹² airway epithelial damage due to cold dry air is a critical feature of airway hyperresponsiveness. According to Barnes P J¹³ inhalation of cold dry air leads to activation of parasympathetic nerves which brings about bronchoconstriction. The inhalation of cold dry air causes bronchoconstriction by local non nervous reactions also like release of histamine and slowly reactive substance of anaphylaxis by mast cells¹⁴.

Therefore probable reasons for the findings of the present study may be airway hyperresponsiveness, epithelial damage, activation of parasympathetic nerves, release of histamine, SRS-A (Slowly reactive substance of anaphylaxis), atopic sensitization or increase in Der P mite allergen density.

Conclusion: Intensive use of air conditioner may predispose to respiratory dysfunction in form of early small and upper airway obstruction. So we suggest frequent computerized spirometry of the workers who work regularly in AC environment. This will ensure early detection of any underlying respiratory dysfunction and its cure.

Limitation of study: As the sample size was too small (n=50) in the present study, it cannot be directly applied to general population. Further studies on a large sample size are indicated. Inclusion of various other parameters like duration of exposure to AC, velocity of cold air of AC, humidity of the environment and space to which the subjects are exposed during air conditioning may further help for in depth evaluation.

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Comparative Study Of Health Status Of The Newborns Belonging To Below Poverty Line And Above Poverty Line Families

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Abstract: Background: Newborn health is the key to childhood health and survival. Socioeconomic factors play a very important role in maternal health and wellbeing thus they can also influence newborn health and survival. Objective of the present study is to compare newborn health outcome between below poverty line (B.P.L.) and above poverty line (A.P.L.) families. Method: history and physical examination of total 60 newborns were done thoroughly and they were divided in two groups, B.P.L. and A.P.L. groups. Data was analyzed statistically. Result: Number of low birth weight (L.B.W) babies is significantly higher in B.P.L. group as compared to A.P.L. group. B.P.L. mothers visited hospital during their antenatal period lesser number of times than A.P.L. mothers and this difference was statistically significant. Conclusion: Present study shows that 37% newborns of B.P.L. group and 10% newborns in A.P.L. group are L.B.W. It is concluded from the present study that poverty increases the incidence of low birth weight in newborns. Also poverty negatively influences antenatal care practices. It's evident that by controlling poverty we can control adverse newborn health outcomes and thus we can improve maternal as well as newborn health.

Key Words: Newborn, neonate, newborn health, low birth weight, poverty and low birth weight, newborn anthropometric indices.

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Introduction: After birth, life begins in the form of a newborn. Newborn health is the key to childhood health and survival. Newborn or neonate (from Latin, neonatus, newborn) refers to an infant in the first 28 days after birth.¹The neonatal period contains the most dramatic and rapid physiological changes seen in human life.

A detailed history taking and clinical examination should be performed on all newborn babies, usually within the first 48 hours of life.

Neonatal deaths account for 40% of all deaths among children under five. The majorities of all neonatal deaths (75%) occur during the first week of life and 25% to 45% of all deaths occur within the first 24 hours. The main causes of newborn deaths are prematurity and low-birth-weight, infections, asphyxia and birth trauma. These causes account for nearly 80% of deaths in this age group.² The Neonatal Mortality rate in India is 32 per 1000 live births, as per 2010 according to a UNICEF report.³

Newborn care is strongly influenced by mother's social and health status and by family care and practices for mother and newborn, as well as by

maternal and newborn care services.⁴Most deaths of newborn babies occur at home, among poor families, and are associated with inadequate maternal health care during pregnancy and childbirth. Lack of maternal health services such as antenatal care and skilled birth attendants are a large part of the problem. A large proportion of the babies who die can be saved with low-tech, low-cost interventions, which would also help save the lives of mothers and prevent stillbirths.⁵Socioeconomic factors play a very important role in maternal health and wellbeing. If proper care is given during pregnancy, neonatal health outcome can be improved.

Few population-based studies have examined the relation between newborn health and family poverty.^{14,15,16} Adverse reproductive outcomes such as low birth weight (L.B.W.), preterm delivery, intrauterine growth retardation (IUGR) are recognized as important determinants not only of infant mortality but also of health outcomes occurring over the entire life course.⁶ Thus, an important goal for public health policy ought to be socioeconomic equity in birth outcomes. This is because health in early life affects health later in life. Ben-Sholmo et al, 2002⁷ and Harding et al,

2001⁸ demonstrated that several diseases of public health significance occur due to intrauterine and early life influences. Present study attempts at finding the relationship between socio economic status of the family and health status of the newborn. Since determination of poverty in India is based on Below Poverty Line (B.P.L.) list and card, we are going to compare health status of newborn belonging to B.P.L. card holder i.e., B.P.L. families and non B.P.L. card holder, i.e., Above Poverty Line (A.P.L.) families.

Aim and Objectives:

1. To assess health status of newborns belonging to Below Poverty Line (B.P.L.) families and Above Poverty Line (A.P.L.) families. By term health status we mean indicators of newborn health at birth i.e., birth weight, anthropometric indices, general and systemic examination of newborn and neonatal reflexes.
2. To compare low birth weight babies between newborns belonging to B.P.L. and A.P.L. families.
3. To compare practices regarding health care of newborn and antenatal visits by mother between B.P.L. and A.P.L. families.

Material and Method: In our country, demarcation between poor and non poor family is based on 'Poverty Line'. There are specific criteria and scoring system to identify a family as a B.P.L. family, each B.P.L. family is given a B.P.L. card and the family which does not fulfill criteria for B.P.L., is classified as Above Poverty Line (A.P.L.) family.

The present study was an observational type of study which was conducted from June, 2011 to December, 2012 on total 60 newborns, 30 newborns belonging to Below Poverty Line (B.P.L.) and 30 newborns belonging to Above Poverty Line (A.P.L.) families at Civil Hospital Ahmedabad and a private hospital in Gujarat. A thorough history taking and examination of each newborn was done. A written consent from parent/guardian of each newborn was taken.

Criteria for selecting a newborn belonging to B.P.L. family:The newborn belonging to a family possessing B.P.L. card issued by Government of Gujarat was classified as a newborn belonging to B.P.L. family.

Criteria for selecting a newborn belonging to A.P.L. family:The newborn belonging to a family which did not have B.P.L. card issued by Government of Gujarat was classified as a newborn belonging to A.P.L. family.

Exclusion criteria for both groups:

Preterm newborn.

Newborn having critical illness, admitted in Neonatal Intensive Care Unit (NICU).

Methodology:Criteria for assessing health status of the newborn include:

A. History:

1. Basic Information
2. Perinatal History.
3. Intrapartum history.
4. History of newborn after birth.

B. Examination:

1. General Examination
2. Neonatal Reflexes
3. Anthropometry
4. Systemic Examination

Neonatal reflexes: Sucking reflex, rooting reflex, moro's reflex, asymmetric tonic neck reflex, palmar grasp, plantar grasp and stepping reflex of all newborns were assessed.

Anthropometry: Birth weight and other measurements: birth weight of newborn is recorded in kilogram (kg) using a weighing scale. It is measured just after the birth. In our case, we took the record of birth weight taken at the time of birth by the hospital staff.

Statistical analysis: The data was analyzed using Fisher's exact test, using statistical software GraphPadInstat trial version.

Result:The present study was performed on total 60 newborns. Out of these 60, 30 newborns belonging to B.P.L. and 30 to A.P.L. families were examined for different parameters indicating their health status and result was compared statistically.

Table 1 :Number of Low Birth Weight (L.B.W.) babies in each group:

Groups	Number of Low birth weight babies	Number of normal birth weight babies	Total babies
B.P.L	11	19	30
A.P.L	3	27	30
Total	14	46	60

P value = 0.0303, Relative risk = 3.667.

No. of low birth weight babies are significantly higher in B.P.L. group as compared to A.P.L. group.

Table 2 : No. of breastfed and topfed newborns in each group.

Group	Number of Breast fed newborns	Number of Top fed newborns	Total babies
B.P.L	24	6	30
A.P.L	24	6	30
Total	48	12	60

There are equal numbers of breastfed and top-fed newborns in each group, therefore practice of breast feeding is equally prevalent in both groups.

Table 3: Number of male and female newborns in each group:

Group	Number of male newborns	Number of female newborns	Total newborn babies
B.P.L	18	12	30
A.P.L	14	16	30
Total	32	28	60

No. of male babies are higher and no. of female babies are lower in B.P.L. group than A.P.L. group, but this difference is not significant statistically.

Mean antenatal visits of B.P.L. was 6.17 ± 2.18 and Mean antenatal visits of A.P.L. was 7.36 ± 2.21

Applying unpaired t-test, $P= 0.0384$, which is considered significant, $t = 2.119$ with 58 degrees of freedom. The above result indicates that A.P.L. group of mothers have taken more antenatal visits as compared to B.P.L. group of mothers.

Table 4: Number of newborns born by normal and Caesarean section delivery in each group:

Group	Newborns born by normal delivery (N)	Newborns born by Caesarean section delivery(N)	Total
B.P.L.	11	19	30
A.P.L.	14	16	30

There is higher number of normal deliveries in A.P.L. group but this difference is not statistically significant. ($p > 0.05$)

Table 5: Newborn gender and L.B.W. babies:

Gender	L.B.W. babies	Normal weight babies	Total
Male	7	25	32
female	7	21	28

The above table suggests overall numbers of L.B.W. and normal birth weight babies in male and female groups, there is no significant difference in both groups between no. of L.B.W. and normal weight babies.

Table 6: Comparison of anthropometric parameters of both groups:

Parameter	B.P.L.	A.P.L.
Mean birth weight (Kg)	2.72 ± 0.45	2.71 ± 0.39
Mean crown heel length (cm)	48.1 ± 2.93	48 ± 2.82
Mean head circumference (cm.)	33.3 ± 1.70	33.35 ± 1.49
Mean chest circumference (cm.)	31.23 ± 2.14	32.12 ± 2.27
Mean Upper segment : lower segment ratio	1.58 ± 0.13	1.62 ± 0.08

There are not significant differences between anthropometric parameters of both groups. But significant difference is there between numbers of low birth weight babies between both groups as we have seen earlier.

Discussion: Present study shows that 37% newborns of B.P.L. group and 10% newborns in A.P.L. group are L.B.W. Other studies indicate the

prevalence of low birth weight range from 20% to 40% in India.^{9,10}

The birth weight of a newborn is a significant determinant of neonatal and postnatal infant mortality.¹¹ It is potentially a useful parameter for measurement of health during the vulnerable periods of life and serves as a useful indicator of health of the community because it is sensitive to environmental and socio-economic influences.¹²

L.B.W. has been associated with a high infant mortality, morbidity in childhood and with an elevated risk of diabetes mellitus, hypertension and other cardiovascular diseases in adulthood.¹³ Low maternal socioeconomic status is stated as the principal determinant of a L.B.W.¹⁴ The association of a low socio economic status with L.B.W. has been reported previously.^{15,16} Such an association may be related to several potential mechanisms. An important mechanism is poor nutritional intake by mother during pregnancy which is more likely in the low socioeconomic status groups and related to certain cultural practices.¹⁷

In the Netherlands, Verkerk et al.,¹⁸ concluded that infants of very low social class are at increased risk for low birth weight for gestational age. Similarly socioeconomic inequalities in L.B.W. in England and Wales were described by Pattenden et al.,¹⁹. They concluded that up to 30% of L.B.W. can be seen as being associated with levels of socioeconomic deprivation below that of the most affluent group. According to the Tuntiseranee et al.,²⁰ in Thailand, poor pregnancy outcome reported in the disadvantaged social class. Cramer²¹ showed that women with higher income had larger babies and in a study in Malaysia, DaVanzo et al.,²² found that income was correlated with birth weight.

There is a significant difference in number of antenatal visits taken by mother between both groups. B.P.L. mothers visited hospital during their antenatal period lesser number of times than A.P.L. mothers and this difference was statistically significant. Early commencement of antenatal care by pregnant women as well as regular visits has the potential to affect maternal and foetal outcome positively.^{23, 24, 25} According to Beekman et al²⁶, the influence of predisposing determinants on the

number of antenatal visits show a trend towards fewer antenatal visits in socioeconomically disadvantaged women. Petrouet al.²⁷ observed the importance of geographical origin in relation to the number of antenatal visits. White British women had the highest number while Pakistani women had the lowest number of antenatal visits. The study of Hildingsson et al.²⁸ found no relationship with origin. In contrast with findings of the present study, they found that more highly educated women belonged more often to the group receiving fewer antenatal visits compared with the standard schedule.

Conclusion: Number of low birth weight babies is significantly higher in B.P.L. group as compared to A.P.L. group. Present study shows that 37% newborns of B.P.L. group and 10% newborns in A.P.L. group are L.B.W. Therefore, it is concluded from the present study that poverty increases the incidence of low birth weight in newborns.

- In both groups, there are equal numbers of breastfed and top-fed newborns.
- 60% of B.P.L. newborns and 47% of A.P.L. newborns are male and 40% of B.P.L. newborns and 53% of A.P.L. newborns are female.
- B.P.L. mothers visited hospital during their antenatal period lesser number of times than A.P.L. mothers and this difference was statistically significant.

Children belonging to poor families experience higher risk to attain poor outcomes in various aspects of life. These outcomes comprise children's cognitive, social and emotional development, school achievements, health and overall wellbeing.

In our study, we can conclude that poverty is associated with increased low birth weight babies. Government is trying hard to reduce the difference of health outcomes between poor and non poor families by implementing JananiSurakshaYojana, ChiranjeeviYojana and BalsakhaYojana but perhaps it would take some time for narrowing the difference in health outcome between poor and non poor families.

Antenatal care is a key component of a healthy pregnancy. Regular antenatal care helps to identify the problems during pregnancy and treat complications early and thus helps to promote

healthy newborn outcome. In our study, we can conclude that B.P.L. mother had taken significantly lesser antenatal visits than A.P.L. mother and also number of low birth weight babies was significantly greater among B.P.L. newborns as compared to A.P.L. newborns. Thus, regular antenatal visits can help to achieve better newborn health.

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Effect Of Kundalini Meditation On Some Physiological Variables Indicating Relaxed State & Parasympathetic Dominance

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Abstract: Background: Meditation is now recognized as a different physiological state scientifically as relaxed & calm mind with parasympathetic dominance. This study is performed on two expert meditators of sahaj yoga kundalini meditation. Objectives of this study is to find out whether regular meditation practice could lead to rapid “stress reduction” & control over autonomic nervous system. Method: Various physiological variables like heart rate, respiratory rate, galvanic skin response are measured before, during & after meditation & electroencephalography is performed during meditation. The following physiological parameters were assessed respiratory rate, heart rate & GSR by physio-pac instrument & electroencephalography by neuropage plus before, during & after meditation. Result: Heart rate, respiratory rate are reduced during meditation session & GSR is increased suggesting parasympathetic dominance. EEG findings suggest relaxed state. Conclusion: This study shows a relaxed & calm state of mind during meditation with parasympathetic dominance.

Key words: EEG, GSR, Beta-endorphin

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Introduction: Meditation is recognised as a calm state of mind with parasympathetic dominance in the body. Kundalini meditation is different from other types of meditation. In sahaj yoga kundalini meditation it is believed that kundalini resides in the sacrum bone.¹

Regular meditators may experience a calm & hypo-metabolic state with parasympathetic dominance. Some studies show beneficial effects in controlling blood pressure in hypertensives. Asthmatics & diabetics have been shown to be benefitted by regular meditation practice.^{2,3,4,5,6}

This study is conducted in the physiology department of Pcms&Rc (bhanpur, Bhopal) (m.p) in two expert sahaj yoga meditators utilising neurophysiology laboratory equipments for conducting EEG & galvanic skin response study & their respiratory rate, heart rate & blood pressure is monitored before during and after meditation.

EEG is recorded by neuropage plus & physio-pac is used to record respiratory rate, heart rate & GSR before during & after meditation.

Objectives: Objectives of this study is to find out whether meditation practice could lead to relaxation of mind & control over autonomic nervous system.

Material and Method: The study is conducted at the peoples college of medical sciences & research centre in bhanpur, Bhopal in two expert sahaj yoga meditators. They are practicing meditation practices regularly each day for more than two hours since more than ten years.

The following physiological parameters were assessed respiratory rate, heart rate & GSR by physio-pac instrument & electroencephalography by neuropage plus before, during & after meditation.

Blood pressure is measured after ten minute rest in the sitting posture before & immediately after meditation by sphygmomanometer method. EEG is done by 16-lead standard EEG machine (neuropage plus). The above physiological parameters are recorded before, during 20-minute meditation session & immediately after meditation.

Procedure of meditation:- Meditation is performed in the neurophysiology laboratory with cool & calm surroundings.

In sitting posture with both their hands on the lap & palm facing forward subjects go into meditation. Neuropage plus is connected for EEG recording with 16-leads on scalp. For assessing respiratory rate, heart rate & GSR physio-pac instrument is connected to the subjects.

Statistical analysis :- “One Way ANOVA” is used for comparison of heart rate & respiratory rate before , during & after meditation & “Difference of Mean Z- test” are used for comparison of blood pressure & GSR. SPSS 20.0 (Software) is used for data analysis.

The interpretation of “P-value” are as follows:-
 P>0.05 - not significant. P<0.05 - Significant. P<0.01 - Highly significant. P<.001 – Very highly significant.

Result:

Table 1: Effect of meditation on Heart rate and Respiratory rate

Parameters	Control Group (N = 60)	Prediabetic Group (N = 60)	P- Value
Age (Years)	45.3 ± 9.1	45.2 ± 8.9	N.S.
WC (cm)	83.1 ± 6.6	92.3 ± 9.7	< 0.0001
BMI (kg/m ²)	22.1 ± 1.4	26.1 ± 2.8	< 0.0001
SBP (mm Hg)	116.9 ± 8.7	131.5 ± 8.2	< 0.0001
DBP (mm Hg)	76.6 ± 5.5	87.1 ± 6.8	< 0.0001
Pulse Rate (RPM)	81.2 ± 8.1	82.2 ± 7.7	N.S.

One way anova

There was significant variation in heart rate (p < 0.05) and according to mean heart rate decrease during process and that decrease after meditation There was no significant difference in respiratory rate (p> 0.05) .

The reference value of heart rate was 73.2 beats / min and decreased by 20 minutes of practice to 66.3 beats / min. It was also noted a decrease in respiratory rate. It is well known that the respiration rate and heart rate determined by the balance between excitatory and inhibitory effects of sympathetic and parasympathetic divisions of the autonomic nervous system. GSR is increased during meditation session & immediately after meditation as compared to resting state. The combined changes between galvanic skin resistance and galvanic skin potential make up the galvanic skin response. Galvanic skin resistance(GSR) refers to the recorded electrical resistance between two electrodes when a very weak current is steadily passed between them. The electrodes are normally placed about an inch

apart, and the resistance recorded varies in accordance with the emotional state of the subject. Galvanic skin potential(GSP) refers to the voltage measured between two electrodes without any externally applied current. This is conducted by connecting the electrodes to a voltage amplifier. Similarly, this voltage varies with the emotional state of the subject.

Due to the response of the skin and muscle tissue to external and internal stimuli the conductance can vary by several microsiemens. When correctly calibrated, the device can measure these subtle differences. There is a relationship between sympathetic activity and emotional arousal, although one cannot identify which specific emotion is being elicited. These autonomic sympathetic changes alter sweating and blood flow, which in turn affects GSR and GSP. If the sympathetic branch of the autonomic nervous system is highly aroused, then sweat gland activity will also increase, which in turn increases skin conductance. In this way, skin conductance can be used as a measure of emotional and sympathetic responses.

Table 2: Effect of meditation on Blood pressure and Galvanic skin resistance

Group	Duration	Mean	SD	N	p
SBP	Before	114.5	0.71	2	0.0077*
	After	109	1.41	2	
DBP	Before	71	1.41	2	0.1679
	After	68.0	1.42	2	
GSR	Before	408.42	8.42	2	0.0210*
	During meditation	523.93	22.52	2	

Difference of Mean Z test , SPSS 20.0

- There was significant Difference in Systolic BP (p < 0.05) and according to mean Systolic BP is Decrease after Meditation .
- There was no significant Difference in Diastolic BP (p > 0.05).
- There was significant Difference in GSR (p < 0.05) and according to mean GSR is Increase During Meditation.

Electroencephalography (EEG) is the recording of electrical activity along the scalp. EEG measures voltage fluctuations resulting from ionic current flows within the neurons of the brain.¹In clinical contexts, EEG refers to the recording of the brain's spontaneous electrical activity over a short period of time, usually 20–40 minutes, as recorded from multiple electrodes placed on the scalp.

Patterns observed in EEG are anterior & frontal midline theta & lower alpha during the meditation session showing a relaxed & calm state of the meditator during the session. These alpha waves continued to appear, and their amplitudes increased. And as meditation progressed, the decrease of the alpha frequency was gradually manifested at the later stage. Further the rhythmical theta train with the amplitude modulated alpha-background was observed.

It is known that the hypothalamus, as the substance of the limbic system, anatomically associated with the nuclei of the thalamus, which direct the activity of the frontal and occipital regions of the cerebral cortex. This explains the increased percentage of alpha activity in the frontal and occipital cortex during meditation.³

Table 3: EEG pattern progressively observed during meditation

Site (electrode placement)	Amplitude (µV)	Frequency (Hz)
Frontal (Fz, Fpz1, Fpz2, F3, F4,)	70 – 100 120 – 250	8- 10 4 -5
Central (Cz, C3, C4, T3, T4, P3, P4, T5, T6)	50 – 100	8- 12
Occipital O1, O2	80 – 100 160 – 300	8- 14 4-7

As evident from the observation, coexistence of metabolic syndrome and prediabetes has increased the future diabetic and CV risk significantly.

Discussion: Blood pressure readings are not done during the meditation session as it may interrupt with the meditative state. Blood pressure is measured before & immediately after meditation. Heart rate & respiratory rate is measured before, during & after meditation.

Heart rate & respiratory rate are reduced during meditation. GSR is markedly increased indicating diminished sympathetic activity. According to Sahaj Yoga literature, actualization of Kundalini awakening (by Sahaj Yoga) takes place in the limbic system, giving rise to bliss, deep relaxation and vibratory awareness of cool breeze flowing from the palms and top of the head.⁹

It is well known that limbic system has hypothalamus as its major substation. Probably, Kundalini awakening conditions the limbic system which modulates the activity of hypothalamic-hypophyseal-adrenal axis.⁷ The practice of meditation leads to hypometabolic states (lowered metabolic rates) and proposed to call it the fourth state of consciousness, different from sleep yet metabolically equivalent or even below metabolic rates seen during sleep. Similarly results were also reported by Johnson & Lubin in their research that states of relaxation are accompanied by high skin resistance, which reaches its maximum during sleep.¹⁰

Reduction in heart rate shows the relaxation during meditation. In an article by Davis, she refers to a quote by the well-known cardiologist and founder of Harvard's Mind/Body Institute¹¹ Herbert Benson, who strongly asserts "Any condition that's caused or worsened by stress can be alleviated through meditation".⁸

Thus on the basis of above findings and discussions, it can be concluded that the meditation affect the galvanic skin response of an individual. Meditation is now a day a topic of research as many medical ailments shows beneficial effects in patients who are doing meditation practice regularly. Diseases like Diabetes Mellitus Type -2, hypertension, asthma, psychiatric conditions like schizophrenia, epilepsy have been assessed by meditation studies & some researchers find beneficial effects in patients doing

regular meditation practices as compared to control groups.^{2,3,11}.

Some research shows an elevated beta-endorphin levels in persons doing regular meditation that may be responsible for relaxed & calm state of regular meditators & it also boost immunity.¹² Further researches are undergoing in meditation physiology to unearth rest of the benefits

Conclusion: The results of this study demonstrated a reduction in systolic blood pressure, respiratory rate & significantly increased GSR indicating parasympathetic nervous system dominance during & immediately after meditation.

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A Comparative Study Of Color Perception In Young Males And Females

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Abstract: Background: It is a well known fact that there is a significant difference in the color perception amongst the people. This study was done to compare color perception in males and females. Method: It is a cross-sectional, interventional study conducted at Civil Hospital, Ahmedabad. Total 100 healthy medical students (50 males and 50 females) were taken. Farnsworth-Munsell 100-hue test was used to assess color perception. Result: Mean age of males was 19.16 with 1.085 SD and mean age of females was 19.86 with 1.83 SD. Favorite color in males was blue (40%) and in females was pink (33%). Mean result of FM 100 hue color perception test in males was 43.8 with SD of 28.524 and in females 28.38 with SD of 22.616 with P value 0.0035 indicating a better color perception in females. The mean and SD for myopes were 46.96, 29.309 respectively and for non myopes 25.2, 18.58 respectively with p value <0.0001. So a better color perception in non-myopes. Conclusion: The test value of FM 100 HUE COLOUR PERCEPTION test is more in the males and myopes. So females and non-myopic has better color perception.

Key words : Color Perception, FM 100 Hue color perception test, Gender, Myopia

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Introduction: Vision is the sensory modality of providing information to own and surrounding environment maximally than any other modality. The main mechanism concerned with vision is initiation, transmission and perception of vision. Color sense is type of color perception which means an ability of the eye to discriminate between different colors excited by light containing different wavelength of the cones. Cones perform this by different types of the pigments which absorb red, green, and blue wavelength of the light. This is done by protein called as opsin and the retinence. Color vision depends on three types of cones, some of which are more sensitive to the longer wavelengths of light (L-cones), some to the middle wavelengths (M-cones), and some to the shorter wavelengths (S-cones). The genes coding for two of these cone photoreceptors (L- and M-cones) are carried on the X-chromosome¹.

Color is a perceptual phenomenon, not just a physical property of an object¹. There are different factors which affect the color perception like gender², age³, illumination of light³, hormonal factors² and eye diseases⁴. So to find difference in the color perception various color metric systems are used in industry, in printings and in the graphic arts. There are two color metric systems. One is Cielcolor space system and second one munsellcolor system. The Cielcolor space system is

based on amounts of three primary colors to match a specified color. While in munsellcolor metric system; all the colors are represented in a cylinder in terms of hue, value and Chroma. This munsell system covers a wide range of colors.⁵ This is also reliable and valid. Many studies are done based on this munsell system for comparing the other Method, has three attributes; hue, lightness and saturation.⁶

There are many Method to test and compare the color perception of different individuals like strips and chart method², Farnsworth munsell 100 hue color perception test^{3,7,8} electro-retinography.⁹ In the strips and chart method, strips of different colors have to be matched with different shades of color in which time and error are recorded and then compare between two different groups.² This method does not seem to be accurate because of the less color member which has to compare. Another method is to check the sensitivity of the cones by the Electro Retinography.⁹ The most common and valuable method for testing the color perception is Farnsworth munsell 100 hue color perception test which was very time consuming method when started earlier. The FM 100-hue test consists of 85 removable colored caps, each of a different hue. The caps are separated into four boxes, each containing 21 or 22 caps each. In addition to the 21 or 22 caps in each box, at each

end of the box there is a fixed cap of a particular hue. patient has to arrange the 21 or 22 removable caps in the box so that they progressively change in hue, starting from the hue of the fixed cap on the left of the box and ending with the hue of the fixed cap on the right of the box, a report is generated based on how correctly they arrange the caps.⁸

There were previous studies done on the color perception based on gender², age³, study on illuminance of light³, study of color vision based on the hormonal factors², study on high myopia associated with color vision defects¹⁰. We know that there is difference in the sensory modality of sex linked color perception. The genes coding for two of these cone photoreceptors (L- and M-cones) are carried on the X-chromosome.

Refraction generally depends on the developmental changes in different parts of the eye including the axial length, corneal curvature, lens power and anterior chamber depth. Genetic and environmental factors both play role in the pathogenesis of myopia. Inheritance of mild to moderate degree of myopia can be polygenic. Whereas severe degree of myopia can be monogenic in the most of the cases in the form of autosomal dominant, autosomal recessive or X linked inherited pattern.⁹ From many studies^{10,11}, the role of genetic factors in pathogenesis of high myopia and associated color vision defects can be understood.

This study has been conducted to know whether there is any difference in color perception in males and females with normal color vision. Among males and females also the myopes and non myopes of the both group were included to compare the color perception amongst myopes and non myopes also. In this study we had used the Farnsworth munsell 100 hue color perception test which is a software based test. This method is less time consuming and had given an accurate result than other manual Method.

Material and Method: Study population and sampling: The present work was a cross-sectional, interventional, single center study conducted at Civil Hospital, Ahmedabad over the period of eight months after prior permission of Institutional

review board and head of department of physiology.

Total 100 healthy medical students (50 males and 50 females) were enrolled in this study. Before study, we had done the pilot study on 10% of students, and validity of the Farnsworth munsell test was checked which was seen to be significant for study of color perception in different groups.

Based on the pilot study, we enrolled 100 healthy subjects as per inclusion criteria. Among these 100 medical students we had selected, 50 were myopes and 50 non myopes (means 25 females and males having myopia and 25 each having no refractive errors . Also the 25 males having the myopia and 25 males have no refractive errors.)

In our study, 96% subjects from the myopic group have mild to moderate degree of myopia. Only 2 students have high degree of myopia (myopia < -6)12. Those who had history of any abnormality in vision other than myopia, past history and family history of eye diseases were excluded.

Data regarding general examination and eye examination were recorded in case record form. Snellen's chart and Ishihara chart were used for visual equity and color vision respectively. Farnsworth-Munsell 100-hue test⁷ (software based) was used to assess color perception. Data was entered in Microsoft excel sheet 2007 and analyzed using appropriate software. This study was done in computer lab between 1:00 pm to 4:00 pm, during bright daylight².

Ophthalmological examination: The Students were asked about any significant history of the eye diseases and the systemic diseases which can affect the vision like diabetes and hypertension. Visual equity 6/6 measured by Snellen's chart with correction of the refractive errors. Color vision was measured by Ishihara's chart because we had to exclude the subjects having color deficiency or anomalies. All the students had gone through the ophthalmological examination by the torch to see any abnormalities in the cornea or lens and the subjects having the abnormalities were excluded. 50 Subjects having myopia (25 each from males and females) with correction of their refractive errors were included.

The subjects having myopia without correction, having history of color blindness, eye disease like conjunctivitis, iritic, retinitis, migraine, eye surgery, glaucoma, cataract, history of tobacco and/ or alcohol, diabetes, hypertension, ischemic heart diseases were excluded.

Fig 1: Farnsworth munsell 100 hue test Manual apparatus (above) and software based system on (below)



Farnsworth-munsell 100 hue color perception test⁷ was used for comparing the color perception which is software based computer scanning system. The result of the test can be produced within the 15 seconds. Here one advantage of our study is that we have used the software based system which is easy to perform and results are easily reproducible, very accurate and takes very less time as compared to the manual method or the DOS based system. We tested the students' color perception with FM 100 hue color perception test online from the website www.xrite.com which is free to use for checking the color vision. As shown in the figure.1 this contains the 4 rows of the different shades of the color combinations. Each of the rows the last box of the color is fixed on both sides. The subject has to arrange this in the one row according to their hue, saturation and lightness. After completion of the test this system automatically develops a total error score. Stastical analysis was done based on the unpaired't' test applied for two groups: gender based group (males and females),

refraction error based group (myopes and non-myopes).

Result: The mean age of male subjects was 19.16 ± 1.085 and the female subjects were 19.86 ± 1.83 .

The result of the total error scores amongst the males and females were compared and can be seen in the graph.1. The total error score for the male group is 43.8 ± 28.52 and for the female group is 28.38 ± 22.62 . Then the P value has derived 0.0035 after application of the unpaired't' test. The two-tailed p value equals 0.0035 which is considered statically significant. This shows that the males had the high total error score than the females (table 1).

The result of the total error score amongst myopes and non-myopes were also compared and can be seen in the graph 2. The total error score for the non-myopic group is 25.2 ± 18.58 and the total error score for the myopic group is 46.96 ± 29.31 . The p value derived by the unpaired't' test is < 0.0001 . This value is extremely significant which shows that the non-myopic individuals give the more correct response. The mean and SD of total error score for the myopes having the spectacle number $\geq (-3)$ was 40.33, 29.78 respectively. The mean and SD for myopic group having spectacle number $< (-3)$ was 49.64, 29.05 respectively (table 2).

The comparison was also done for the favorite color amongst males and females, which shows that 33.3% females prefer pink color and that of 13.33%, shades of red color. 40% males prefer blue and 23.33% males having the favorite color was black which is shown in the graph 3 and 4.

Discussion: This study shows that the total error score is high in the male group and low in the female group that means the females can identify more color range as compared to males. This difference may be due to sexual dimorphism. The genes that encode the photo pigment of long wavelength sensitive cones in the retina are more in females.¹³

Graph 1: Total error scores amongst males and female

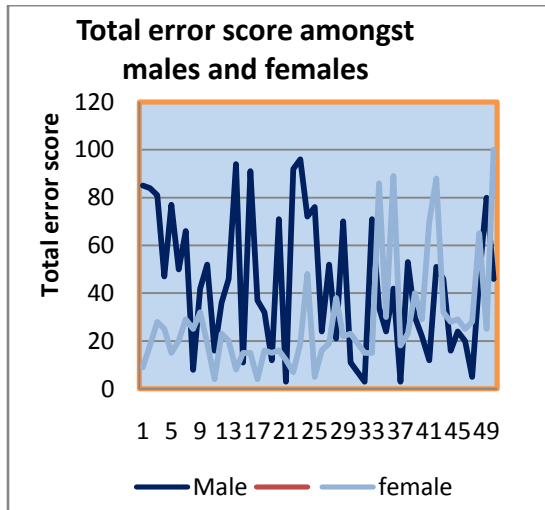
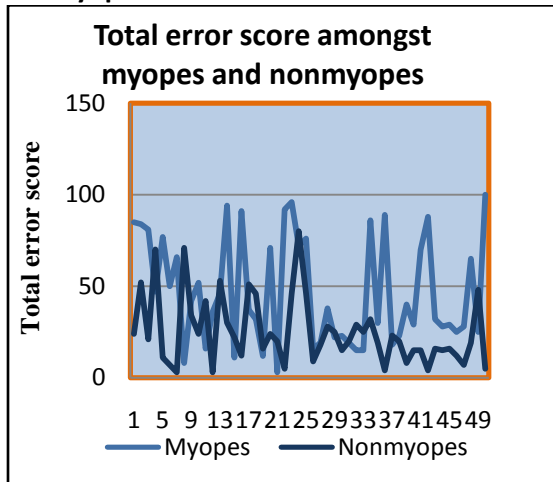


Table 2 : Total error score amongst myopics and nonmyopics

	Total error score (mean± SD)		Total error score (mean ± SD)
Myopes	46.96± 29.31	>3	40.33 ± 29.78
		<3	49.64 ± 29.05**
Nonmyopes	25.2± 18.58*		-

* P value < 0.0001 significant
** p value 0.3228 Not significant

Graph 2: Total error scores amongst myopes and nonmyopes



Graph 3: Favourite color in males

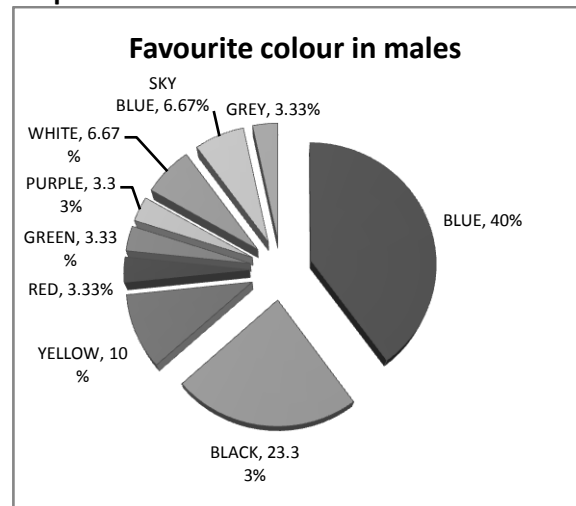
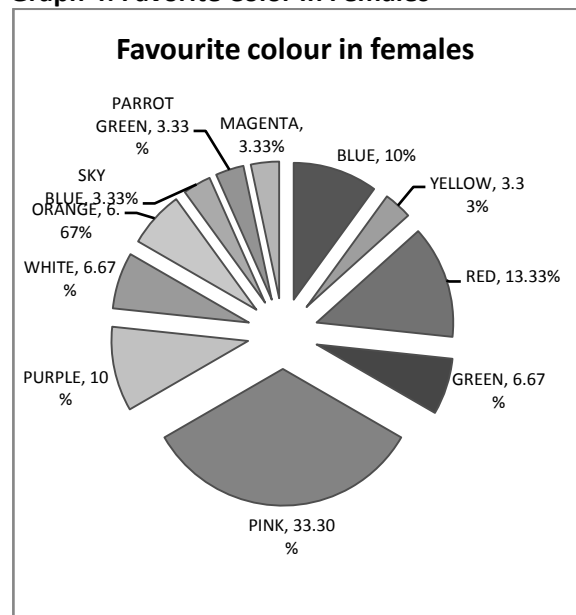


Table 1: Total error score amongst males and females

	MALES	FEMALES	p VALUE
Age (mean ± sd)	19.16 ± 1.085	19.86 ± 1.83	-
Total error score (mean ±SD)	43.8 ± 28.52	28.38 ± 22.6	0.0035

* pvalue<0.0035 significant.

Graph 4: Favorite Color In Females



Females have the two X chromosomes. These chromosomes have the genes for the different types of the red pigment on the two X chromosomes. In females, on one X chromosome some type of the red and green pigment containing cones are activated whereas the other type of cones for different red and green (but less for the green pigment containing cones) pigment activated on the other X chromosome. So there is certain type of different red and green cones on the two X chromosomes. Also the red cones lie very nearer to each other on the X chromosome. This is called as the super color vision power of the female.¹⁴

A study done by St. George found that blue for men stands out far more than for women¹⁵. Another study by Jastrow et al also found that men preferred blue to red and women red to blue.¹⁵ This may be due to less development of red and green cones in the males and more development of red and green cones in the females.¹

Color perception represents a major adaptive advantage which has been given by evolutionary pathways. It is such an important mechanism of biological signaling, a source of information from the environment. There are factors other than those related with physiological visual processes influencing such perception, which may be linked to the presence of estrogen receptors the retina.¹⁶

Color vision capabilities are believed to be developed and functioning equally in males and females by 1 year of age, but at the age of 5 to 6 years the ability to identify primary colors by name is significantly greater in girls than in boys.¹⁷ The explanation offered is that various constitutional and environmental factors undoubtedly influence the acquisition of color-naming ability by children, and verbal skill and interest in colors may vary between boys and girls¹⁷. In adults, a number of studies suggest that color lexicons differ in fundamental ways across gender. Comparative cross-cultural studies of some Asian cultures found that females prefer reddish, pink, and purplish colors.¹⁷

Human color vision is trichromatic depending upon the different cones. Especially females express more than one variant of the opsin which forms the L and M types of the cone photo pigments.

Males required a slightly longer wavelength to experience the same hue as did females. This difference is because of the testosterone receptors lying on the cerebral cortex in males.¹⁸

A study conducted by Bimler suggested that relative differences in the salience of color-space axes, with the males tending to attend more to a lightness axis and less to a red-green axis. They are also less reliable in identifying the colors. This may be due to existence of photo pigment heterozygosity among females while males are hemizygous, and gender differences in overall color awareness. Wald suggested that the genes for red and green receptors were altered in men and these genes must lie near each other on the X-chromosome.^{9, 19, 20}

A study by Guilford and Smith found that men were generally more tolerant toward achromatic colors than women. Thus, women might be more color-conscious and their color tastes more flexible and diverse.¹⁵ Explanations for differences in color experience could be sought at a number of levels, from retinal performance (e.g., photo pigment heterozygosity in a subgroup of females), influence of the wavelength absorption by the macular pigments.¹⁵

An interview based study by Thomas et al in Nepalese found that there was a significant difference between men and women for naming of color. Although, the women consistently listed more color names than men did.¹⁵

Moreover in our study 96% of the subjects have myopia of mild to moderate degree. Only the 4% of the subjects having high degree of myopia did not give the significant family history of high myopia or the color deficiencies running in the family members. So the poor color perception amongst myopes probably not due to the color vision defects resulting from the congenital autosomal dominant, autosomal recessive or x linked disorders. In our study in the myopic individuals the color vision is normal when checked by the Ishihara's chart but the total error score is significantly higher which is correlated with the study by M Mäntyjärvi and K Typpurainen.¹³ They explained in their study that the high myopic

individuals without degenerative changes in their retina and with normal color vision shows high total error score in the spectrum of blue color. This occurs due to stretching of the posterior pole of the retina in the myopic individuals and this posterior pole of the retina contains s-cones (short wavelength cones) in the human beings which comprises only 10% of total cones. These s-cones are also known as the blue cones which are related with the discrimination of the blue color. In the myopes the degenerative changes are stopped at the inner nuclear layer.¹³In the study of Gündogan NU et al¹⁰, showed that the high myopia responsible for the changes in the fundus. It also causes diminished response in the rods and cones which is resulting from the congenital myopia which is of the high degree.¹⁰

Conclusion:This study concludes that the females can see more range of colors as compared to males. In other words, the beautiful world is more colorful to the females. The high refractive error in the form of myopia can also affect the color vision.

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Role Of Multifocal Electroretinography In Assessing Local Retinal Abnormalities In Diabetic Subjects With And Without Retinopathy

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Abstracts: Background: Electrophysiological studies of humans with diabetes could be used to assess alterations such as dysfunction of ganglion cells and loss of colour and contrast sensitivity. Sensitivity of the full-field ERG is limited, precisely because it reflects the activity of the entire retina. In contrast, mfERG the ability to measure local ERGs in diabetes which would improve objective detection of early functional alterations and assessment of local change over time. Aim: The purpose of this study was to identify local retinal abnormalities in diabetic subjects with and without non-proliferative diabetic retinopathy (NPDR) using the mfERG. Method: This is a cross sectional study of patients who were clinically diagnosed and sent to us by M& J Regional Institute of Ophthalmology, Ahmedabad, India. Subjects were divided into three groups as group A (normal), B (Diabetics without Retinopathy) and C (Diabetics with Retinopathy) on the basis of medical/ocular history, visual acuity and fundus. mfERG was done in all subjects and the responses were analysed using t test. Result: P1 response density was decreased in Group B and Group C subjects as compared to control in Group A. In subjects with diabetic retinopathy the N1 latencies were higher as compared to diabetics - no DR and control group. When compared the mean global P1 implicit time increased from normal to diabetics - no DR group and DR group. Conclusion: The presence of significant local response delays in eyes without clinically evident retinopathy suggests that such mfERG changes may provide a very early indicator of local retinal dysfunction in diabetes.

Key Words: Diabetic Retinopathy, mfERG, N1 Latency, P1 Implicit time

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Introduction: Retinopathy is the most common microvascular complication of diabetes, and it remains a major cause of visual impairment worldwide. Almost all patients with type 1 diabetes will develop retinopathy over a 15 to 20-year period, and approximately 20-30% will advance to the blinding stage of the disease. More than 60% of patients with type 2 diabetes will have retinopathy.¹

Vascular lesions in the early stages of diabetic retinopathy are characterized by the presence of capillary microaneurysms, pericyte deficient capillaries, and obliterated and degenerated capillaries. Proliferative diabetic retinopathy is the more advanced form of the disease, when circulation problems cause the retina to become oxygen deprived. As a result, new fragile blood vessels can begin to grow in the retina and into the vitreous. Therefore, diabetic retinopathy has long been recognized as a vascular disease. The neuronal cells of the retina are also affected by diabetes.

Electroretinography (ERG) is the neurophysiological test used in order to measure electric changes that happen in the retina after a light stimulus. Changes in the ERG may be due to impairment of any of the retinal cell types: photoreceptors (a-wave ERG), and amacrine, bipolar, and, mainly, Muller cells (b-wave ERG). Moreover, oscillatory potentials are likely to be due to inner retinal neurotransmission.¹

Electrophysiological studies of humans with diabetes could be used to assess alterations such as dysfunction of ganglion cells and loss of colour and contrast sensitivity; moreover alterations in oscillatory potentials have been shown to predict the onset of proliferative retinopathy better than vascular lesions seen on fundus photographs²

Sensitivity of the full-field ERG is limited, precisely because it reflects the activity of the entire retina. Even advanced disease, if confined to small, discrete patches can remain undetected by the full-field ERG³. In diabetes, the earliest clinical retinal changes are typically confined to the posterior pole. Therefore, the ability to measure local ERGs

in diabetes would improve objective detection of early functional alterations and assessment of local change over time.

In contrast, the multifocal electroretinography (mfERG) developed by Sutter and Tran⁴ enables assessment of up to 103 of distinct retinal areas within approximately 4 minutes per eye. This technique has been applied to the study of retinitis pigmentosa, macular degeneration, glaucoma and diabetes⁵. Studies demonstrated that in some patients with diabetes, mfERG responses (averaged across relatively large areas of retina) were smaller in amplitude and delayed in comparison with those in normal patients⁶. However, they did not determine the extent to which local abnormalities were detected.

The purpose of this study was to identify local retinal abnormalities in diabetic patients with and without non-proliferative diabetic retinopathy (NPDR) using the mfERG.

Material and Method: It was cross sectional study conducted in ERG clinic, in M & J Western Regional institute of ophthalmology, Ahmedabad after obtaining ethical clearance from institutional ethical committee.

The cases were referred to us from ophthalmology. The procedure of examination performed was explained to all the cases and written consent was taken prior to examination. Proper ocular examination was done prior to examination including acuity of vision and corrective lens were given for the test.

The subjects were divided in two groups on the clinical established diagnosis and by fundus examination and compare with 20 normal subjects(32 eyes) with age from 30 to 54 were taken as control who were examined with mfERG under the same condition, using the ISCEV standard⁷. Normal subjects were those sent to us for testing malingering or the normal eye in unocular disease. They had full visual acuity and no history of eye disease or other relevant disorders in the eye taken as control. They were taken as Group A.

In group B were diabetics with normal fundus and no diabetic retinopathy present (no DR). They were 10 subjects with mean age(53± 7.2) years.

In group C were diabetics with changes of diabetic retinopathy (DR) in fundus examination. They were 11 subjects in this group with mean age(57 ±9.1) years.

The stimulus, consisting of 103 hexagons covering a visual field of 50°, was presented on a 9 inch CRT (Cathode ray tube) with a frame rate of 75 Hz at a distance of about 40 cm from the subject's eye. Every 13.3 ms the frame of the monitor changes and each sector has a 50/50 chance of appearing "white" (briefly flashed) or "black" (no flash). The white hexagons were 200 cd/m² and the black hexagons the darkest the screen allowed, less than 5 cd/m². The area surrounding the array of hexagons was set to 100 cd/m² and a central cross was used for fixation. All recordings were performed with the room lights on to help assure a constant state of light adaptation

The duration of the recording session was about 4 minutes, which included 8 recording segments of approximately 30 sec between samples, during which the subjects were not allowed to blink or move.

Both the eyes were dilated with tropicamide (1%) and 2.5% phenylephrine and anesthetized with 0.5% proparacaine. The ERG responses were recorded by means of a bipolar BurianAllen contact electrode which makes use of a large speculum to hold the eyelids apart. A smaller clear corneal contact lens is held against the cornea with a spring assembly. The skin electrode (gold cup electrodes) fixed to the forehead with a conducting pasteserved as a ground electrode. The electroretinogram were amplified (x 50,000 - 100,000) and band pass filtered (10–300 Hz). Recording quality and eye movements were monitored by real-time display and the eye camera, respectively. Contaminated segments were discarded and repeated. The VERIS software 6.1.1 (EDI, San Mateo) developed by Sutter, using a fast m transform algorithm⁴ was employed for the calculation and analysis of the 103 local ERG responses from the measured signal. All the data

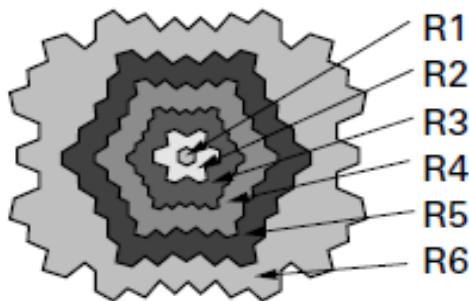
was statistically analysed using student t test and were found to be statistically significant ($p \leq 0.05$)

Result: The visual acuity and fundus finding in the subjects are given in Table 1. For data analysis, the 103 local responses were grouped six concentric rings (R1- R6) centred on the fovea (Fig 1). Response densities and implicit times of the major components N1, P1, N2 in each ring was calculated and analysed.

Table 1: Visual Acuity and fundus finding of the subjects in Group A, B and C

Group	Visual Acuity	Fundus finding
A	6/6 to 6/12	No changes
B	6/6 to 6/12	No changes
C	6/12 to 6/60	Micro aneurysm, retinal haemorrhages. Neovascularisation was found in 1 subject

Fig 1: Concentric rings centering in fovea



Global P1 implicit time was calculated in each eye analysed. As expected in normal subjects the response density decreased from fovea (Ring 1) to eccentricity (Ring 6). In subjects with diabetics - no DR and with DR there was a continuous decrease in response density from the maximum at the fovea towards the periphery. The response density in diabetics without retinopathy was less than normal subjects and more than that of subjects of DR (Fig 2). Student's t test was applied and the difference was found to be statistically significant ($p \leq 0.01$)

Subjects with diabetes without retinopathy showed increased N1 latency compared with those of the control subject. In subjects with diabetic retinopathy the latencies were higher as compared to group B and A (Fig 3)

Fig 2: P1 response density in different concentric ring in Group A (normal), B (no DR) and C (Diabetic Retinopathy)

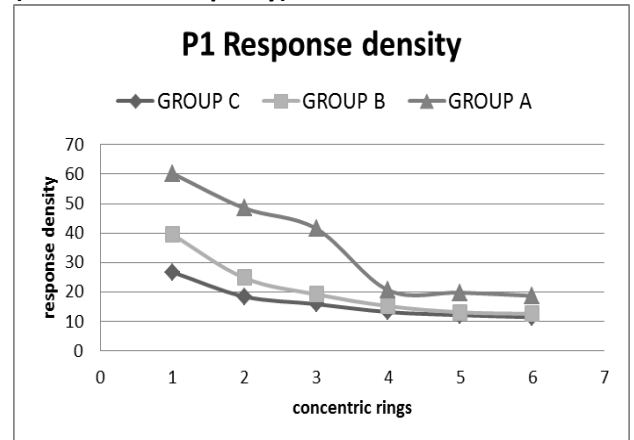


Fig 3: N1 Latency in different concentric ring in group A (normal), B (no DR) and C (Diabetic Retinopathy).

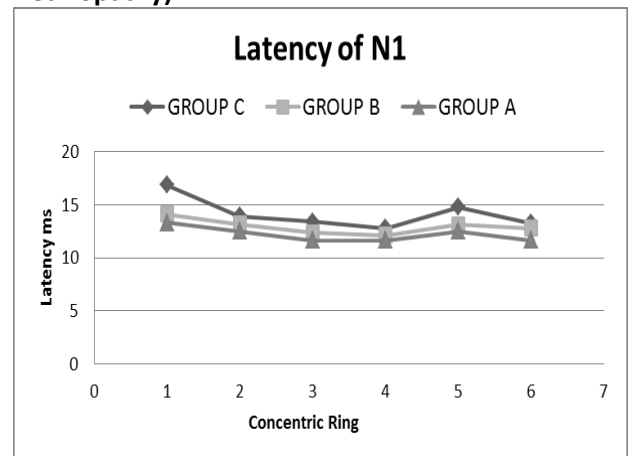
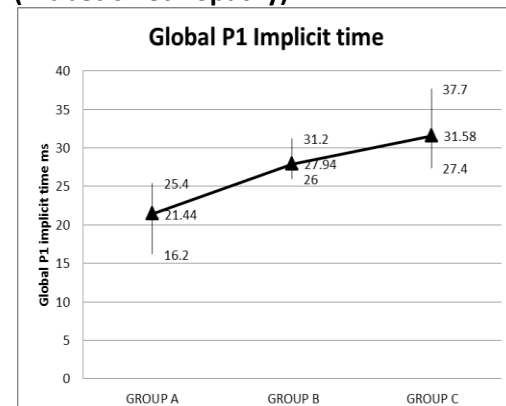


Fig 4: Global P1 Implicit time with the maximum and minimum and the black triangle depicting the mean in each of group A (normal), B (no DR) and C (Diabetic Retinopathy)



P1 implicit time varied throughout different 103 segments of retina. The variation was minimal in normal subjects while the variation of response increased in group B and C. Global P1 implicit time was calculated from the average of the implicit time in all the segments. When compared the mean global P1 implicit time increased from normal to no DR group and DR group (Fig 4)

Discussion: We focused on the detection of functional changes in the retina that precede diabetic retinopathy, as the group B in this study showed no pathological changes detectable by standard ophthalmoscopy. The mfERG response revealed a significant amplitude reduction in diabetes.

The results demonstrate that mfERG implicit time analysis is a highly sensitive method of assessment of local retinal function in diabetes. The range of local ERG implicit times observed for the normal eyes in this study was very narrow, consistent with the findings of other mfERG studies⁸. Consequently, local ERG delays as small as 2.5 msec may be regarded as representing significant local retinal dysfunction in diabetic eyes.

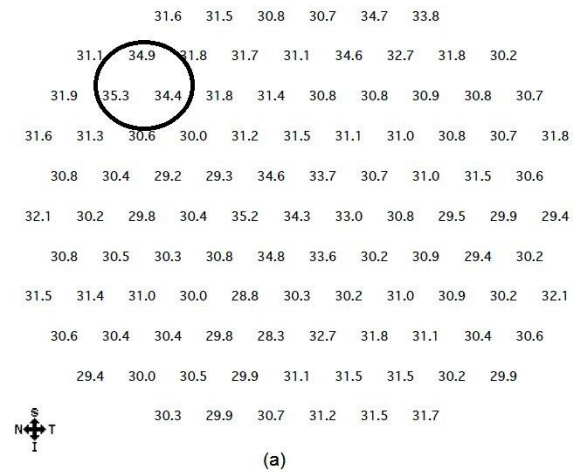
In eyes with DR, delays of local responses were greater and were found more throughout the retina than in eyes without retinopathy. Response delays were progressively worse toward the centre of discrete ophthalmoscopic lesions in the retinopathic eye (Fig 5) Smaller, but significant local response delays were found in eyes without retinopathy suggesting that the implicit time analysis revealed subclinical, local retinal dysfunction in these areas. Amplitude variability within diabetic eyes with or without retinopathy was also large (Fig 2). Recently studies⁶ reported that implicit times of mfERGs, averaged across the whole retina, were significantly delayed in some diabetic eyes without retinopathy. Whole-field response delays were greater in magnitude and more prevalent among their group of eyes with NPDR.

In the above figure Superior nasal part shows the retinal haemorrhages in fundus photograph marked by black circle and increase in P1 Implicit

time as compared to neiHbA1coring segments is found in similar segment of P1 implicit time array.

Fig 5: (a) P1 implicit time in right eye of a patient of Non-progressive DR (b) Fundus photograph of the right eye of same patient.

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Timing changes appear to represent neural response or conduction delays secondary to compromised local metabolism and/or blood flow. Even the early features of the diabetic responses (first trough and peak, or a- and b-wave analogues, respectively) appeared to be delayed. This suggests that the generators of early response components may be functionally compromised within these retinal regions. The initial negative and positive voltage deflections of the mfERG have been shown to behave much like the components of the photopic, full-field flash ERG and are likely to be generated by the same retinal elements⁹. Based on this parallel, it is possible that some of the

response timing changes observed here represent compromised function in the outer retina (cone photoreceptors) and/or middle retina (cone bipolar cells, Muller cells) secondary to diabetes.

It is possible that such early local ERG changes, found in the absence of retinal vascular findings, are caused by early diabetic choroidal lesions¹⁰. Retinal hypoxia is thought to be a major stimulus leading to increased expression of vascular endothelial growth factor and vascular permeability factor (VEGF/VPF)¹¹, although increased glucose concentration alone may be sufficiently damaging¹². In turn, increased expression of VEGF/VPF is likely to be a critical factor in the development of even the earliest retinal vascular lesions in NPDR¹³. In fact, local breakdown of the blood–retinal barrier has been associated with increased immunoreactivity for VEGF/VPF in the early stages of experimental diabetic retinopathy, as well as in diabetic human eyes in patients in whom fellow eyes had no evidence of retinopathy¹⁴.

Taken together, these results suggest that the mfERG may serve to monitor local metabolic conditions that lead to (or are related to) the development of diabetic retinal vascular lesions such as breakdown of the blood–retinal barrier. Use of the mfERG may also improve objective follow-up of treatment interventions.

Conclusion: The presence of significant local response delays in eyes without clinically evident retinopathy suggests that such mfERG changes may provide a very early indicator of local retinal dysfunction in diabetes. Observing these subjects longitudinally will help determine whether abnormal mfERG responses (timing delays, in particular) predict development and/or progression of retinopathy in discrete retinal locations.

In summary, we believe that the results presented here demonstrate that implicit time delays of multifocal ERGs reveal abnormal local retinal function in diabetes corresponding to local, discrete retinopathic lesions. The mfERG is easily obtained in a clinical setting, and provides a very

sensitive, objective assessment of local retinal health in diabetes.

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A Comparative Study Of Autonomic Functions Between The Patients Of Diabetes Mellitus And Controls

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Abstract: Background: Autonomic failure is encountered in many clinical conditions as primary or secondary disorders. Amongst all, Diabetes mellitus is most common systemic disease causing autonomic dysfunctions, whose severity is related to duration of diabetes and the degree of the metabolic control. While the degree of loss of autonomic functions can be assess by series of autonomic tests. The aim of the present study was to find out the effects of diabetes mellitus on autonomic functions. Method: In this cross sectional study, 30 diabetics were compared with 30 non-diabetics (plasma glucose level between 80-120 mg %) for their autonomic functions. Their autonomic functions were counted as per the protocol of 'Autonomic Function Lab', AIIMS, New Delhi. Statistical analysis was performed using Medcalc 11.1.0.0 statistical software. Result: All the autonomic tests- Deep breathing test, Valsalva maneuver, Sustain hand grip test & Lying to standing test has shown significantly altered autonomic functions amongst diabetics than non diabetics. Conclusion: Diabetes mellitus is one of the systemic disease which leads to autonomic dysfunctions when compared to non diabetes which may be because of increased blood glucose.

Key words: Diabetes mellitus, Autonomic neuropathy, Autonomic function tests

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Introduction: Autonomic system is the part of peripheral nervous system and subdivided into the sympathetic and the parasympathetic nervous system. It controls the most visceral functions of the body. When these functions are compromised, it results into "Autonomic malfunction". Autonomic malfunctions are also known as "Autonomic Neuropathy".

Autonomic failure results in mild-to-severe degree of life threatening conditions depending on the degree of dysfunction. In neuropathy nerve fibers of different size and of different types may be variably involved.^{1, 8} Autonomic failures is encountered in many clinical conditions as primary disorder or secondary disorder such as diabetes mellitus, alcoholism, amyloidosis etc. Diabetes mellitus is most common systemic disease causing neuropathy. It occurs secondary to metabolic disturbance, and prevalence is related to duration of diabetes and the degree of the metabolic control. In such conditions, clinical assessment may not be sufficient to assess the degree of autonomic failure. Clinical symptoms of autonomic failure may appear late in the course of disease. In these conditions and assessment of degree of loss of autonomic functions can be done by series of autonomic tests.

Material And Method: This cross sectional study was designed as per the protocol of autonomic function lab, AIIMS, New Delhi. Participants were recruited from Medicine OPD of SSG Hospital and were enrolled after taking informed written consent.

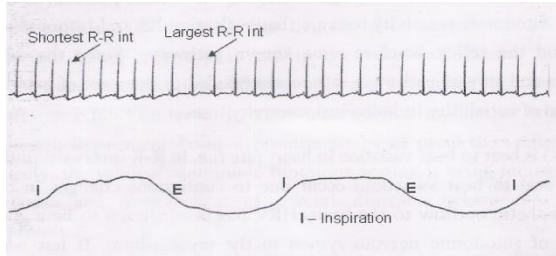
All Participants were free of hypertension or any other systemic disease. In our study, two different categories of participants are, non-diabetic control subjects (n=30), whose plasma glucose level remain within normal range i.e. between 80-120mg%, and second category is diabetes subjects (n=30, under medical treatment and has diabetes^{1,2} for more than 5 years as referred from hospital case paper). At the time of participation plasma glucose level of all the participants were taken by digital glucometer (GLUCOCHECK).^{4,5}

Autonomic functions of 30 diabetics and 30 non-diabetics making a total of 60 voluntary participants were compared on the bases of the following tests-

Deep breathing test: Procedure Continuous ECG and Respiration of a supine participant is recorded by Schillers Multipara Monitor for six cycles per minute (which was guided by a hand

signal to get a smooth, slow & deep breathing) and E:I ratio is measured.

Fig 1: Tracing of deep breathing test with three respiratory cycles

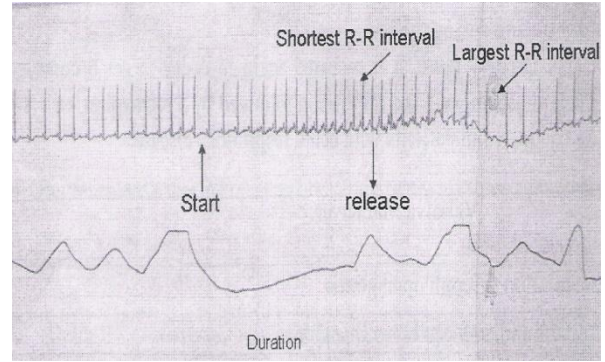
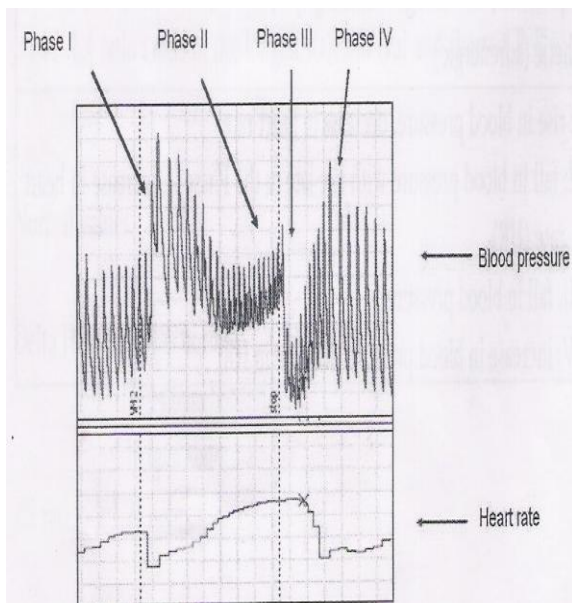


$$\frac{E}{I} \text{ ratio} = \frac{\text{Longest R-R interval during expiration}}{\text{Shortest R-R interval during inspiration}}$$

(Averaged over 6 cycles) Normally during breathing test E : I ≥ 1.21

Valsalva maneuver: Procedure Participant in supine position is asked to expire into mouthpiece attached to sphygmomanometer. The participant has to maintain the expiratory pressure at 40 mmHg for 15 seconds. Their ECG, Respiration and BP are recorded as ab

Fig 2: Tracing of Valsalva Maneuver record with different phases



Longest R-R interval in phase IV

Valsalva ratio = Shortest R-R interval in phase II

Normally valsalva ratio is more > 1.2

Sustained handgrip test: Procedure After taking baseline blood pressure the participant is asked to maintain a handgrip of 30% of their maximum voluntary contraction for 4 min in handgrip dynamometer and blood pressure is measured during the test. Normal increase in diastolic blood pressure is ≥ 16 mm Hg.

Lying to standing test: Procedure The base line blood pressure and heart rate is taken during resting condition in supine position. After 10 minutes of rest the participant was told to attain standing posture within 3 seconds and recordings are taken immediately.

Normally fall in systolic blood pressure ≤ 10 mm Hg.

Result: In our study, demographic characteristics (age, height, weight), diastolic blood pressure and basal heart rate has shown no significant difference in their distribution amongst the two groups while FBS, PP2BS and basal systolic blood pressure has shown a significant difference. This provides the most suitable background to carry out the comparison amongst the diabetics and non-diabetics.

Table 1: It is showing age, height, weight, FBS, PP2BS, duration of diabetes, systolic blood pressure, diastolic blood pressure, heart rate in diabetes mellitus group and non-diabetes group i.e. control subjects

No	Parameters	Diabetic (n=30)		Non-diabetic (n=30)	
		Mean	SD	Mean	SD
1	Age (Years)	49.47	13.35	49.57	14.17
2	Height (cm)	158.97	9.11	171.26	6.10
3	Weight (kg)	62.3	11.45	71.1	8.58
4	FBS (mg/dl)	156.3*	55.19	94.43	13.54
5	PP2BS (mg/dl)	219.93*	72.90	151.7	10.36
6	Systolic B.P. (mm of Hg)	137.13*	17.50	120.67	6.86
7	Diastolic B.P. (mm of Hg)	78.37	8.88	78.3	7.25
8	Basal H.R./min	80.47	12.18	80.87	12.36

*Statistically significant.

Table 2 : Comparison of autonomic functions in diabetes mellitus group and non-diabetic group based on mean values

No	Test	Group	Mean	SD	'p' Value
1	Deep breathig	Control	1.525	0.266	<0.0001
		Diabetic	1.109	0.148	
2	Valsala maneuver	Control	1.734	0.320	<0.0001
		Diabetic	1.107	0.081	
3	Sustained handgrip	Control	22.2	6.375	<0.0001
		Diabetic	10.6	5.411	
4	Lying to Standing	Control	3.8	2.537	<0.0001
		Diabetic	13.9	5.352	

While comparing both the groups for autonomic functions it shows statistically significant differences which indicates diabetes as the main culprit in causing autonomic dysfunctions.

Discussion: The activity of the autonomic nervous system is of crucial importance in moment to moment regulation of heart rate and blood vessels resistance, thereby controlling arterial pressure, cardiac output and tissue perfusion³. Assessment of cardiovascular autonomic nerve damage can be made from the combined results of simple non-invasive cardio-autonomic tests⁴. From the above result, it can be explained that diabetes mellitus affect the autonomic system.

Duration of diabetes had a significant correlation with the degree of cardiac autonomic dysfunction detected by all the studied tests. Schnell et al¹ and Nsimies et al² showed the passive effect of the disease duration on all the tests results.

The mean value of heart rate response to E:I ratio in diabetes and control group were (1.109±0.148) and (1.525±0.266) respectively, they show statistically significant difference. Samy m. makary and associates⁵ found statistically significant (p=0.02) difference of mean values of HR response to E:I ratio in diabetics (1.13±0.18) and control (1.37±0.18) group, when carried out study on 77 diabetic subjects and 23 control subjects. The mean values of heart rate response to valsalva ratio in diabetic and control group were (1.107 ± 0.081) and (1.734 ± 0.320) respectively. The differences of mean values were statistically significant (P< 0.0001). Didangelos and associates (2003)(6) found statistically significant (P< 0.001) difference of mean values of HR response to valsalva ratio in diabetics with DAN (1.38 ± 0.26) and controls i.e. diabetics without DAN (1.78 ± 0.29) which shows association of diabetes with diabetic auto neuropathy.

The mean values of increase in diastolic blood pressure (mmHg) during sustained handgrip test in diabetic and control group were (10.6 ± 5.41) and (22.2 ± 6.37) respectively. The mean difference in diastolic blood pressure was statistically significant P< 0.0001. May O and associates⁷ reported impaired diastolic blood pressure increase during sustained handgrip test which is statistically significant i.e. P=0.037.

The mean values of decrease in systolic blood pressure (mmHg) during postural change from lying to standing in diabetic and control group were (13.9 ± 5.35) and (3.8 ± 2.53) respectively. The mean difference in systolic blood pressure was statistically highly significant (P< 0.0001). Didangelos and associates⁶ also found statistical significant difference (P< 0.001) in mean values of decreased systolic blood pressure in group with diabetic autonomic neuropathy (20.6 ±

13.6) group without diabetic autonomic neuropathy (1.67 ± 4.08).

As very few studies were undertaken amongst the Indians, the above results is very valuable in indicating that there must be some co-relationship between blood glucose level and development of neuropathies and hence autonomic dysfunctions. Specific investigative studies will better able to explain pathophysiological changes which are resulting in these dysfunctions.

Conclusion: Diabetes mellitus is one of the systemic disease which leads to autonomic dysfunctions, which may be because of interactions between increased blood glucose and neuronal tissues. Autonomic dysfunction is a prevalent and serious complication for individuals with diabetes.

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Hypolipidemic Effect Of Fenugreek And Garlic On Experimentally Induced Hyperlipidemia In Rabbits: A Randomized Control Trial

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Abstract: Background: Hyperlipidemia is very common in especially with the Indian diet context. So efforts are done time to time to find out the hypolipidemic ingredients in Indian diet itself, so with the use of those ingredients can neutralize the hyperlipidemia caused by a lot of fats used for cooking in India Objective: To assess and compare the hypolipidemic effect of Garlic and fenugreek. Method: A randomized control trial was conducted on hyperlipidemia induced rabbits in Department of Physiology, Dr S N Medical College, Jodhpur (Rajasthan) India. In all rabbits experimental hyperlipidemia was induced by feeding cholesterol 500mg/kg body weight. Then they were divided randomly into three groups v.i.z. Group (1) who was given grass hay diet, Group (2) and Group (3) who was given fenugreek extract and garlic extract as supplement respectively for four weeks. Mean changes of lipid profile from pre-intervention to post-intervention of each group were assessed and compared with Anova and Tukey-Kramer test. Result: It was observed that garlic as well as fenugreek group was having significant ($P < 0.001$) hypolipidemia in comparison to control group. It was also seen that garlic has significantly more ($P < 0.05$) hypolipidemic effect than fenugreek. Conclusion: Both garlic and fenugreeks have hypolipidemic effect. Garlic is having more hypolipidemic effect than fenugreek.

Key words: Fenugreek, Garlic, Lipid Profile, Hypolipidemia

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Introduction: Atherosclerosis remains the major cause of death and premature disability. Hyperlipidemia is the most firmly established and best understood risk factor for atherosclerosis¹. Nowadays, major drugs used for treatment of hyperlipidemia have several adverse effects. Modern lipid lowering agents i.e. statins (atorvastatin, simvastatin, rosuvastatin etc.) are not only expensive but also have side effects like: hepatic dysfunction, renal insufficiency, hypothyroidism, advanced age and serious infections². On the above they have limitations of the use in many conditions like pregnancy and lactations etc.³

Herbal medications such as garlic (*Allium sativa*), fenugreek, and guggular are in use as lipid lowering agents from very ancient times. Garlic contains a variety of organosulfur compounds, amino acids, vitamins and minerals⁴. Some of the sulfur compounds present in garlic such as allicin, ajoene, S-allylcysteine (SAC), diallyl disulfide (DADS), S-methylcysteine sulfoxide, and S-allylcysteine sulfoxide may be responsible for the therapeutic properties of garlic⁵. Fenugreek seeds are rich source of trigonelline, lysine and l-tryptophan and they also contain a large

amount of steroidal saponins and fibers. Steroidal saponins inhibit cholesterol synthesis and its absorption, while fiber may help lowering sugar levels^{6, 7}. Studies have shown that fenugreek helped in lowering cholesterol and blood sugar levels in patients suffering from diabetes⁸⁻¹¹. In the context of Indian diet it becomes much more difficult to avoid fat, so from the ingredients used in Indian kitchen lipid lowering ingredients can be found out to neutralize the hyperlipidemia caused by a lot of fats used for cooking in India. So the proposed study was intended to assess and compare the hypolipidemic effect of garlic and fenugreek.

Material and Method: A randomized control trial was conducted on hyperlipidemia induced rabbits in Department of Physiology, Dr S N Medical College, Jodhpur (Rajasthan) India after getting approved in the college research review board.

Stage I: Ninety rabbits of European rabbits (Order – lagomorpha, Family – laporidae, Genus – orictolagus, Species – cuniculus) weighing 1 Kg to 2 Kg of either sex were included in the study. Lipid profile* of all rabbits was assessed before inducing hyperlipidemia.

Stage II: These rabbits were given cholesterol in doses of 500mg/kg body weight to induce experimental hyperlipidemia for 4 weeks to induce hyperlipidemia. After inducing hyperlipidemia lipid profile of all rabbits was again assessed (pre-intervention levels).

Stage III: Cholesterol diet was discontinued then these rabbits were divided randomly into three groups v.i.z. Group (1) who was given normal grass hay diet, Group (2) and Group (3) who were given fenugreek extract** and garlic extract*** as normal diet supplement respectively for four weeks. After 4 weeks of this diet again lipid profile of each of rabbit from each of group was assessed i.e. stage III or Post interventional lipid profile. Pre-intervention lipid profile of each of rabbit was compared with its Post-intervention lipid profile.

Statistical Analysis: Change in mean level of lipid profile from stage I to stage II in each of three groups was assessed to find found level of hyperlipidemia. Change in mean level of lipid profile from pre-intervention to post-intervention in each of three groups was assessed to find out the effect of intervention. This Mean change of effect on lipid profile level of each group was compared with ANOVA and then it was further compared in various combinations with Post-hoc-Tukey-Kramer test.

*Lipid Profile: It includes Serum Cholesterol, Serum Triglyceride, Serum Low Density Lipoprotein, (LDL), Serum Very Low Density Lipoprotein (VLDL) and Serum High Density Lipoprotein (HDL) level

**Fenugreek extract preparation: 250 gms of fenugreek seed were grinded to make powder. This powder was dissolved in water in a dose of 500mg /kg body weight/day and this emulsion was pushed directly into the stomach of rabbit by infant feeding tube.

***Garlic extracts preparation: 200gms of garlic cloves were crushed in a grinder and kept

overnight at room temperature in a beaker containing distilled water to obtain garlic emulsion. This emulsion was filtered through muslin cloth and then filtrate is evaporated in desiccators to get final extract of garlic. About 100 ml garlic extract was prepared in this way (since 1ml of garlic extract is drawn from 2gm of garlic). 2ml of garlic extract was given daily.

Result: In the present study significantly higher levels of Serum Cholesterol, Triglyceride, HDL, LDL and VLDL levels were induced with cholesterol diet given to all the 90 rabbits included in study.

In 1st stage of this study after receiving cholesterol diet mean Serum Cholesterol, Triglyceride, HDL, LDL and VLDL levels were significantly ($P < 0.001$) raised in rabbits.

After giving Grass to group (1), Fenugreek to group (2) and garlic to group (3) rabbits i.e. 30 in each group, it was observed in the present study that difference in mean change from pre-intervention level to post-intervention level of Serum Cholesterol in all the three groups i.e. control group, Fenugreek group and Garlic group were having highly significant ($P < 0.001$) variation.

Likewise, when the difference in mean serum Triglyceride, HDL, LDL and VLDL levels in all the three groups i.e. control group (Gp 1), Fenugreek group (Gp 2) and Garlic group (Gp 3) were observed in the present study, it was also found with highly significant ($P < 0.001$) variation in serum Triglyceride, HDL, LDL and VLDL levels.

It was also observed in this study that fenugreek significantly ($P < 0.05$) lowered Serum Cholesterol, Triglyceride and LDL levels than the control group. But fenugreek significantly ($P < 0.05$) raised the HDL level. In case of VLDL this change was not significant ($P > 0.05$)

It was also observed in this study that garlic significantly ($P < 0.05$) lowered Serum Cholesterol, Triglyceride, LDL and VLDL levels than the control group. But fenugreek significantly ($P < 0.05$) raised the HDL level.

It was also observed in this study that mean change in Serum Cholesterol, Triglyceride, LDL and VLDL levels were significantly more with

garlic than fenugreek. Likewise mean change in Serum HDL levels was significantly less with garlic than fenugreek.

Table 1: Mean change in total lipid profile of animals before and after intervention

Lipid Profile Variables	Group 1 (n=30) (Control Gp)	Group 2 (n=30) (Fenugreek Gp)	Group 3 (n=30) (Garlic Gp)	ANOVA	P Value LS
Cholesterol(gm/dl)	204.±10.8	289.19±22.78	337.15±31.55	125.48	<0.001 HS
Triglyceride(mg/dl)	34±9.1	53.42±10.45	148.4±23.56	225.73	<0.001 HS
HDL(mg/dl)	5.07±1.08	-8.84±3.21	-16±2.15	320.96	<0.001 HS
LDL(mg/dl)	191.85±12.1	287.3±33.28	323.16±42.15	68.4	<0.001 HS
VLDL(mg/dl)	7.42±1.17	10.7±2.07	30.2±8.67	84.44	<0.001 HS

@Mean Change = Mean of (Pre-interventional level - Post-interventional level)

Table 2 : Significance In Difference In @Mean Change Of Total Lipid Profile In Various Groups Of Animals

Lipid Profile Variables	Gp 1 V/s Gp 2 (grass hay/fenugreek)	Gp 1 V/s Gp 3 (grass hay/garlic)	Gp 2 V/s Gp 3 (fenugreek/garlic)
Cholesterol(gm/dl)	P<0.05 S	P<0.05 S	P<0.05 S
Triglyceride(mg/dl)	P<0.05 S	P<0.05 S	P<0.05 S
HDL(mg/dl)	P<0.05 S	P<0.05 S	P<0.05 S
LDL(mg/dl)	P<0.05 S	P<0.05 S	P<0.05 S
VLDL(mg/dl)	P>0.05 NS	P<0.05 S	P<0.05 S

* through Tukey Test of significance for multiple comparison
 @Mean Change = Mean of (Pre-interventional level - Post-interventional level)

Stevenson C. et al.¹² investigated the effect of garlic on total cholesterol level in persons who had hypercholesterolemia. They reported that garlic can reduce total cholesterol levels. RahmanK.¹³ reviewed historical perspective of garlic on cardiovascular diseases, who reported that garlic extract (kyolic) had hypolipidemic effect in reducing serum cholesterol and triglycerides in hyper-lipidemic patients. In a randomized, double-blind and placebo – controlled study Yu-Yan Yeh and Lijuan Liu¹⁴ showed that aged garlic extract (AGE) supplementation was effective in lowering plasma concentration of total cholesterol by 7% in individuals with hypercholesterolemia. Banerjee K. S. et al¹⁵ also reviewed the effect of garlic on cardiovascular disorders and found that garlic consumers had lowered the total cholesterol and LDL. Javedkojuriet al¹⁶ also observed that garlic administration in hyperlipidemic patients can significantly decrease the total cholesterol and LDL.

Furthermore in present study it was also revealed that fenugreek also has hypolipidemic effect. This observation was also well supported with findings of other authors.¹⁷⁻²⁰

AbuSaleh M¹⁷ reported that administration of fenugreek seed of 25gm orally twice daily for three weeks and six weeks produces significant reduction (P<.001) of total serum cholesterol triglyceride and LDL cholesterol in hypercholesterolemia group. Annida B et al¹⁸ observed the effect of supplementation of fenugreek leaves in streptozocin induced diabetic rats who had elevated blood glucose and serum and tissue lipids. They observed that ingestion of fenugreeks leaves significantly lowered the blood glucose and serum and tissue lipids.

PunnaRamaluet al¹⁹ also reported the hypolipidemic effect of a soluble dietary fiber isolated from fenugreek seeds. In addition to this present study also revealed that garlic had

significantly more hypolipidemic effect than fenugreek.

Conclusion: Garlic and fenugreek both have hypolipidemic effect and able to reduce Serum Cholesterol, Triglyceride, LDL and VLDL and able to raise HDL. Hypolipidemic effect of garlic is better than fenugreek.

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Prevalence Of Diabetes Mellitus Type 2 In The General Population Of Ahmedabad City

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Abstract: Background: Diabetes mellitus type 2 is the predominant form of diabetes worldwide. The prevalence of DM type 2 is increasing rapidly. According to the IDF, 61.3 million people in India had diabetes in 2011. That figure is projected to rise to 101.2 million by 2030. However, there is dearth of data available on diabetes prevalence in Ahmedabad. Method: The study was carried out by means of a cross-sectional community-based screening of 300 people, aged ≥ 30 years residing in Ahmedabad city. Result: The prevalence of diabetes mellitus type 2 is 21% in this study. The prevalence in 30-40 years age group is 8.11%. Prevalence increases with increasing age. The prevalence of diabetes is significantly more among males (29.5%) than females (14.6%). It is highest in middle socio economic group- 25.7%. Diabetes is also significantly associated with the middle and low socio economic groups. Conclusion: There is a high prevalence of diabetes mellitus type 2 in the studied population. Earlier considered a disease of the elderly and affluent society, diabetes is now widely prevalent in younger ages and in the low socio economic class as well.

Key Words: diabetes, diabetes mellitus type 2, prevalence, Ahmedabad.

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Introduction: Type 2 diabetes mellitus (T2DM) is the predominant form of diabetes worldwide; accounting for 90% of cases globally.¹ The impacts of T2DM are considerable: as a lifelong disease, it increases morbidity and mortality and decreases the quality of life.² At the same time, the disease and its complications cause a heavy economic burden for diabetic patients themselves, their families and society.²

Although the prevalence of both type 1 and type 2 DM is increasing worldwide, the prevalence of type 2 DM is rising much more rapidly because of increasing obesity, reduced activity levels and population aging.³ The 2012 report of the International Diabetes Federation (IDF) says that 371 million people were living with diabetes in 2011.⁴ Based on current trends, the IDF projects that 438 million individuals will have diabetes (type 2 DM) by the year 2030.³ In line with the global prevalence trends, diabetes burden is increasing as rapidly in India as the country is industrializing. According to the IDF, 61.3 million people in India had diabetes in 2011. That figure is projected to rise to 101.2 million by 2030.⁵

There is an extensive history of epidemiological studies on diabetes conducted in different parts of India. However, there is dearth of data available on diabetes prevalence in Ahmedabad. Ahmedabad is one of the fastest developing cities of the country

and is increasingly adapting the western lifestyle and junk food culture, while the traditional high fiber diet and physical hard work patterns are being lost. Also, there is increasing rural to urban migration. All these factors put the people of Ahmedabad at a high risk of developing the disease. It is in the wake of this scenario that the current study was conducted.

Materials and Method: Study design, sampling technique and data collection: The study was an observational type of study carried out by means of a cross-sectional community-based screening of the people residing in Ahmedabad city. The subjects were selected by simple random sampling. The data was collected by means of a personal interview and history taking followed by physical examination. An informed consent of all the participants was taken. The study was carried out during November 2011 to May 2012.

Sample size: Rough estimate of the prevalence of diabetes mellitus, as estimated by Research Society for the Study of Diabetes in India (RSSDI), Ahmedabad chapter, was at 13.8%.⁶ With this prevalence rate and 10% margin of error at 5% level of significance, the calculated sample size is 2400.⁷ Due to limitation of resources, the study was carried out with 300 participants, which is 12.5% of the required sample size.

Study population/ place of study: To make the sample true representative of the population in terms of socio economic demographics and respective lifestyle and diabetes risk factors, people belonging to all the three socio economic groups were included in the study in proportion to their number in the general population at large. Due to lack of availability of such actual data with the city's municipal corporation, a rough estimate was made. The sample size was made to include about 10% people belonging to high income group, 70% middle income group and 20% low income group people. For high income group people, people residing in a high-end, posh residential area society were taken. For middle income group, common societies were identified. And for low income group, 'chali'/ slum area was chosen. This classification was taken due to its ease of use and comparable life styles in people so grouped.³

Inclusion criteria: Subjects of age more than or equal to thirty years were included in the study.

Exclusion criteria: Known cases of diabetes mellitus type 1, pregnant women, people suffering from chronic auto immune diseases, people taking steroidal drugs, people who were acutely ill, and people less than 30 years of age were excluded from the study.³

Instruments used: (a) Glucometer used and test strips used: Accu-Chek Sensor (Roche pharmaceuticals, Germany) (b) For recording blood pressure: mercury-in-glass sphygmomanometer (Diamond make) calibrated in mmHg (0–300).

Classifications and cut-offs of parameters:

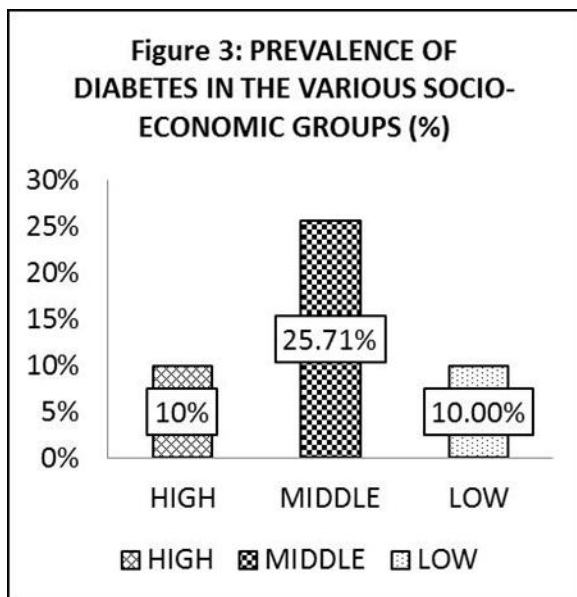
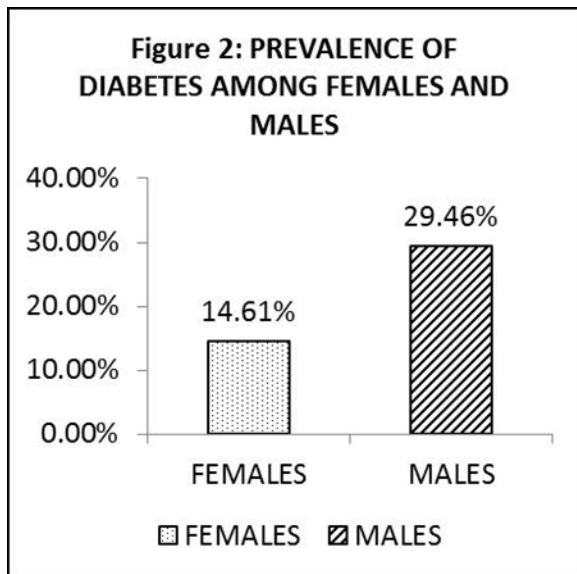
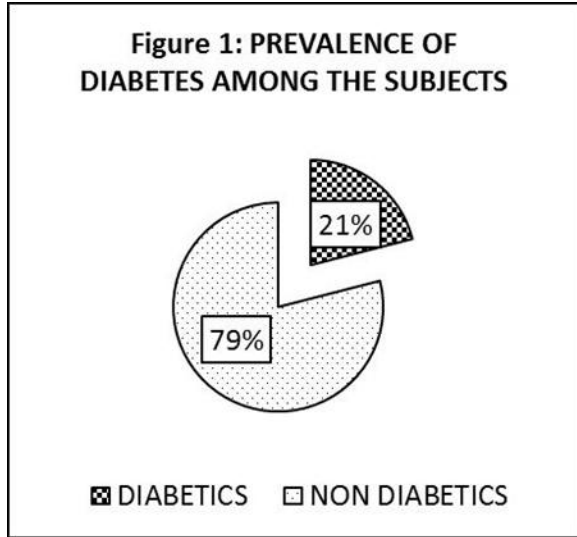
(a) Random blood sugar: Diabetics: Subjects with a random blood sugar more than or equal to 200 mg/dl with symptoms of diabetes (polyuria/ polydipsia/ polyphagia/ recent unexplained weight loss or weight gain/blurring of vision/fatigue/frequent superficial infections and slow healing of wounds) and known cases of diabetes, irrespective of their current treatment status and glycemic control status. All others were considered as non-diabetics.³ **(b) Blood Pressure: Hypertensives:** those subjects whose systolic blood pressure SBP was ≥ 140 mmHg and / or diastolic blood pressure DBP ≥ 90 mmHg and known cases of

hypertension, irrespective of treatment being taken or not and blood pressure being controlled or uncontrolled, were taken as Hypertensives. Rest all were taken as Non Hypertensives (pre hypertensives and normotensives). (JNC 7 report on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure, U. S. Department of Health and Human Services)⁹ (c) Body Mass Index: obese: subjects with BMI ≥ 30 kg/m² were classified as being Obese and those with BMI ≥ 25 kg/m² but < 30 kg/m² were identified as being Overweight. (Global database on BMI, WHO 2005)¹⁰

Statistical analysis: The data was analyzed using Microsoft excel by applying unpaired t-test for quantitative data and using Epi Info 7 version 7.0.8.3 by applying chi-square test for qualitative data. Correlation coefficients and Odds ratio were calculated for the different variables. Significance level was taken as p less than 0.05.

Result: The 300 respondents in the study included 171 females and 129 males. 10% of the subjects were taken from high socio economic group – they included 19 females and 11 males. 20% of the subjects were taken from low socio economic group, which included 34 females and 26 males. Among the respondents/ subjects belonging to the middle socio economic group (70%), there were 118 females and 92 males. Figure 1, figure 2 and figure 3 depict the prevalence of diabetes among the subjects. Table 1 shows the prevalence of diabetes in different age groups. Table 2 shows the comparison of characteristics of diabetic and non-diabetic subjects. Table 3 shows the significance of association of gender and socio-economic group with diabetes prevalence.

Discussion: Prevalence of Diabetes: A very high prevalence - 21% of diabetes mellitus type 2 has been recorded in this study. Gupta R et al had reported a prevalence of 20.1% in Jaipur in 2006¹¹ while Menon et al¹² reported a 19.5% prevalence in Kochi in 2006. Ramachandran A et al reported a prevalence of 18.6% in Tamil Nadu in 2008.¹³ The ICMR study conducted in the early 1970s reported a prevalence of 2.1% in India and in the same study approximately 3.7% prevalence was quoted for



Ahmedabad.¹⁴ In 1991, Ahuja reported a prevalence of 3.9% in Ahmedabad.¹⁵ Thereafter, the National Urban Diabetes Survey (NUDS), conducted in six large cities from different regions of India in 2001 revealed a prevalence of 12.1%.¹⁶ The prevalence rate in this study indicates the continuation of the rising trend in prevalence of diabetes over all these years with a four-fold increase since 1991.

Age and Diabetes: Prevalence of diabetes increases with increasing age. Diabetes is most prevalent in the age group 70 – 80 years (44%). Both females and males show similar trend in the prevalence of diabetes in the different age groups. West et al (1978)¹⁷, Gupta et al (1982)¹⁸ and Ramachandran et al (1988)¹⁹ have reported the same trend of very high prevalence of diabetes with increasing age in their respective works. The prevalence of diabetes is high in the younger age group of 30-40 years – 8.11%. This underscores the penetration of diabetes and its risk factors in younger ages.^{20, 21}

Table 1: Prevalence of Diabetes in the Different Age Groups -%

Age group (years)	Females	Males	Females + Males
30-40	2.44%	15.15%	8.11%
40-50	2.78%	10%	5.36%
50-60	16.67%	43.33%	26.92%
60-70	32.14%	44.44%	38.18%
70-80	40%	50%	44%
80-90	0	11.11%	8.33%
Total	14.62%	29.46%	21%

Gender and Diabetes: The prevalence of diabetes is significantly more among males (29.5%) compared to females (14.6%). Kutty et al (2000)²², Gupta et al (2004)²³, Mohan et al (2005)²⁴ and Reddy et al (2006)²⁵ have reported higher prevalence of diabetes among males too. The WHO also quotes a higher prevalence of diabetes among males in its non-communicable disease report of 2010.²⁶ However, some studies evidence the opposite.^{1, 17} How gender relates to diabetes, is not conclusively known.

Table 2: Characteristics of the Diabetic and Non-Diabetic Subjects

	Non Diabetics		Diabetics		T Test	Result p<0.05
	Mean	SD	Mean	SD		
Age (years)	49.70	14.09	58.83	11.06	2.43 x 10 ⁻⁰⁷	S
Weight (kg)	63.39	15.31	70.35	14.87	0.001	S
Height (m)	1.57	0.1	1.6	0.1	0.12	NS
BMI (kg/m ²)	25.53	5.46	27.66	5.72	0.009	S
SBP (mmHg)	132.07	22.91	139.62	22.07	0.02	S
DBP (mmHg)	83.14	10.69	83.62	11.01	0.76	NS
RBS (md/dl)	121.12	27.30	210.97	102.25	2.62 x 10 ⁻⁰⁹	S

Table 3: Significance of Association

Male Gender with Diabetes					
Gender	Odds Ratio	Lower Limit	Upper Limit	Chi Square Test	Result ($\chi^2 \geq 3.84$)
Male	2.4387	1.3811	4.3061	8.8836	S
Female	0.4101	0.2322	0.7241	8.8836	S
SE Group with Diabetes					
SE Group	Odds Ratio	Lower Limit	Upper Limit	Chi Square Test	Result ($\chi^2 \geq 3.84$)
High	0.3056	0.0894	1.0442	3.1076	NS
Middle	6.0000	2.7782	12.9581	22.6420	S
Low	0.2105	0.0854	0.5191	11.9600	S

Socio economic group and Diabetes: The prevalence of diabetes is found to be highest in middle socio economic group- 25.7%. At 5% significance level, diabetes prevalence is found to be significantly associated with this SE group. V Mohan et al. in 2001 concluded a higher prevalence of diabetes among the people of middle socioeconomic group than those of low socio economic group.²⁷ Diabetes is also significantly associated with the lower socio economic group. Connolly V et al had suggested the same in their study.²⁸ But the odds ratios for a person belonging to high socio economic group and for a person of low socio economic group of developing diabetes are comparable. This suggests that the low SE group too has high prevalence of diabetes and its associated risk factors. The better education, knowledge about disease, access to better health amenities and healthier dietary habits probably accounts for the relatively less prevalence of diabetes among the high SE group subjects. However, Ramachandran A et al observed a lower prevalence among the people of lower socio-economic group people.²⁹

Conclusion: There is a high prevalence of diabetes mellitus type 2 among the present study participants- 21% in age ≥ 30 years. The prevalence of the disease is significantly more among males compared to females. The prevalence of diabetes is highest among the subjects belonging to the middle socio economic group and the association is statistically significant. The prevalence is also significantly more in low socio economic group subjects, emphasizing the penetration of the disease and its etiologic factors in them too. But the prevalence in higher socio economic group subjects is less. The prevalence of diabetes is high in the younger age group- 30-40 years, which highlights the increasingly younger age of onset of diabetes now, and the prevalence increases with age. It is therefore recommended that bigger agencies and government conduct large scale studies to get the exact figures, to bring to light the responsible factors and implement measures to arrest the increase in diabetes prevalence.

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Effects Of Generalized Anxiety Disorder On Heart Rate Variability

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Abstract: Background: Heart rate variability (HRV) is an easy, non-invasive, accurate and reliable tool in assessing autonomic function. Aim: Aim of this study was to determine whether the patients with generalised anxiety disorder have lower heart rate variability compared to healthy controls or not. Objective: To determine and compare heart rate variability in generalized anxiety disorder patients and in age and sex matched healthy controls. Method: Study had been done in 2 groups: 1st group comprises adult patients of generalized anxiety disorder (n=50) & the 2nd group of healthy controls (n=50). It was carried out on instrument windows based Heart rate variability analysis system Variowin-HR at Govt. Medical College, Bhavnagar. Heart-rate variability was studied using the standard protocol and was statistically analyzed. Result: Significantly reduced variability of the heart rate was observed in both the time domain parameters like SDNN (Standard deviation of all NN interval), RMSSD (The square root of the mean of the sum of the squares of differences between adjacent NN intervals), SDSD (Standard deviation of differences between adjacent NN intervals), NN50count (Number of pairs of adjacent NN intervals differing by more than 50 ms in the entire recording), pNN50 (NN50 count divided by the total number of all NN intervals) as well as frequency domain parameters like LF(low frequency), HF (high frequency), LF/HF ratio in the disorder group as compared to the control group which are statistically significant (p<0.05). Conclusion: According to this study, generalized anxiety disorder (GAD) is associated with significantly lower Heart Rate Variability (HRV).

Key Words: Generalized Anxiety Disorder, Heart Rate Variability, Time Domain parameters, Frequency Domain parameters.

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Introduction: Generalised anxiety disorder (GAD) is characterized by excessive, uncontrollable and often irrational worry about everyday things that is disproportionate to the actual source of worry and rigid, inflexible response patterns. Anxiety disorders in the youth are receiving increasing attention. Such attention is understandable considering that an estimated 10 - 20% of the youngsters suffer from anxiety and anxiety-related symptoms. Anxiety disorders comprise the most prevalent set of psychiatric disorders in children and adolescents^{1, 2, 3}. Diminished variability in HR may be common to clinical anxiety and the related psychopathologies. Non-invasive assessment of the intrinsic sources of HR variability is an area of great interest in psychophysiology^{4,5}.

Heart rate variability (HRV) is the physiological phenomenon of variation in the time interval between heartbeats. It is measured by the variation in the beat-to-beat (R-R) interval. It is a noninvasive electrocardiographic marker

reflecting the activity of the sympathetic and vagal components of the autonomic nervous system (ANS) on the sinus node of the heart and has become the conventionally accepted term to describe variations of both instantaneous heart rate and RR intervals. Thus degree of variability in heart rate provides information about functioning of the autonomic nervous control on the heart rate and heart's ability to respond.

Disorders of affect such as anxiety disorders have been viewed as distorted emotional states in which an individual is not able to respond in an appropriate, flexible way to environmental demands⁶. Activation of the sympathetic nervous system enables the organism to organize an alarm reaction to respond appropriately to a stressful situation, also known as a "fight-or-flight" reaction. However, when the sympathetic nervous system dominates for prolonged periods of time, the energy demands on the body become excessive and eventually cannot be met, contributing to

wear-and-tear of bodily systems. Dysregulation of the ANS is thus associated with a number of physical and psychological symptoms and diseases, and is associated with increased risk of all-cause mortality⁷. As HRV is one of the non invasive tests for ANS function, dysregulation of ANS can be easily accessed by HRV and can prevent further complications occurring due to this. Reduced heart rate variability (HRV) is a prognostic factor for cardiac mortality⁸. The current study Aim at assessing the HR variability among subjects with generalised anxiety disorder as compared to healthy controls.

Material and Method: This study was carried out at Dept.of Physiology and Dept.of Psychiatry, Govt. medical college and Sir T Hospital, Bhavnagar, Gujarat, India. The study groups were comprised of Group-A (case) 50 patients of Generalised Anxiety Disorder came in psychiatry OPD and diagnosed clinically as having GAD by psychiatrist and severity of GAD was assessed by BECK ANXIETY INVENTORY and Group-B (control) 50 normal age and sex matched healthy subjects with no present or past history of any anxiety disorders (Table-1) of Bhavnagar district. After they were informed about the procedures and objectives of the study a written consent was taken as per standard protocol from all participants. All participants were advised to avoid eating and drinking (tea, coffee and alcohol) at least six hour prior to test as these may affect the results. Patients with Cardiovascular disorders (hypertension, h/o myocardial infarction, cardiac arrhythmia, having pacemaker) and other diseases like diabetes mellitus, renal failure, liver failure, cancer, AIDS and tuberculosis etc. terminal illnesses were excluded from the study.

Procedure: After giving information about the procedure, all participants were allowed to relax for ten minutes in a separate quiet testing room before starting the test. Case record form containing personal information of subjects, clinical history- diagnosis and vitals were filled up. Subjects were asked to lying down in a supine position and remain quiet, without speaking or making any movements for 5

minutes. ECG electrodes for HRV measurement were placed at both infraclavicular and both lumber regions of the subjects. The changes in the heart rate were measured with an instantaneous heart rate variability analyses software system – Variowin -HR interfaced with computer.

HRV were measured by continuous lead II ECG recording for 5 minutes (Short term HRV) based on R-R interval. Both time domain (SDNN, RMSSD, SDDSD, NN50Count, pNN50%) and frequency domain (LF, HF, LF/HF ratio) parameters of HRV analyses were measured and taken into calculation in the study.

Other Physiological Measurements: In this study, other physiological parameters like height, weight, BMI, temperature, heart rate, blood pressure and respiratory rate were measured and documented in the case record form.

statistical Analysis: All data were represented as a Mean \pm SD and statistical analysis was done by using unpaired t-test. We were using graphpad instat statistical software for data analysis.

Result: A Total of 100 subjects were recruited in the study of which 50 were in the generalised anxiety disorders group and 50 were in the healthy controls group. Table-1 shows that participants with GAD (group-A) did not significantly differ from healthy controls (group-B) with regard to age, sex, height and weight.

Heart rate variability exhibited significant differences for both time domain and frequency domain parameters between the generalised anxiety disorder group (A) and healthy control group (B). Time domain and frequency domain measures of heart rate variability are depicted in table-2 and table-3 respectively. In Time domain, GAD group(A) had reduced all parameters like SDNN(ms), RMSSD (ms), SDDSD, NN50 Count, pNN50(%) compared to the control group (B) and all values were statistically extremely significant ($p < .05$) except the SDDSD.

Table 1: Physiological Characteristics (Mean ±SD) of Disorder group and Control group.

Physiological Parameters	(A)Disorder Group(50) (Mean ± Sd)	(B)Control Group(50) (Mean ± Sd)	P Value
Age(yrs)	33.28 ± 10.126	37.64 ± 12.317	0.0561
Weight(kg)	56.10 ± 10.533	60.16 ± 10.479	0.0562
Height(cms)	162.94 ± 8.819	161.18 ± 10.484	0.3659
BMI	21.17 ± 3.890	23.22 ± 4.143	0.01249
Sex			
Male-----→	19(38%)	21(42%)	
Female----→	31(62%)	29(58%)	

SD=Standard Deviation, p value < 0.05 indicates significance.

Table 2: Comparison between Time domain parameters (mean ± SD) of both groups and P values of each parameters.

Time Domain Parameters	(A)Disorder Group(50) (Mean ± Sd)	(B)Control Group(50) (Mean ± Sd)	P Value
SDNN (ms)	34.39 ± 15.85	45.78 ± 9.96	<0.0001
RMSSD (ms)	27.19 ± 17.70	36.18 ± 11.69	0.0035
SDSD (ms)	33.84 ± 58.97	35.42 ± 11.91	0.8529
NN50 Count	30.1 ± 41.42	51.3 ± 31.60	0.0049
pNN50 (%)	8.36 ± 11.61	13.22 ± 8.95	0.0211

SD=Standard Deviation, P value < 0.05 indicates significance.

HF: Power in the high frequency (HF) band (~0.15–0.4 Hz in adults) has been associated with respiratory sinus arrhythmia and it is considered to reflect vagal modulation of the heart.

LF: power in the low frequency (LF) band (~0.05–0.15 Hz) probably reflects a complex interplay between sympathetic and vagal influences.

In frequency domain measures, the disorder group patients had significantly lower values of

LF and HF compared to the control group (p<.05). These findings signify decreases in both sympathetic and parasympathetic activities in patients with generalised anxiety disorder. The value of LF/HF ratio is significantly higher in group-A than group-B, which indicates dominance of sympathetic activity.

Table 3: Comparison between frequency domain parameters (mean ± SD) of both groups and P values of each parameters.

Frequency Domain Parameters	(A)Disorder Group (50) (Mean ± Sd)	(B)Control Group(50) (Mean ± Sd)	P Value
LF (ms2/HZ)	612.57 ± 652.47	1080.72 ± 645.50	0.0005
HF (ms2/HZ)	484.53 ± 497.20	889.57 ± 600.29	0.0004
LF/HF Ratio	1.81 ± 1.23	1.39 ± 0.78	0.0460

SD=Standard Deviation., P value < 0.05 indicates significance.

Discussion: The current study is aimed at finding the differences in heart rate variability (HRV) among the patients with generalised anxiety disorder (GAD) as compared to healthy controls. We have included an age and sex matched control group.

Literature reveals that anxiety disorders in the youth are receiving increasing attention. It is also prevalent in childrens and adolescents^{1, 2, 3}. Anxiety is often accompanied by somatic manifestations that suggest morbid changes in the autonomic nervous system (ANS) activity, such as rapid heart rate (HR), shortness of breath and sweating. The autonomic characteristics of depression and panic disorder have been studied extensively. However, relatively few studies have examined the autonomic characteristics of generalised anxiety disorder⁹.

In the current study, heart rate variability (HRV), a measure of both sympathetic and parasympathetic activity exhibited significant differences between the generalised anxiety disorder group (A) and healthy control group (B)

for both the time and frequency domain parameters of HRV. The time domain parameters shows significantly reduced heart rate variability in generalised anxiety disorder group. These findings shows a pattern of decreased parasympathetic activity in the GAD group. This was similar to a previous study done on adults aged 23-40 years¹⁰ which was postulated that anxiety was related to a reduced vagal control (parasympathetic activity) of the heart. Licht et al.¹¹ reported a lower HR variability among adults with anxiety disorders.

The present study findings of frequency domain parameters shows that decreases in sympathetic and parasympathetic activity in the disorder group, thus representing diminished physiological variability at rest¹². The parameter that increased its value significantly, and that are related to sympathetic activity is LF/HF. The value of LF/HF ratio is significantly higher in group-A than group B, which indicates dominance of sympathetic activity (sympathetic modulation of heart rhythm) over parasympathetic control. The actual results are in line with those obtained for phobic anxiety¹³ and according to level of anxiety¹⁴. This is in conform with the studies that reported a decrease in vagal activity with anxiety disorders^{15,16}.

It is important to note that HRV measures fluctuations in autonomic inputs to the heart rather than the mean level of autonomic inputs. Thus, both autonomic withdrawal and saturatingly- high level of sympathetic input lead to diminished Heart rate variability (HRV)¹⁷.

Heart rate variability (HRV) measurement is useful in investigating the pathophysiology of various psychiatric disorders¹⁸. Several behavioural and psychological states such as acute and chronic smoking, acute and chronic alcohol ingestion, sedentary lifestyle, depression, panic disorders and aging have all been associated with a loss of heart rate variability and complexity^{19, 20, 21, 22}.

The presence of a high vagal tone seems to be a marker of physiological and psychological

flexibility. So, decreased vagal tone as in generalised anxiety disorder group in our study may cause loss of flexibility in physiological systems in general, and in the cardiovascular system in particular which has recently been linked with a number of diseases and dysfunctions. Certain conditions such as sudden cardiac death, ventricular fibrillation, hypertension, diabetes mellitus and coronary atherosclerosis have been associated with reduced HR variability^{23, 24}.

Hence, reduced heart rate variability in our study indicates that psychological states like generalised anxiety disorder can impact dramatically on dynamic autonomic control of heart. This is an issue that requires interdisciplinary approaches across multiple levels of analysis, ranging from the psychological to the biological.

Conclusion: This study indicates that generalised anxiety disorder (GAD) is associated with reduced HRV and vagal tone. Reduced heart rate variability (HRV) in GAD is a prognostic factor for cardiac mortality and associated with autonomic dysfunction that seems likely to play a pathogenetic role in the long term.

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Effects Of Flour Dust On Computerized Spirometric Parameters In Flour Mill Workers

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Abstract: Background: The work environment seriously influences the organism of exposed human. The occupational hazards, such as dust, unfavourable microclimatic condition, and excessive noise and insufficient light are most important. The occupation related lung diseases are most likely due to the deposition of dust in the lungs and are influenced by the short (types) of dusts, the period of exposure, the concentration and size of airborne dust in the breathing zone. Present study was undertaken to study the effect of flour dust on respiratory functions of exposed workers. Method: We evaluated 50 male subjects in the age group of 18-50 years consisting of 50 industrial workers from flour mills in different areas of Bhavnagar city. Computerized spirometric parameters of flour mill workers (FMW) were done by computerized software of pulmonary function test named "SPIROEXCEL" and compared with their predicted values. The various data were collected; compiled, statistically analyzed and valid Conclusion were drawn. Result: The present study results showed the mean values of FVC, FEV1, Mid expiratory flow rate, FEF_{25%}, FEF_{50%}, FEF_{75%}, SVC, PEFR, and MVV were decreased in flour mill worker as compared with their predicted value, which were statistically significant. Conclusion: Flour dust causes chronic bronchial irritation which is responsible for causing restrictive type and restrictive plus obstructive mix type of pulmonary function impairment in flour mill workers.

Key Words: Occupational Hazards, Flour Mill Workers (FMW), Flour dust, Computerized spirometric parameters

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Introduction: since times immemorial, man has been the victim of occupational diseases, among which lung diseases are most common. Subjects with workplace exposure to organic dust have high prevalence of respiratory diseases¹. There is a growing consensus on the deleterious effects of organic dust on respiratory symptoms and functions of industrial workers. Industrial dust inhalation over a long period leads to proliferative and fibrotic changes in lungs². Flour dust is widely incriminated to cause such effects. Exposure to flour dust occurs across a range of food industries including grain mills, flour mills and bakeries.

Wheat flour is a complex organic dust with a large diversity of antigenic or allergic components³. The antigens involved can be wheat flour proteins, flour parasites, silica, fungi, insects or technical additives such as enzymes⁴. Albumin and globulins appear to be the most important proteins contributing to immediate hypersensitivity reaction to wheat proteins⁵. Many studies have shown that flour

dust exposure causes respiratory symptoms and is associated with impairment of lung functions⁶. Flour dust is an asthmagen and is known to cause sensitization, allergic rhinitis and occupational asthma among bakers and Millers⁷. The dust can be absorbed through the skin or swallowed but most frequently it is inhaled, irritating the portal of entry and leading to various obstructive lung diseases.

Measurement of dynamic lung functions is more important than that of static lung volumes⁸. Now it is well recognized that pulmonary function tests have been beneficial in the early recognition of pulmonary dysfunctions in patients considered to be normal on the basis of clinical and radiological examination and in the differential diagnosis of patients with a known pulmonary disease.

Materials and Method: The present study was carried out at pulmonary function test lab, department of physiology, Govt. Medical College, Bhavnagar, Gujarat. 50 male subjects

were included in this study who were working in Flour Mill in different areas of Bhavnagar city. All the individuals from Flour Mill workers were subjected to detailed history taking and clinical examination prior to spirometry.

INCLUSION CRITERIA: (1) Gender:- male. (2) Age:- 18 to 50 yrs. (3) Duration of work in Flour Mill atleast 3 years. (4) No history of any acute or chronic respiratory illness. (5) No history of smoking (6) Absence of use of any protective equipment at working place. (7) No history of any major chronic disease which may directly or indirectly affect respiratory functions.

The present study was carried out by computerized software of pulmonary function test named "SPIROEXCEL". Spiroexcel is a device that uses electronic and mechanical precision components and must be in the following ambient condition: Temperature maintained between 5°C and 40 °C, relative humidity lower than 90%. Avoid using it in environment full of noxious smoke and excessive dust. Never set the instrument near any kind of heat and water source. All pulmonary function tests were carried out at a fixed time of the day to minimize the any diurnal variation⁹.

Method: The experimental protocol was explained to all the subjects and written consent was obtained from them. Prior permission of institutional ethical committee of Govt. Med, college, Bhavnagar, was obtained.

Anthropometrical measurements including age, height and weight were recorded and BMI was calculated. Further a preliminary clinical examination was carried out on the subjects to rule out any medical problems.

Obtaining Spirometric parameters using "spiroexcel": All tests were recorded in sitting comfortable and relaxed position in chair on 11 A.M. Before lunch and with no any tight clothing which substantially restricts full chest and abdominal expansion. Subjects were explained and demonstrated about the procedure to be performed. They were allowed to do enough practice, as lung volume depends

on subject making a maximal voluntary effort. Full series of tests takes time of about four to five minutes. The testing procedures were quite, simple, non-invasive and harmless from subject's point of view. Only three maneuvers required to collect all data which are FVC, SVC and MVV.

For FVC maneuver, subject's nose was clipped and instructed to take maximum deep inspiration as much as possible and hold it, then mouth piece was kept firmly in the mouth between lips so as to avoid escape of any air, then asked the subject to blow out force fully and as fast and long as much possible in the mouth piece and by doing this value of FVC and its components were obtained. For MVV maneuver, the subject was asked to perform inspiration and expiration as fast and as deep as possible in the mouth piece for minimum of 15 seconds with nose was clipped. For SVC maneuver, the subject was asked to perform first three tidal respiration and one deep expiration and deep inspiration followed by other three tidal respirations in the mouth piece.

By doing above three maneuvers we obtained following actual and predicted values , Forced vital capacity (FVC) , Forced expiratory volume (FEV) , FEV1 / FVC ratio, Forced expiratory flow 25–75 % (FEF 25-75), FEF25% (L/S), FEF50% (L/S), FEF75% (L/S) and Maximal voluntary ventilation(MVV) L/min , slow vital capacity (SVC-L), Peak expiratory flow rate (PEFR-L/S).

Following acceptability criteria were used for good quality results: A sharp peak flow and an expiratory duration is grater then six seconds, Two or three acceptable maneuvers should be performed, The two highest FEV1 values from these acceptable maneuvers should be within 0.15L of each other, Graph must be free from artifacts, There must have no cough, no leak, and no obstruction in mouthpiece and have good start.

Predicted values of all Spiro metric parameters for age and stature were provided by the manufacturer of the spiroexcel. Statistical

analysis was done by “unpaired student t test” with the help of “Graph pad instate” statistical software and p value less than 0.005 taken as statistically significant.

Result & Discussion: Flour dust is a heterogeneous substance with respiratory sensitizing and irritating properties. Its exposure may induce acute or chronic respiratory ailments. This study was designed to investigate the effects of flour dust on the lung function in Flour Mill workers. The results of the present study (Table 2) showed a significant reduction in the mean values of FVC, FEV1, FEF25-75, PEFR, FEF25%, FEF50%, SVC and MVV in the Flour Mill workers as compared with their predicted values.

As per table 3 in 44% of flour mill workers the ratio of FEV1/FVC is increased and in 56% of flour mill workers it is decreased in comparison to their predicted values.

Table 1: Anthropological parameters of flour mill workers

Parameter	Flour Mill worker (Mean ± SD)
Age	36.36 ± 7.74
Weight	63.08 ± 10.95
Height	165.44 ± 5.45
BSA*	1.68 ± 0.13

*BSA- Body Surface Area

Fig 1: Age distribution in flour mill workers

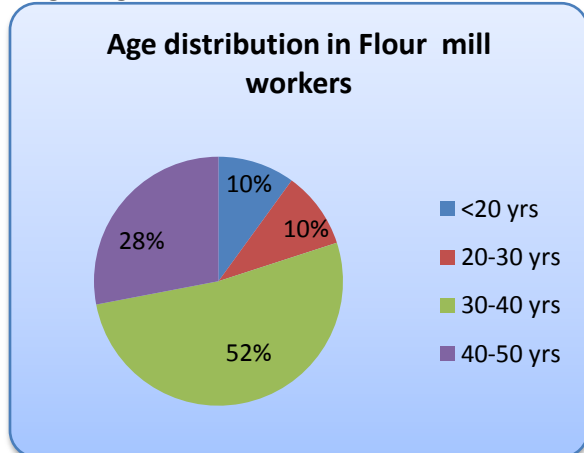


Table 2: Computerized spirometric parameters in flour mill workers

Parameters	Predicted Mean ± SD	Test Mean ± SD	% of Pred.	P value
FVC	4.19 ± 0.35	2.10 ± 0.78	50.12	<0.001*
FEV1	3.49 ± 0.32	1.65 ± 0.52	47.28	<0.001*
PEFR	8.59 ± 0.51	3.30 ± 1.70	38.42	<0.001*
FEF25-75 %	4.22 ± 0.40	2.29 ± 1.22	54.27	<0.001*
FEF25 %	7.40 ± 0.35	2.95 ± 1.71	39.87	<0.001*
FEF50 %	4.69 ± 0.34	2.54 ± 1.49	54.16	<0.001*
FEF75 %	1.95 ± 0.27	1.64 ± 0.82	84.11	<0.001*
FEV1/FVC	79.96 ± 1.89	76.28 ± 16.64	95.39	= 0.457
SVC	4.08 ± 0.61	2.19 ± 1.19	53.67	<0.001*
MVV	125.36 ± 9.95	34.66 ± 20.32	27.64	<0.001*

* Statistically significant, **Pred.**=Predicted value

Table 3: Flour mill workers who have decreased or increased value of four lung function parameters

Parameter	Flour Mill workers (Total n=50)	
	% of subject Increase value of	% of subject Decrease value of
FVC	0%	100%
FEV1	0%	100%
FEV1/FVC(%)	44%	56%
PEFR	2%	98%

Table 4: Distribution of subjects according to ventilatory impairments of lung function

Ventilatory Impairments	Flour Mill Workers		
	Pure Obstruction	Pure Restriction	Obstruction plus Restriction
	0%	44%	56%

Study by Bohadana et.al.¹⁰ Shows that regardless of exposure to relatively low concentration levels of inspirable flour dust, subjects working in the baking industry are at risk of developing respiratory symptoms and airway hyper responsiveness. Ijadunola et.al.¹¹ reported an increase in frequency of respiratory symptoms and decreased FEV1 in a group of workers exposed to grain and flour dust. In addition, Gimenez et.al.¹² have observed that flour dust exposure causes cough, phlegm production and the decreased pulmonary function values among Flour Mill workers

compared to their matched controls. Similarly, Corzo and Naveda¹³ reported a decrease in the values of PEFR, FEF25%, FEF75% and also demonstrated that the longer summative time of exposure to flour dust was associated with more diminished Spiro metric values. Awad et.al.¹⁴ Also observed a significant decline in the lung function parameters, FVC and FEV1, in workers exposed to Flour dust compared to the control group.

Ige and Awoyemi¹⁵ investigated the occupation induced lung function impairment in bakery workers as a result of exposure to grain and flour dusts. They reported that the mean values of FVC, FEV1, PEFR, and FEV1/FVC% in the bakery workers were significantly lower than those of the control subjects. Zodpey and Tiwari¹⁶ reported that the PEFR value was significantly reduced in Flour Mill workers as compared to their controls. Shamssain¹⁷ observed ventilatory function in non-smoking flour processing male bakery workers and reported that the exposed group had significantly lower forced expiratory indices than the control group. Mean percent predicted values for FEV1, FEV1/FVC%, FEF25%–75%, and PEFR were respectively, 52.72%, 4.61%, 45.73%, and 61.58% lower in the exposed group compared to their predicted value. Chen¹⁸ divided the Flour Mill workers into high and Low exposure groups and observed that FEV1, FVC and PEFR were significantly decreased in the highly-exposed group. The finding indicates that exposure to high concentration of dust for a long period of time impairs the pulmonary function. In addition, Meo¹⁹ studied the relationship between dose responses and duration of exposure on the lung function in Flour Mill workers and observed that FVC, FEV1, PEFR and MVV were decreased in Flour Mill workers compared to their matched controls.

The present study supports the findings of other researchers and suggests that Flour dust adversely affects the pulmonary function parameters. While discussing the pathophysiological aspects of a drop in the values of the aforesaid lung function

parameters, FVC is decreased in pulmonary obstruction, emphysema, pleural effusion, pneumothorax, pulmonary edema and poliomyelitis. Similarly, the FEV1 value is low in obstructive lung diseases and in reduced lung volume. The decline in FEV1 is a convenient standard against which we can measure marked declines in subjects with the history of chronic obstructive pulmonary disease (COPD) or in subject exposed to environmental pollutants. Whereas, PEFR provides an objective assessment of functional changes associated with environmental and occupational exposures and determines acute or chronic disease processes. In patients with severe COPD, PEFR is persistently low and represents collapsing of large airways. In addition, MVV reflects the function of the entire ventilatory apparatus and depends upon the compliance of the thoracic wall and lungs, airway resistance and muscular force. MVV is profoundly reduced in patients with airway obstruction or emphysema.

If we try to identify the subject according to ventilatory impairment, it shows that most of the subject from flour mill workers 44% shows restrictive type of lung function impairment and 56% of workers shows mix restrictive plus obstructive type of impairments (table 4) because the decrease in FVC and MVV indicates a restrictive impairment whereas decrease in FEV1, FEF25-75, PEFR indicates an obstructive impairment.

Conclusion: Flour dust causes chronic bronchial irritation which is responsible for the restrictive plus obstructive type of pulmonary impairment of lung functions. The problem of effects of flour dust is of importance in that it highlights the need to reduce exposure and shows the magnitude of the effect on the population at risk. Because the dust exposure can lead to lung function impairments. It is advisable therefore, that health risk should be reduced by the mutual collaboration between health officials, mill management and their workers in the area of implementation of protective measures, such as improvement of ventilation and use of individual protective devices.

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Multifocal Electroretinography in Assessment Of Diseases Of Posterior Pole Of Retina

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Abstract: Background: Multifocal electroretinography (mfERG) based on the m-sequence stimulation technique which allows quick simultaneous recording of many local electroretinograms from the posterior pole. The multifocal ERG is a powerful tool in patients with an affected cone system, especially when defects are localized and therefore not detectable with full field electroretinography. Aim: The purpose of the present study was to investigate and describe differences in regional dysfunction between groups of patients with impaired vision due to diseases affecting predominantly the posterior pole. Method: This is a retrospective study of patient who were clinically diagnosed and sent to us by M&J Regional Institute of Ophthalmology,Ahmedabad, India. 31 patients were divided into 4 groups including Stargardt's macular dystrophy (SMD), age-related macular degeneration (AMD), cone dystrophy (CD), central retinal vein occlusion (CRVO) and 11 normal subjects were taken as control. mfERG was done in all subjects and the responses were analysed using t test. Result:In patients with SMD or with AMD functional defects were mainly at the foveal region and extended to eccentricity only in advanced cases. A reduction of response amplitude even in the most peripheral ring was found in cone dystrophies and moderately in patients with central retinal vein occlusion. Prolonged implicit times were found in all but in the patients of SMD and they were maximal in patients with CRVO. Conclusion: The multifocal electroretinography provides detailed information of local activity of the cone dominated retina. In most of the patients with maculopathies, the photopic Ganzfeld ERG was normal, so that multifocal ERG can be valuable in diagnosing these diseases.

Key Words: Multifocal ERG, Maculopathy; Cone dystrophy; Central vein occlusion

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Introduction:The mfERG is a relatively newer technique for assessing the local ERG from different regions of the posterior retina¹. It was initially developed by Eric Sutter and Tran, which attempts to measure the spatial distribution of the central retinal cone function².

The electroretinogram (ERG) is a mass potential, the result of the summed electrical activity of the cells of the retina. Typically, the clinical ERG is elicited by full-field (Ganzfeld) flashes of light. With an appropriate selection of test and background lights, rod and cone function can be assessed separately³. As the ganglion cells contribute relatively little to the full-field flash ERG, the ERG has helped neuro-ophthalmologists to distinguish between diseases of the outer retina (affecting photoreceptors and/or bipolar cells) and diseases of the inner retina (ganglion cells) and optic nerve. However, because the ERG is the sum of all retinal activity, relatively large retinal defects may not be detected by standard full-field ERG testing. Although the pattern ERG and focal ERG can both

provide information about visual loss from lesions in the foveal region^{4,5} these techniques do not provide topographical information or assessment of nonfoveal lesions.

Multifocal electroretinography (mfERG) based on the m-sequence stimulation technique² allows quick simultaneous recording of many local electroretinograms from the posterior pole. The multifocal ERG is a powerful tool in patients with an affected cone system, especially when defects are localized and therefore not detectable with full field electroretinography. With the multifocal technique, 100 or more focal ERG responses can be recorded from the cone-driven retina in 8 minutes. The purpose of the present study was to investigate and describe differences in regional dysfunction between groups of patients with impaired vision due to diseases affecting predominantly the posterior pole.

Material and Method: This is a retrospective study of patients who were clinically diagnosed and sent

to us by M&J Regional Institute of Ophthalmology, Ahmedabad. The patients were divided in 4 groups on the clinical established diagnosis and compared with the 11 normal subjects (15 eyes) with age 11 to 64 years who were examined with the multifocal ERG under the same conditions, to serve as a control group. Normal subjects were those sent to us for testing malingering or the normal eye in unioocular disease. They had full visual acuity and no history of eye disease or other relevant disorders in the eye taken as control.

Group diagnoses included Stargardt's macular dystrophy (SMD), age-related macular degeneration (AMD), cone dystrophy (CD), and central retinal vein occlusion (CRVO).

In group 1 were 11 patients (22 eyes) with age (13 ± 3.2) years in whom Stargardt's macular dystrophy (SMD) was diagnosed on the basis of history, symmetric bilateral involvement, the typical alterations of the pigment epithelium layer (assessed by Fundus autofluorescence or optical coherence tomography), by visual field, and by Ganzfeld-electroretinography according to the ISCEV standard were taken. Group 2 consisted of 8 patients (13 eyes) of age (56 ± 7.1) years with age related macular degeneration (ARMD) whose diagnosis was made on the basis of medical/ocular history, visual acuity, Amsler grid test and fundus photograph.

In group 3, 7 patients (14 eyes) with age (58 ± 9.5) years CRVO was diagnosed by the clinical picture of typical haemorrhages in all four quadrants of the retina associated with dilatation and tortuosity of the venules. 5 patients (10 eyes) with age (35.5 ± 16.4) years in group 4 were diagnosed cone dystrophy on basis of history, vision loss, sensitivity to bright lights, poor color vision and assessment of fluorescein angiography and visual field testing. The study was conducted according to the tenets of the Declaration of Helsinki, and after a detailed explanation of the procedure; all patients gave informed consent before the study.

The stimulus, consisting of 103 hexagons covering a visual field of 50° , was presented on a 9 inch CRT (Cathode ray tube) with a frame rate of 75 Hz at a distance of about 40 cm from the subject's eye.

Every 13.3 ms the frame of the monitor changes and each sector has a 50/50 chance of appearing "white" (briefly flashed) or "black" (no flash). The white hexagons were 200 cd/m^2 and the black hexagons the darkest the screen allowed, less than 5 cd/m^2 . The area surrounding the array of hexagons was set to 100 cd/m^2 and a central cross was used for fixation. All recordings were performed with the room lights on to help assure a constant state of light adaptation. Because of the light levels employed and the rapid rate of stimulation, the mfERG is a response of the cone system. The duration of the recording session was about 4 minutes, which included 8 recording segments of approx. 30 sec between samples, during which the subjects were not allowed to blink or move.

Both the eyes were dilated with tropicamide (1%) and 2.5% phenylephrine hydrochloride and anesthetized with 0.5% proparacaine. The ERG responses were recorded by means of a bipolar Burian-Allen contact electrode which makes use of a large speculum to hold the eyelids apart. A smaller clear corneal contact lens is held against the cornea with a spring assembly. The skin electrode (gold cup electrodes) fixed to the forehead with a conducting paste served as a ground electrode. The electroretinograms were amplified ($\times 50,000$ - $100,000$) and band pass filtered (10–300 Hz). The VERIS software 6.1.1 (EDI, San Mateo) developed by Sutter, using a fast m transform algorithm² was employed for the calculation and analysis of the 103 local ERG responses from the measured signal. All the data was statistically analysed using student t test and were found to be statistically significant ($p \leq 0.05$).

Result: For data analysis, the 103 local responses were grouped six concentric rings (R1- R6) centred on the fovea (Fig 1a). A typical waveform begins with a negative deflection (N1), followed by a positive deflection (P1), and a second negative Deflection (N2) (Fig 1b). Response densities and implicit times of the major components N1, P1, N2 in each ring was calculated and analysed.

In normal subjects: As expected from retinal anatomy, there was a continuous decrease in response density from the maximum at the fovea towards the periphery. The responses were

obtained from foveal ERG (ring 1) to ERG at eccentricity (ring 6) and were density scaled. The response density can be obtained by dividing local ERGs by the area they were elicited from. Besides the decrease in response density with eccentricity, localized areas of low amplitude such as the blind spot are also visible. All component densities decreased with eccentricity, although there was no further decrease from ring 5 to ring 6 (fig 2a). The implicit times were highest in the fovea (ring 1) and lowest in ring 3 for all three components. (fig 2b).

Fig1a: Concentric rings centering in fovea

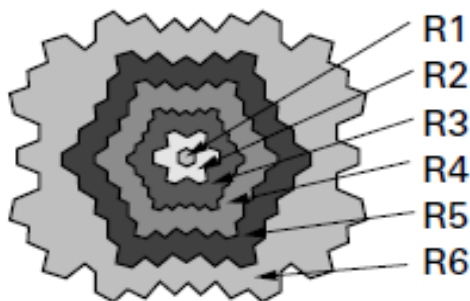


Fig 1b: Typical Waveform in ERG

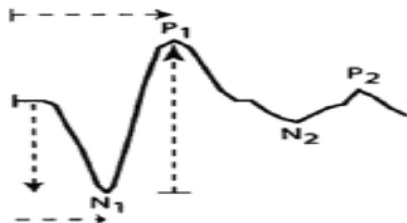


Fig 2a: Response density in normal subjects

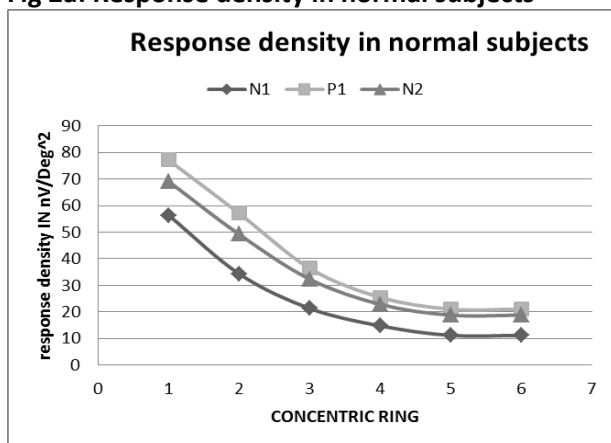
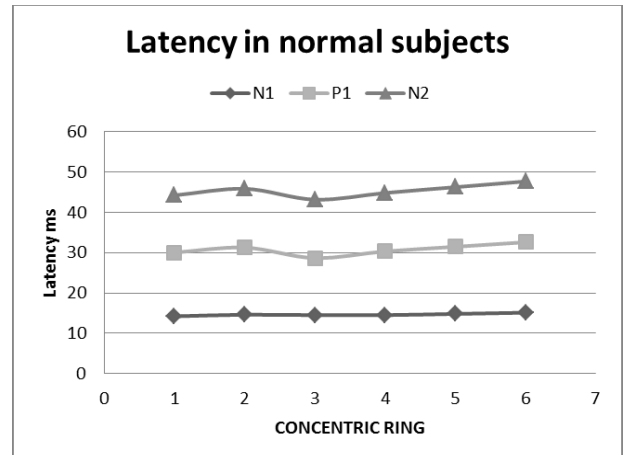


Fig 2b: Latency in normal subjects



For the comparison of latency and response density among various disease and that to the normal all P1 amplitudes and N1 latencies of the mfERG responses in the 6 concentric rings were calculated and compared.

Stargardt's Macular Dystrophy: -Patients with juvenile (SMD) and age-related (AMD) maculopathies exhibited patterns of extinguished or markedly diminished responses in the centre, which approached normal values towards the periphery (fig 3a). In the SMD group, a deep functional defect was restricted to the macula. The three-dimensional plot of the response density had a crater-like appearance due to that central defect. No change of implicit times could be detected. **ARMD:** - The functional lesions in ARMD were restricted to the macular area, with good responses in the periphery. Response density decreased and latencies increased in the rings from fovea to eccentricity (Fig 3a). Implicit times were prolonged. (Fig 3b)

Cone Dystrophy: -All patients with cone dystrophy had strongly reduced or non-detectable responses in the entire test field. The patient had no focal response distinguishable from noise in any of the 103 focal ERG traces. In all patients with cone dystrophy, no foveal response was discernible, and the response densities were diminished up to ring 6. (Fig 3a) The implicit times were prolonged

CRVO: -In the patients with CRVO, the functional defect was similar to that found in maculopathies. No foveal responses were found that exceeded the noise level, but, unlike SMD and AMD, the

peripheral responses were also significantly diminished (Fig 3a). The smaller wavelets following N2 were absent. The implicit times were markedly prolonged in the entire test field. (Fig 3b)

Fig 3a: Comparison of P1 response density

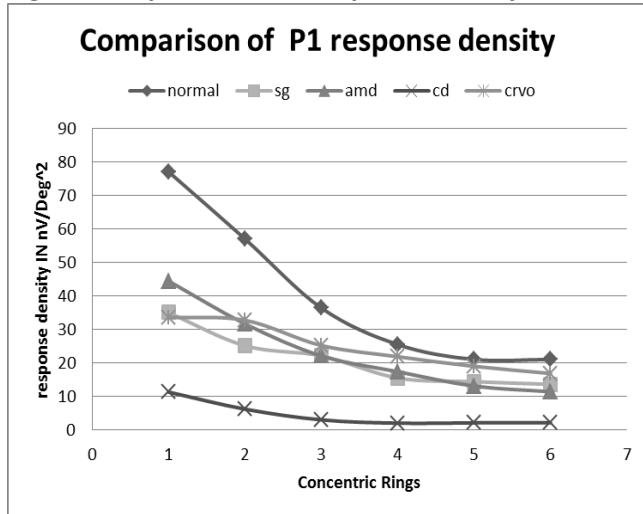
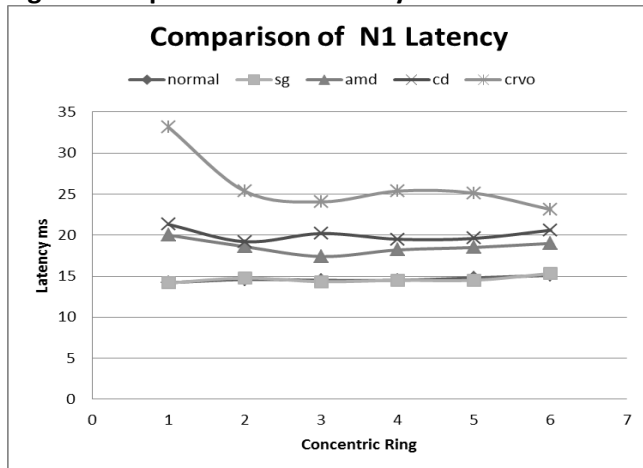


Fig 3b: Comparison of N1 latency



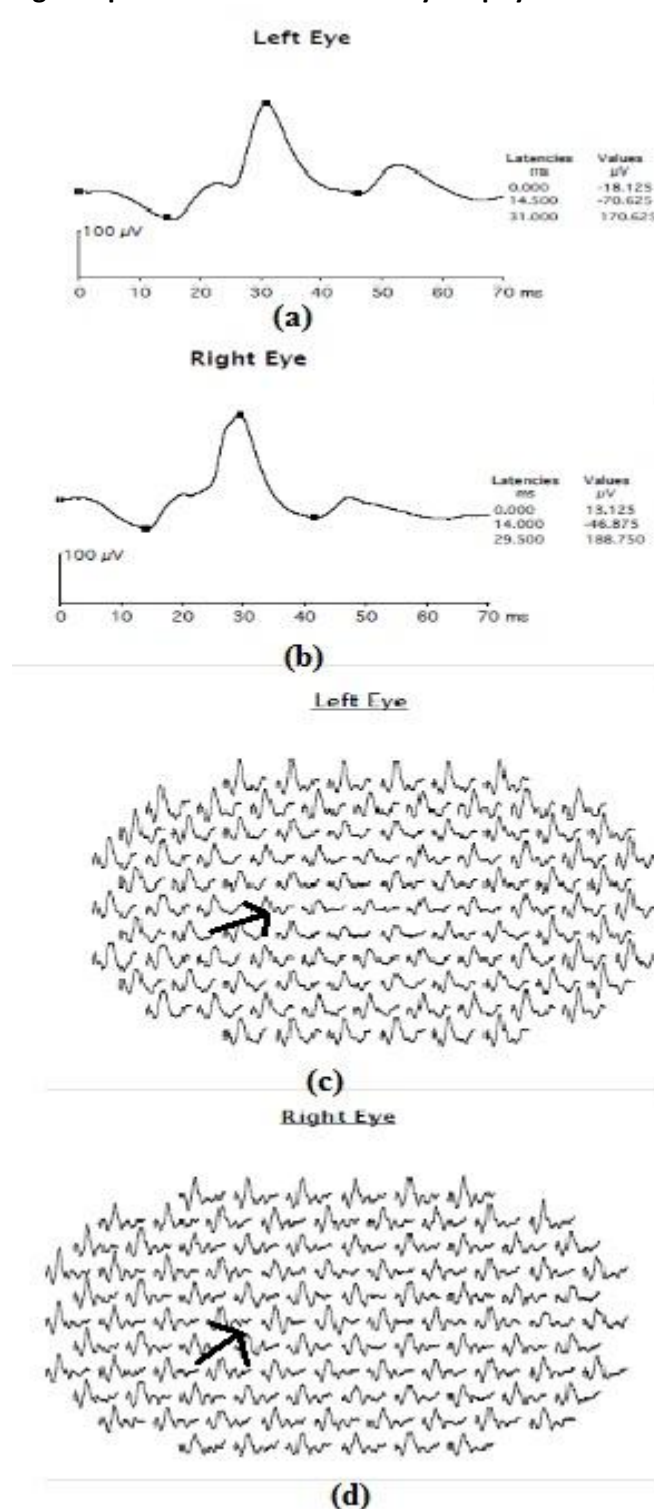
Discussion: The multifocal ERG based on the m-sequence stimulation approach^{6, 7} is capable of mapping the central visual field functionally by means of local electroretinographic responses. As shown by Sutter and Tran⁸ using recordings with higher spatial resolution and longer recording time, the response density decreases markedly from the foveal area towards the periphery. This response distribution resembles the anatomical distribution of cones as well as the electroretinographic findings obtained with focal flicker stimulation by Maxwellian view

Given that the multifocal ERG is in principle a photopic ERG under special conditions of light adaptation, the most impressive alterations in the multifocal ERG can be expected in patients with general receptor dystrophies leading to reduced and delayed Ganzfeld responses. Consequently, the most prominent and widespread changes of amplitudes were found in the cone dystrophy group. Since there were barely any clear responses in the macular region it was difficult to reliably measure implicit times.

Juvenile (Stargardt's) and age-related maculopathies were considered diseases in which a primary defect in the retinal pigment epithelium leads to a secondary, localized degeneration of photoreceptors. Recently, a defect in the ABCR-gene which is expressed in rods was found in patients with Stargardt's macular dystrophy⁹. Therefore, changes in the pigment epithelium and cones might be secondary to a primary defect in the rod photoreceptors at least in some of the patients. Similar mechanisms were proposed for AMD¹⁰. The following thoughts may illustrate why Ganzfeld-ERG cannot detect the photoreceptor loss in these diseases. The area stimulated by the multifocal ERG setup used here covers roughly 35% of the entire cone population. The contribution of the macular area (ring 1 and 2) to the overall sum of multifocal ERG responses is only about 12%. Under the simplifying assumption that all cones are reached by the photopic Ganzfeld-ERG and each cone contributes equally, the estimated loss caused by an isolated defect of the macula would be about 4%, which is certainly within the range of inter-individual variability in normal.

The data presented show that the multifocal ERG detected the central functional defect in every patient with a maculopathy, regardless of the stage of the disease. Even in the stargardt's macular dystrophy patient with nearly full visual acuity, the foveal responses were diminished.

In many cases, multifocal ERG can be used to verify unclear visual field defects of retinal origin, although it is not possible to predict visual field defects from a reduced or extinguished mfERG.

Fig 4: A patient of macular cone dystrophy

The overall outcome of the multifocal ERG in patients with CRVO was a decrease in amplitude and an increase in implicit times as in flicker Ganzfeld- ERG. The effect on the fovea was more pronounced than the effect on the extramacular area. One reason for this may be the greater

susceptibility of the macula to develop oedema¹¹ Compared to the findings in maculopathies; the defect had a patchy appearance.

The shape of the waveform with its major components N1, P1, and N2 was not affected by the different diseases beyond amplitude reduction and implicit time increase.

In the above figure of macular cone dystrophy showed (a) and (b) normal Photopic waves in both eyes in full field ERG (c) Decreased response density in foveal region of affected eye(left) and (d) Normal response density in other eye (right) in mfERG.

Conclusion: The multifocal electroretinography provides detailed information of local activity of the cone system. It was possible to detect macular cone dysfunction in patients with early and advanced SMD, AMD, cone dystrophies, and retinal vein occlusions (Fig 4). In most of the patients with maculopathies, the photopic Ganzfeld ERG was normal, so that multifocal ERG can be valuable in diagnosing these diseases.

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Cardiovascular Risk Status According To Lipids Levels In Type 2 Diabetic Patients

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Abstract: Background: Diabetes mellitus is a common secondary cause of hyperlipidaemia, particularly, if glycaemic control is poor, which in-turn is an important risk factor for atherosclerosis and coronary heart diseases. The aim of the study was to define dyslipidaemia pattern among type 2 diabetic patients using ATP (Adult treatment panel) III guidelines for the classification of lipoprotein concentrations into cardio vascular disease risk categories. Method: The present study was conducted on 100 type 2 diabetics males aged 40-60 years. Among them, 30 patients having HbA1c levels ≤ 7 were categorized as having good glycaemic control (group-1), and 70 patients having HbA1c levels > 7 were categorized as having poor glycaemic control (group-2). We assessed the percentage of patients falling into desirable, borderline and high risk categories according to the criteria laid down by ATP III guidelines. Result: Mean age (49.09 vs 50.5 years, $P=0.13$) and duration of diabetes (6.9 vs 8 years, $P=0.07$) was not different between the two groups. Compared to good glycaemic control group, diabetics with poor glycaemic control were significantly more in high cardiovascular risk status ($P < 0.05$) according total cholesterol levels. According to LDL-C levels and TG levels number of diabetics with poor glycaemic control were significantly higher in borderline cardiovascular risk status ($P < 0.01$). Conclusion: We concluded that diabetic patients particularly those with poor glycaemic control are at high cardiovascular risk status according to serum cholesterol levels and borderline risk according to LDL-C levels and TG levels. Reductions in Trans and saturated fats are mainstays for reducing LDL-C. Reduced body weight (10%), more physical activity and improvement in glycaemic control more favourably modified TG, HDL-C and LDL-C.

Key Words: Cardiovascular risk status, HbA1c, Lipid profile

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Introduction: The first systematic description was written by the Arelaeus of cappadosis in Asia Minor, probably in the 1st century AD, the disease as "A melting down of flesh into the urine". The discovery by Van Mering and Minikowaski in 1889 that pancreatotomy causes a metabolic disorder called Diabetes mellitus is the result of insulin deficiency. It is characterized by either the absence of insulin that is Type 1 or which is insensitive to the insulin that is Type 2. It is a complex disease where the carbohydrate and fat metabolism is impaired¹. Type 2 diabetes is a disorder of insulin resistance and failure of Beta cell of pancreas causing chronic hyperglycaemia.² According to the International Diabetes Federation (IDF), India has more diabetics than any other country in the world after china, diabetes affects more than 50 million Indians, 7.1% of the nation's adults and kills about 1 million Indians a year.³ Macro-vascular complications such as myocardial infarction, stroke, and peripheral vascular disease, are common causes of morbidity and premature mortality.⁴ Micro-vascular disease, primarily affecting the nerves, eyes, and kidneys, can lead to neuropathy, blindness, and renal failure.

Cardiovascular diseases (CVD) are the number one cause of death globally: more people die annually from CVDs than from any other cause. An estimated 17.3 million people died from CVDs in 2008, representing 30% of all global deaths of these deaths, an estimated 7.3 million were due to coronary heart disease and 6.2 million were due to stroke. Low- and middle-income countries are disproportionately affected: over 80% of CVD deaths take place in low- and middle-income countries and occur almost equally in men and women.⁵

There is high risk of cardiovascular diseases in people with type 2 diabetes, while cardiovascular death is top killer in this population. Eighty percent of mortality in adults with type 2 diabetics results from complications of coronary artery disease, or peripheral arterial diseases.⁶ Epidemiological studies have shown that diabetics have 2-4 times higher risk of developing cardiovascular diseases. An elevated concentration of Triglyceride (TG) and LDL-C are a major risk factor for atherosclerosis and coronary heart disease (CHD).⁷ Elevations in LDL-C can produce full blown atherosclerosis and premature CHD in the complete absence of other

risk factor. Using the current National Cholesterol Education Programme Adult Treatment Panel III guideline, diabetes is considered to be a CHD risk equivalent.⁸ Diabetes mellitus is a common secondary cause of hyperlipidaemia, particularly, if glycaemic control is poor, which in-turn is an important risk factor for atherosclerosis and coronary heart diseases. Diabetes care is complex and requires that many issues, beyond glycaemic control, be addressed. It is a chronic disease and usually irreversible. Therefore the patients with diabetes often have to consult health-care providers for the remainder of their lives. They are prone to certain complications and evidence supporting the benefits of glycaemic control as well as control of blood pressure and lipid levels in the prevention or delay in onset & severity of diabetes complications.⁹

Material and Method: The study was conducted on 100 type-2 diabetic patients with permission from Institutional Ethics committee. All our subjects were males between 40 to 60 years age. They were all non smokers, normotensives, with moderate built and moderately active life style. Those with history of alcoholism, familial dyslipidemia, renal disorders, endocrine disorders and those on lipid lowering drugs and beta blockers were excluded from the study. After eliciting history, detailed physical and systemic examination anthropometric measurements were done. Blood samples were collected in fasting state for following serum investigations:

Lipid profile: Fasting total cholesterol, TG and HDL-C was tested by “End point Biochemistry” method.¹⁰ The serum LDL-C concentration was calculated from the serum concentrations of total cholesterol, HDL-C and TG using the formula, $LDL-C = TC - (HDL-C + TG/5)(mg/dl)$. The VLDL-C concentration was calculated from the values of TG (as $TG/5$). (2) Fasting blood glucose by Glucose oxidase-Peroxidase (God-Pod) method. (Normal level: 70-110 mg/dl). (3) HbA1C by ion exchange resin method (Normal: $\leq 7\%$). (4) Post prandial blood glucose (PP₂BS). (Normal level: < 140 mg/dl). 30 patients having HbA1c levels ≤ 7 were categorized as having good glycaemic control

(group-1), and 70 patients having HbA1c levels > 7 were categorized as having poor glycaemic control (group-2). We assessed the percentage of patients falling into desirable, borderline and high risk categories according to the criteria laid down by Adult treatment panel III of National Cholesterol Education Program (NCEP).

Students’ T- test was applied to compare the general parameters between the 2 groups; chi square test (with Yates correction) was applied to compare number of patients with the cardiovascular risk parameters in the two groups as well as within each group. P value of < 0.05 was considered as statistically significant.

Result: Mean age and duration of diabetes in between good glycaemic control and poor glycaemic control group are not different. (P value > 0.05)

Table 1: Mean Age and duration of diabetes in the two groups (values are mean \pm SD)

	Good glycaemic control (HbA1c $\leq 7\%$) N=30	poor glycaemic control (HbA1c $> 7\%$) N=70	P value
Age (years)	49.09 \pm 5.80	50.5 \pm 5.66	0.13
Duration of Diabetes (years)	6.9 \pm 3.05	8 \pm 3.36	0.07

Cardiovascular risk status according to LDL-C levels: In our study (table-2) out of 100 type-2 diabetic patients 29, 52 and 19 patients had low, borderline and high risk LDL-C levels respectively. Out of 30 patients with good glycaemic control 23 (76.66%) had low risk, 05 (16.67%) had borderline risk and 02 (6.67%) had high risk LDL-C levels. Out of 70 patients with poor glycaemic control 06 (8.57%) had low risk, 47 (67.14%) had borderline risk and 17(24.29%) had high risk LDL-C levels. Low, borderline and high cardiovascular risk status was statistically significant between good and poor glycaemic control group according to LDL-C levels.

Table 2: Category of cardiovascular risk status based on lipid levels

Lipids	Recommended level for adults with Diabetes	Cardio-vascular risk	No. of patients	Group 1 Patients with good glycaemic control (HbA1c ≤7%)	Group 2 Patients with poor glycaemic control (HbA1c >7%)	P value (comparing two Groups)
LDL-C	<100 mg/dl	Low	29	23	06	0.00
	100-129 mg/dl	Borderline	52	05	47	0.0008
	≥130 mg /dl	High	19	02	17	0.06
	P value (comparing risk levels)			0.000	0.000	
HDL-C	<35 mg/dl	High	13	02	11	0.23
	35-45 mg/dl	Borderline	21	04	17	0.27
	>45 mg/dl	Low	66	24	42	0.25
	P value (comparing risk levels)			0.26	0.56	
TG	<200 mg/dl	Low	46	24	22	0.03
	200-399mg/dl	Borderline	54	06	48	0.001
	(≥400mg/dl)	High	-	-	-	
	P value (comparing risk levels)			0.000	0.00	
Total cholesterol	<200 mg/dl	Low	34	25	9	0.02
	200-239mg/dl	Borderline	19	3	16	0.14
	(≥240mg/dl)	High	47	2	45	0.01
	P value (comparing risk levels)			0.000	0.002	

Thus our study demonstrates that diabetics especially the patients with poor glycaemic control are at high cardiovascular risk status as determined by their LDL-C levels.

Cardiovascular risk status according to HDL-C levels: In our study (table-2) out of 100 type-2 diabetic patients 66, 21 and 13 patients had low, borderline and high risk HDL-C levels respectively. Out of 30 patients with good glycaemic control 02 (6.67%) had high risk, 04(13.33%) had borderline risk and 24 (80%) had low risk HDL-C levels. Out of 70 patients with poor glycaemic control 11(15.71%) had high risk, 17(24.29%) had borderline risk and 42 (60%) had low risk HDL-C levels. Low, borderline and high cardiovascular risk status was not statistically significant between good and poor glycaemic control group according to HDL-C levels. From our study we concluded that majority of our patients of both groups fall in low risk HDL-C category. More number of patients with poor HDL-C levels than those with good glycaemic control.

Cardiovascular risk status according to TG levels: In our study (table-2 shows that) out of

100 diabetic patients 46 had low risk and 54 had borderline TG levels. None had high risk TG levels. Out of 30 patients with good glycaemic control 24 (80%) had low risk and 06 (20%) had borderline risk, and none had high risk TG levels. Out of 52 patients with poor glycaemic control 22 (31.43%) had low risk, 48 (68.57%) had borderline risk and none had high risk TG levels. Low, borderline cardiovascular risk status was statistically significant between good and poor glycaemic control group according to TG level.

Cardiovascular risk status according to Serum cholesterol levels: In our study (table-2 shows that) out of 100 diabetic patients 34 had low risk and 19 had borderline TG levels, 47 had high risk Serum cholesterol. Out of 30 patients with good glycaemic control 25 (83.34%) had low risk and 3(10.00%) had borderline risk and 2 (06.66%) had high risk serum cholesterol levels. Out of 70 patients with poor glycaemic control 9 (12.87%) had low risk, 16 (22.86%) had borderline risk and 45 (64.27%) had high risk serum cholesterol levels. Low and high cardiovascular risk status were statically significant between good and poor

glycaemic control group and not borderline cardiovascular risk according to Total Cholesterol level.

Thus, our study demonstrated that (i) greater number of patients with good glycaemic control had low cardiovascular risk TG levels (ii) greater number of patients with poor glycaemic control had borderline cardiovascular risk TG levels. (iii) greater number of patients with high risk serum cholesterol and LDL-C were in poor glycaemic control, greater number of patient with low risk serum cholesterol were in good glycaemic control.

Discussion: Glycaemic control status of all the patients was determined on the basis of HbA1c levels, 30% patients had good glycaemic control and 70% had poor glycaemic control... Using Adult treatment panel III guidelines cardiovascular risk status based on lipid levels was determined. The patients with poor glycaemic control are at borderline to high cardiovascular risk status as determined by TG and LDL-C levels and serum cholesterol levels.

Eid Mohamed, Mafauzy Mohamed et al¹² studied 211 type 2 diabetic subjects and observed that 6(26 %) patients in the high risk HDL-C group, 65 (31 %) were in the borderline risk group, and 90 (43 %) were in the low risk group. Type 2 diabetic patients with high, borderline, and low risk LDL –C level were 131 (62 %), 53 (25 %) and 20 (10 %), respectively. Only seven (3 %) and 53(25 %) of patients had TG concentration in the high and borderline risk categories, respectively, but 151 (72 %) had a low risk TG level. Among the patients with good glycaemic control, 16 % and 84 % had TG level in the borderline high and low risk categories, respectively. In acceptable glycaemic control group the proportion of patients with high, borderline high and low risk TG were 3%, 27 % and 70 %, respectively. In poor glycaemic control group the high, borderline high and low risk TG were observed in 3 %, 25 % and 72 % patients, respectively. Significant differences in the proportions of patients with high, borderline high and low risk TG between glycaemic control groups were observed.

Similar results were found among urban African-Americans with type 2 Diabetes. In this study, Cook et al¹³ found that the percentages of African-Americans with LDL-C >100 mg/dl was 86 %, HDL-C < 45 mg/dl was 74% and high and borderline triglycerides was 19 %. In another study in Malaysia, Ismail et al¹⁴ found that 90.9 % of their subjects had LDL-C >100 mg/dl, 52.6 % had HDL-C < 45 mg/dl and 27.3 % had TG > 200 mg/dl. Nasir Ahmed et al¹⁵ studied on 100 type 2 diabetic subjects and observed that patients with good glycaemic control (HbA1c ≤8%) were having better lipid profile than poorly controlled group. 78 were found to have Hypertriglyceridaemia, while, 92 had LDL-C in borderline cardiovascular risk status. Out of 78 patients with Hypertriglyceridaemia 46 (59%) were poorly controlled diabetics (HbA1c>8%) emphasizing the importance of good glycaemic control. However none of patients had a low HDL-C as found in some other study. Syed Shahid Habib¹⁶ observed that 56.6, 23.6, 77.1 and 48.9 percent of diabetic's subjects had borderline to high risk levels of TC, TG, LDL-C and HDL-C respectively.

Shameem Ahmad Siddiqui et al¹⁷ studied on 1200 type-2 diabetes patients. There was poor glycaemic control, in 87.5% subjects judged on blood HbA1c levels. These patients had higher total cholesterol, LDL-C and low HDL-C levels in blood. The percentage of patients with high, borderline and near optimal risk LDL-C was 62.7, 26.9 and 10.4% respectively, while HDL-C >40mg/dl were seen in 67%. Raised VLDL-C (above 40 mg/dl) was seen in 32.9% cases. The group with high LDL and VLDL is at risk of developing cardiovascular disease. Hypertriglyceridaemia was found in 55% and hypercholesterolemia in 45.4% cases.

Conclusion: Thus we concluded from our study that diabetic patients particularly those with poor glycaemic control are at high cardiovascular risk status according to LDL-C levels and serum cholesterol levels and borderline risk according to TG levels. Our study indicates prevalence of lipid disorders in patients with type-2 diabetes. There is a

positive association between dyslipidemia and glycaemic control. Raised triglyceride and LDL-C levels are established risk factors for coronary artery diseases. In addition to weight reduction, physical exercise and anti diabetic drugs for fair glycaemic controls, the optimal care of diabetic patients should also include periodic screening for lipid abnormalities. The lipid lowering drugs may also be considered for achieving effective lipid control. Reductions in Trans and saturated fats are mainstays for reducing LDL-C. Reduced body weight (10%), more physical activity and improvement in glycaemic control more favourably modified TG and HDL-C and LDL-C.

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Tumor Necrosis Factor Alpha In Preeclampsia

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Abstract: Pre-eclampsia is one of the most frequent complications of pregnancy, however, little is known about its aetiology. Insufficient adaptation of the decidual and intramyometrial portions of the spiral arterioles in preeclampsia results in reduced utero-placental blood flow, leading to local placental hypoxia. Pre-eclampsia is pregnancy-induced hypertension (PIH) of unknown etiology. Pre-eclampsia can be quite serious as it can lead to various complications both for the mother and the baby. In fact, pre-eclampsia and eclampsia, severe forms of PIH, are the leading cause of infant and maternal death in India. Hypertension complicates an estimated 6-8% of all pregnancies. Significant risk factors identified in univariate analysis included pre pregnancy body mass index (BMI > 25) (OR = 11.27), history of chronic hypertension (OR = 8.65), history of diabetes (OR = 11.0), history of renal disease (OR = 7.98), family history of hypertension (OR = 5.4), history of pre-eclampsia in earlier pregnancy (OR = 9.63), and multiple pregnancy (OR = 4.85). Cytokines are major contributors in pathogenesis of pre eclampsia. Several studies confirm a significant increase ($p < 0.01$) in circulating TNF- α levels in the last trimester of pregnancy, compared to the non-pregnant status. Significantly increased serum concentrations ($p < 0.001$) were also found in pregnant patients with preeclampsia, compared to normotensive pregnant women. Conclusion: Preeclampsia is an exacerbation of a generalized inflammatory response, physiologically present in the third trimester of pregnancy. TNF- α pro inflammatory cytokine can be a potential marker of the severity of the preeclamptic syndrome, without being an indicator of the fetal status at birth.

Key Words: Preeclampsia, TNF alpha, Cytokines.

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Introduction: Normal physiological pregnancy undergoes various physiologic and metabolic changes so as to meet the increasing energy needs of the developing fetus. Not only there occurs increase in the weight and blood volume which is required to perfuse the vital organs like kidneys but the pregnant uterus also undergoes vascular remodeling. The uterine spiral arteries are transformed into low-resistance flow vessels that are able to accommodate more blood volume and gain access to the placental intervillous space¹. Complex cytokine networks also play an important role in a wide range of reproductive and pregnancy related processes. These influence a wide range of uterine functions during the menstrual cycle, implantation, pregnancy and labour. The synergistic interactions between individual cytokines are intricate and dynamic, and modulated by pregnancy hormones. If there is any disturbance in this cytokine signalling adverse pregnancy outcomes such as miscarriage, preeclampsia, preterm labour and foetal brain injury may occur².

Immune system in pregnancy: Normal pregnancy requires an appropriate immunological interaction between the mother and the developing fetus because the fetus expresses paternal antigens which are considered semi-allograft to the maternal immune system³. The placenta has an important role in normal pregnancy as it acts as an immunological barrier between maternal and fetal antigens. Placenta does not express the usual major histocompatibility molecules like MHC class I, HLA-A, HLA-B or MHC class II molecules and thus it is protected from the cytotoxic effect of T lymphocytes.

To avoid killing by natural killer (NK) cells, which are programmed to recognize HLA-null cells, trophoblast cells express non classical MHC molecules like HLA-G⁴, HLA-E, and HLA-F⁵. The decidual NK cells which constitute about 50-70% of all maternal immune cells present in the uterus do not have any lytic activity. These regulate pregnancy through secretion of cytokines and angiogenic factors which have important action on the vascular and decidual transformations occurring in the

uterine wall during the early weeks of pregnancy⁶⁻⁸.

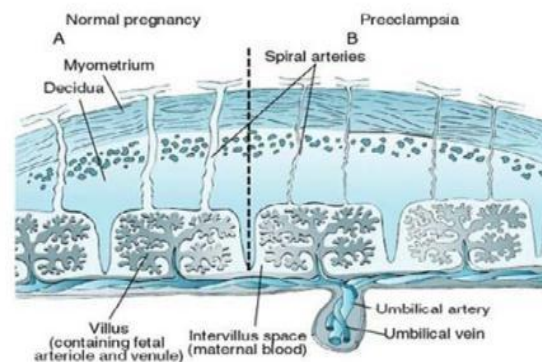
In normal pregnancy there is a balance between T helper 1 and T helper 2 cytokines. Th2 immunity is characterized by the dominance of humoral immune responses over cell-mediated, responses which are more destructive and can be detrimental to the fetal allograft. CD4-positive Th2 lymphocytes develop from naïve T helper cells in the presence of interleukin (IL)-4 and IL-10, whereas Th1 cells arise when IL-2 and interferon (IFN)- γ are present. It has been demonstrated that the placental bed encloses a high incidence of the Th2 factors IL-4 and IL-10⁹⁻¹³. Several isoforms of the immunosuppressive transforming growth factor (TGF) β have also been localized in the placenta, adding to the immune privilege of this tissue¹⁴⁻¹⁶.

Cytokines in normal pregnancy: TNF alpha is a 17 kD polypeptide cytokine which is produced in preeclampsia by neutrophils, monocytes and placenta. Cytokines are involved both in normal pregnancy and labour. IL-1, IL-6 and TNF alpha are all detected in placenta and amniotic fluid¹⁷. TNF alpha is produced in human deciduas in response to bacterial products and it stimulates prostaglandin production by amnion and deciduas^{18,19}. Normal pregnancy is a condition of mild maternal systemic inflammation and circulating levels of particular pro-inflammatory cytokines, such as tumor necrosis factor (TNF)alpha, IL-6, and IL-1 are raised compared to nonpregnant women^{20,21}. TNF alpha regulates trophoblast proliferation and differentiation, cell adhesion tissue remodeling, the apoptosis of villous trophoblast and trophoblast hormone production²²⁻²⁴. The low level of uterine TNF alpha is beneficial to pregnancy, whereas elevated concentrations are detrimental.

Preeclampsia: Preeclampsia is a multisystem disorder of pregnancy and is characterized by new onset of hypertension ($\geq 140/90$ mm Hg) and proteinuria (≥ 300 mg/24 h) after 20 weeks of gestation. It occurs in about 2-8% of pregnancies^{25,26}. It is the most common medical complication of pregnancy whose incidence has continued to increase worldwide and is

associated with significant maternal mortality and morbidity. Its incidence is more in primigravida and the risk decreases in the subsequent pregnancies. Among the primiparous women there is disparity in the risk among different ethnic groups. The risk is very high in women of Indian origin²⁷. Risk factors include primiparity, multiple pregnancies, a previous history of preeclampsia, and chronic medical conditions such as obesity, hypertension, vascular disease, or diabetes²⁸. However, there is no factor by which we can predict this disease nor there is any preventive treatment available.

The main pathology of the disease lies in the placenta and occurs during the first weeks of pregnancy. The number and distribution of macrophages in placental beds are significantly altered in preeclampsia in comparison to normal pregnancy²⁹⁻³¹. Activated macrophages induce apoptosis of extravillous trophoblasts in vitro. The normal vascular remodeling does not take place in preeclampsia. Extravillous trophoblasts invasion is abnormally shallow, and remodeling and enlargement of the spiral arteries is restricted to their placental-proximal part^{32,33}.



Inadequate vascular remodeling results in placental ischaemia and release of proinflammatory cytokines such as IL-6 and TNF alpha by the placenta³⁴⁻³⁶. IL-6 increases the endothelial cell permeability and inhibits the prostacyclin permeability. TNF alpha stimulates cell proliferation and hypoxia induced cell activation but inhibits decidual invasion by cytotrophoblasts. Further it leads to alterations in endothelial cells, release of endothelin-1 and inhibition of acetylcholine mediated

vasodilatation^{37,38}. The levels of endothelin-1 and cytokines (TNF alpha, IL-2 and IF- γ) in the maternal sera have been found higher in preeclampsia as compared to normal pregnancy suggesting their role in the pathogenesis in the development of preeclampsia³⁹. The concentration of TNF alpha is higher in preeclampsia as compared to normal pregnancy during the third trimester^{40, 41}. Zhou P et al.⁴² found the expression of pentraxin 3 (PTX3) and TNF alpha in placental tissues and maternal sera to be higher in preeclampsia and preeclampsia with intrauterine growth restriction suggesting the involvement of these in the pathogenesis of preeclampsia. A doublefold increase was observed in TNF-alpha levels at 36 weeks in patients with pre-eclampsia (P=0.003) which decreased significantly (P=0.001) after delivery.⁴³

Conclusion: Preeclampsia is multifactorial and the use of TNF alpha in predicting this disease is still controversial. This cytokine has a role in normal pregnancy from implantation to parturition. Preeclampsia is a major cause of maternal morbidity and mortality. Though many studies have suggested the role of TNF alpha in the pathogenesis of preeclampsia but still the cause is unknown. Further studies are required to find the role of TNF alpha in predicting this disease so as to improve the maternal outcome.

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Good Teaching - Learning Practices Application Of Learning Principles In Physiology Education

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Abstract: Evidence based medicine is essential for providing optimal health care. However, evidence based educational practice is lacking in health professions education including Physiology education. There is an existing body of learning theories such as Adult learning theory, Theory of constructivism, Theory of reflective practice and Experiential learning theory which can inform teaching- learning practices. The key learning principles emerging from these theories and their application in Physiology education are: Build on prior knowledge and skills by assessing prior experience and building new knowledge on it; Provide safe non-threatening environment for optimal learning to occur; Encourage active participation of the learner in the learning process; Provide relevant content and problem centred approach for the learner to value learning; Providing opportunities and support to learners for self-directed learning will make them lifelong learners; Timely and constructive feedback with reflections enhances learning; Address different learning styles by using a variety of Method. Teachers in Physiology and other disciplines can use the learning principles to inform their teaching-learning practices and enhance student learning.

Key words: evidence based educational practice, learning theories, learning principles, application in physiology education

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Introduction: To provide best patient care it is essential that patient management is based on best available evidence¹. Evidence based medicine (EBM) or Evidence based practice is what health profession is striving towards currently to provide optimum health care². One of the ways to achieve this would be to follow Evidence based educational practices for our medical students. However, in health professions education, including teaching and learning of Physiology, evidence based educational practice is lacking³.

As health professional teachers it would be helpful to have guidelines to follow when faced with difficult situations³. There is a need today to use the existing body of theory and principles to inform teaching and learning practices in health professions education. This “informing” can improve and empower teachers in preparing to teach and be facilitators of student learning.

The purpose of this communication is to provide a brief review of four of the learning theories and the learning principles emerging from them. This will be followed by a discussion

on the applicability of these learning principles to Physiology education.

Theories of Learning^{3,4}: (Table 1): Adult learning theory: Malcolm Knowles introduced the term andragogy, for adult learners which are based on five assumptions about adult learning: Adults are independent and self-directed, have experience, value learning which they can practice, interested in problem centred approach and motivated to learn by internal drives.

Theory of Constructivism: This considers learning to be based on prior experience, teachers as facilitators and learners to be engaged actively in the learning process. The learning here is active rather than passive.

Theory of Reflective practice: Schon described this theory of learning on the following assumptions: “Reflection in action” and “Reflection on action” to inform learning practices. “Reflection in action” is the ability to reflect as a continuous on-going process even as one is doing the action (eg patient management) and make modifications based on reflection. “Reflection on action” is to reflect

after the task is over and learn from it. It is believed that maximal learning happens with reflective practice.

Experiential learning theory: elaborates that learning relies on previous experience and knowledge is created through transformation of experience. Kolbs learning cycle which has been popularly used for application in classroom teaching is based on this theory.

Table 1: Learning theories

LEARNING THEORY	DESCRIPTION
Adult learning	Learners are independent self- directed learners Learners have prior experience Learners value learning which can be practiced Learners are interested in problem centered approach Learners have intrinsic motivation
Constructivism	Learning based on prior experience Teachers are facilitators Active engagement of learner in learning process
Reflective Practice	Reflection in action and Reflection on action to inform learning practices
Experiential learning	Learning relies on previous experience Knowledge is created through transformation of experience

Learning Principles Emerging from the Learning Theories and its Application in Physiology Education: (Table 2) Typically Physiology teaching- learning is done for undergraduate medical and allied health students as well as postgraduates in Physiology and other specialities. The bulk of the teaching is however, reserved for the undergraduate health professionals who are traditionally taught Physiology through lectures, tutorials and practical class. Some teachers may be using

other innovative Method to enhance learning in Physiology.

The learning principles that emerge from the theories and their application in Physiology education are described below. Reflection on ones’ best experiences with learning will show that in these experiences the teacher had incorporated one or more of the learning principles.

Principle 1. Build on prior knowledge and skills:

The learner brings some prior learning / experiences in the class. Learners’ previous knowledge and skills are critical to the current learning and should be incorporated in the learning process. As a teacher to facilitate learning one must first assess prior knowledge; followed by discussion of the responses for clarification; then build upon the knowledge which the learner already has adding new learning on to it; and then check for understanding to ensure new learning has occurred.

Some of the strategies for assessing prior knowledge are: Know, Want, Learn (KWL) strategy⁴: Before the session, the students write on a hand out what they already Know about the topic and what they Want to learn about it. After the class /session the students again write on the hand-out what they did Learn.

Conducting a pre-session quiz on the topic. Audience Response System can be used if the classroom has the provision for it. Alternatively, a show of hands or showing number cards can be used. Participants could write their comments/thoughts on statement or questions about the topic. If it is a practical class the learner could be asked to demonstrate the skill to be learnt.

Principle 2. Provide a safe non-threatening environment.:

Provide a comfortable, safe, non-threatening environment yet challenging to the learner for optimal learning to occur. The key feature here is to create an environment of respect for the learner.

Some of the ways in which it could be done in a classroom is to be courteous and patient with the students. Listen to their viewpoints and questions. Encourage them to ask questions to the teacher as well as answer questions asked by the teacher. Do not pull them up in front of their peers. If correction is required call them in private and give constructive feedback to them. Design and introduce group activities in the class.

Some of the specific Method that can be used are: Think- Pair-share: Throw a question to the class. Ask each student to first think about it. Encourage them to write down their thoughts. Then ask them to discuss it with the person sitting next to them. If it is a lecture class with a large group of students asks for few pairs to respond. If it is a tutorial with a small group of students ask each pair to respond. The whole activity takes about 2 minutes. It gives confidence to the learner as they are sharing their thoughts with a peer and the response to the whole class is not their individual response but that of the shared one with their peer.

Confusion technique: At the end of the class, ask the students to write one point /concept taught which is not clear to them on a piece of paper. Ask them to fold the paper twice. Then ask them to keep on passing the paper for a minute / till you ring the bell. Then ask a few students to read the question from the paper which they are holding. The teacher can clarify the issue/unclear point. The student feels comfortable in reading out because it is not his/her paper and the student whose paper is being read has his/her question answered without coming into the limelight. The teacher can handle it in a variety of ways. Many teachers prefer to collect all the papers and then identify difficult areas for learning and start the next class clarifying those concepts.

Call students by their names^{3,4}: If it is a tutorial class learn all the names. However, if it is a lecture class with large number of students, ideal would be to learn all the names but may be difficult for most teachers. So try and learn as many as possible. Group quiz: Students can

be divided in smaller groups and a quiz can be conducted with a small prize for the winning group.

Principle 3. Active participation: Active participation of the learner in the educational process contributes to learning. The challenge before the teacher is to actively engage the mind of the learner with the content being discussed. One has to be very good and updated in content knowledge of the topic being taught, presenting ones' ideas in a logical flow and sequence and clarifying concepts. There are some specific strategies which can be used to encourage active participation of the learner in the learning process.

Think-Pair-Share and Confusion technique described above. Encourage sharing of experiences and questioning. Introduce Crossword puzzle and Interactive quizzes in the class.

Note taking guide⁴: This consists of key concepts of the topic, space for key points to be noted down followed by one to two short answer questions which promote higher order thinking.

Essence: at the end of the class or in the middle of the class, ask the students to share the key message/concept. This is different from summarizing.

Summary: can ask students to summarize at the end of the class.

If it is a tutorial, the students take turns to be the scribe for the discussion. The tutorial group can also formulate their own learning goals with the help of the teacher.

If it is a practical class invite the students to participate in the demonstration of the skills.

Principle 4 . Relevant content and Problem centred approach.

Relevant content applicable to their practice will make learners value the learning and problem centred approach will enhance the learning process. Learners will value learning

which is relevant and has practical applications. Some of the things which teachers can do are:

Develop Specific Learning Objectives which address relevant content⁴. Case Based Learning: For example a case of hyperthyroidism could be used to discuss the physiological basis of signs and symptoms followed by functions and mechanism of action of thyroid hormone in a Physiology class.

In a Physiology practical class for examination of Cardiovascular system the discussion could be started with a clinical case of a patient with murmur followed by demonstration and discussion of heart sounds.

Early clinical exposure⁵: This means exposing the first year medical students to the patient/clinical case. However, the discussion is on the basic science concepts and not on diagnosis and management. The purpose of the clinical case is to provide relevance and context to; and importance of learning basic science concepts.

For example, during Physiology class on thyroid gland, the students could be taken to the hospital to see a patient with goitre followed by discussion of physiology of thyroid gland. Alternatively the patient could be brought to the classroom instead of a hospital visit after taking informed consent from the patient.

However in both situations the discussion should be focussed on the physiology of thyroid gland.

Community Based Learning: Globally the move is towards community based learning where the community is involved in students learning. This could be done by getting the students do small projects in the community in groups. For example they could screen for hypothyroidism in a small area, present their finding followed by a debriefing by the teacher on Physiology of thyroid gland.

Principle 5. Self Directed Learning^{3,4}: Opportunities and support should be provided to the learner for self-directed learning. The students of today will be doctors of tomorrow. Providing self-directed learning skills to the

students is crucial to enable them to be lifelong learners, an important attribute of a competent doctor. Self-directed learning deepens learning and makes it long lasting^{3,4}.

The teacher can encourage the students to be self-directed learners by helping them formulate their own learning objectives and identifying how they will reach it. The students can also be encouraged for independent study. Eg. Ask questions in class which the students have to go and find out. Alternatively give them assignments which require higher order thinking.

However, in order to inculcate self-directed learning skills in the students it is mandatory to provide them with appropriate learning resources such as references, journal articles, books, hand-outs, self-learning modules etc⁴.

Principle 6. Feedback and Reflections⁴: It is important to give constructive, timely feedback to the students on their learning and encourage them to reflect to enhance learning. This leads to “successful learning and mastery of content and skills”⁴.

Some of the Method that can be used in a classroom are: Ask questions to check understanding (could use the Think- Pair- Share or Quiz or crossword puzzle) followed by discussion of the response/answer, clarify misunderstandings and give the correct answer.

Give a case in advance to prepare followed by a debriefing session with the whole class. Encourage reflections. Students could keep journals and teachers can give feedback on it. However this is quite challenging as the art and skills of reflection need to be learnt first.

Principle 7. Address different learning styles. All learners do not learn the same way. Students have different learning styles. There are instruments such as the VARK (Visual, Auditory, Reading/Writing, and Kinaesthetic) questionnaires to find out the different learning styles⁶. However, as a teacher one must use a variety of Method to address the different

learning styles of the students to maximize learning. These Method include role play, case studies, questioning, using varying technology such as media, video etc. and games^{3,4}. For example an online game has been used to teach

blood grouping to the first year medical students⁷. This game is available at <http://www.nobelprize.org/educational/medicine/bloodtypinggame/>

Table 2: Learning principles and their application in teaching- learning

LEARNING PRINCIPLES	DESCRIPTION	KEY FEATURE	APPLICATION IN TEACHING - LEARNING
Build on prior knowledge	Learners' previous knowledge and skills are critical to the current learning and should be incorporated in the learning process.	Use prior experience	Assess prior knowledge Discussion of response for clarification Build upon it adding new learning Check for understanding
Safe non threatening environment	Provide a comfortable, safe, non-threatening environment yet challenging to the learner for optimal learning to occur	Respect the students	Think-Pair-Share Encourage questioning Call students by names Provide small group activities Confusion technique Group quiz
Active participation	Active participation of the learner in the educational process contributes to learning	Actively engage the mind of the learner with the content	Crossword puzzle Quiz Essence Note taking guide Scribe Formulate learning goals
Relevant content and Problem centered approach	Relevant content applicable to their practice will make learners value the learning and problem centred approach will enhance the learning process.	Provide learning that is relevant and has practical application	Develop relevant specific learning objectives Case based learning Early clinical exposure Community based learning
Self directed learning	Providing opportunities and support to the learner for self-directed learning enables them to be lifelong learners,	Provide learning resources	Formulate own learning objectives Independent study Assignments
Feedback and Reflection	Leads to effective learning	Constructive and Timely	Ask question to check understanding, followed by discussion of the response, clarify misunderstandings and give the correct answer Journals for reflections
Address different learning styles	All learners do not learn the same way	Use variety of teaching-learning Method	Role play Questioning Games Varying technology

Conclusion: Learning principles inform educational practices. Many teachers may already be using some / all of the strategies. The way forward is for the teacher in Physiology and other disciplines in medical education to use them/ continue using them to become facilitators of learning and enhance student learning.

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Making Sense Of Smell : From Odorant Receptors To The Olfactory Cortex

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Abstract: The olfactory system is uniquely essential for life. Olfactory receptor cells, located in the olfactory mucous membrane project to the olfactory glomeruli where they synapse with the lateral dendrites of the mitral and tufted cells. This mechanism of lateral inhibition sharpens the olfactory signal enabling differentiation of odours. From the olfactory glomeruli, second-order neurons project to the olfactory cortex which has evolved over millions of years. It consists of an older system (concerned with primitive responses to olfaction) and a newer system (concerned with the conscious analysis of odour). The intriguing question as to how human beings can detect 10,000 different odours was solved by two scientists Drs. Richard Axel and Linda Buck. They unravelled the 1000 different olfactory receptors, each activated by a combination of different odours. Genes coding for the olfactory receptors form the largest gene family in humans, larger than the T-cell receptor gene family.

Key Words: Olfaction, olfactory receptors, olfactory cortex

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Introduction: The olfactory system is uniquely essential for life. Many species rely on their sense of smell to locate food, detect predators or other dangers, navigate and communicate societal information. Olfaction plays a role in mate choice, mother-infant recognition and signaling between members of a group in all species and for marking of territory in big cats. Humans may not rely on olfaction for survival, but we nevertheless use olfaction to gather information on the surrounding e.g. from the mother checking if the milk is still safe for the baby, to the hunter using smell to locate prey, to the wine taster enjoying a vintage Bordeaux. Humans also communicate via odorants and pheromones, both consciously (by applying artificial scents) and subconsciously. For example, olfaction mediates the curious synchronization of menstrual cycles of women living in close proximity. Aesthetically, olfaction is important for enjoyment of our food, our natural environment and our lives in general. In addition, smell rekindles sweet (and sometimes unpleasant) memories from the past. Smell also has a protective role e.g. the odour of methylmercaptan in natural gas gives a warning signal when only a small amount of gas has leaked^{1,2}.

Recently, a lot of research is focused on the olfactory system to solve the intriguing question: how a simple sense organ and its brain representation that lacks a high degree of

complexity can mediate the perception of 10,000 different odours?

Organization Of The Olfactory System:

Olfactory mucous membrane: The olfactory receptor cells are located in the olfactory mucous membrane in the roof of the nasal cavity near the nasal septum (Fig 1). In humans, it covers an area of about 5 cm²; however, in macroscopic animals like dogs, the area of the olfactory mucous membrane is forty times larger (Fig 2).

The olfactory receptor cells are **bipolar neurons**. Each neuron has a short thick expanded dendrite called the olfactory rod; the axons penetrate the cribriform plate of the ethmoid bone and terminate in the olfactory bulb. The dendrites have numerous cilia, on which are located the olfactory receptor cells.

In fact, the olfactory mucosa is the place where the nervous system is closest to the external world.

The olfactory neurons are true neurons, and like the taste receptor cells are continuously being renewed. **Bone morphogenetic proteins (BMP)**- growth factors involved in growth in all tissues of the body, are involved in regulating regeneration of the olfactory neurons³. (Fig. 1 & 2) The phenomenon of **lateral inhibition** sharpens the olfactory signal projecting to the olfactory cortex, and thus enables differentiation of odour^{3,4}. (Fig 3).

Each olfactory glomerulus receives input from similar receptor cells. Each receptor projects to two glomeruli (there are about 2000 olfactory glomeruli) Because the olfactory neurons are continuously renewed it is a wonder as to how their axons find their way to the correct glomerulus^{3,5,6}.

Fig.1. Olfactory mucosa and olfactory receptor cells

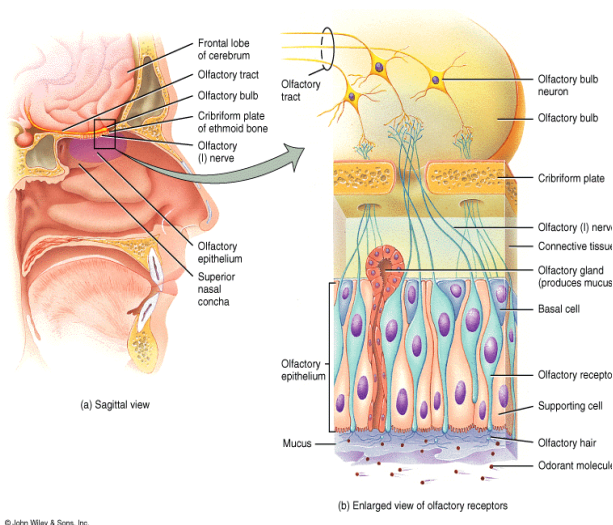
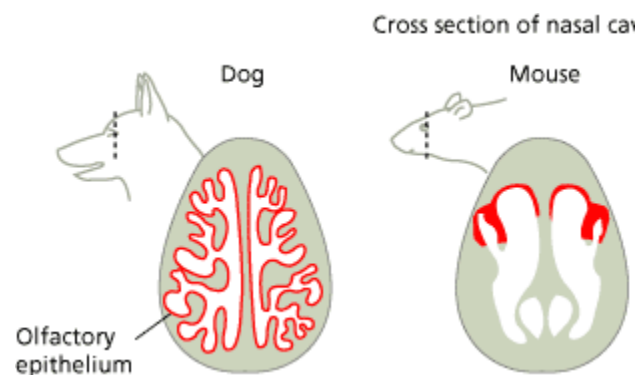
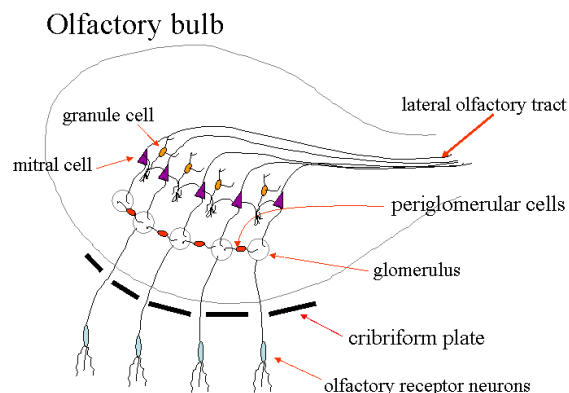


Fig.2. Portion of the nasal cavity occupied by the olfactory mucous membrane in dogs, mice and humans (From www.nobelprize.org)



Olfactory glomeruli: The axons of the olfactory receptor cells terminate in the olfactory bulb, where they synapse in the olfactory glomeruli, with the primary dendrites of the **mitral and tufted cells**. Mitral and tufted cells are second order neurons projecting to the olfactory cortex. In addition, there are **peri-glomerular cells** connecting one glomerulus to the other. Centrifug

Fig. 3. Olfactory glomeruli (From Cardiff.ac.uk)



al fibres project from the olfactory cortex to the olfactory bulb, where **granule cells** synapse with the lateral dendrites of the mitral and tufted cells forming dendro-dendritic synapses. The mitral and tufted cells excite the granule cells by releasing glutamate, while the latter releases GABA inhibiting the mitral and tufted cells. (Fig. 3) .

Olfactory Receptors, Olfactory Genes And The Nobel Prize: The dilemma as to how we can perceive 10,000 different odours was solved by two scientists, **Dr. Richard Axel** and **Dr. Linda Buck** of Columbia University and Harvard University, USA respectively. In a series of pioneering experiments they unravelled the olfactory receptors, genes, cortical representation and related aspects. Subsequently, the 2004 Nobel Prize in Physiology or Medicine was awarded jointly to Axel and Buck⁷.(Fig 4).

Fig.4. Drs. Richard Axel and Linda Buck (From www.nobelprize.org)



Olfactory receptors are **serpentine G –protein coupled receptors with seven transmembrane domains**. Mice have about 1000 different olfactory receptors. Humans have a similar number, although some receptors have been lost in evolution⁴. Unlike other receptors which are specific for a ligand, olfactory receptors bind a number of odorants with different affinities. It is a result of **combinatorial activation** of a number of receptors that a particular odour can be detected^{8,9}.

Each olfactory receptor expresses one and only one gene. Thus, the olfactory gene family is the **largest gene family** in humans, larger than the immunoglobulin and T-cell receptor gene family. It comprises about 3 % of the total human genome^{3,7}.

Olfactory signal transduction: Binding of the odorant to the olfactory receptor activates the heterotrimeric **G protein (Golf)**. Though earlier both IP₃ and cAMP were considered second messengers, current evidence suggests one common pathway for intracellular signaling – **the adenylylase-cAMP system**. G protein activation of adenylylase results in the production of a cyclic nucleotide, cAMP. This directly opens ion channels, causing an inward directed current carried by Na⁺ and Ca⁺ ions. Olfactory sensory neurons maintain a high intracellular concentration of Cl⁻ ions, and increase in intracellular concentration of Ca⁺² causes the opening of Ca⁺² activated Cl⁻ channels, that produce an efflux of Cl⁻, contributing to olfactory neuron depolarization. The depolarization is conveyed along the axon of the olfactory receptor cell to the olfactory glomeruli

The described molecular mechanism of olfactory transduction has several important physiological consequences :

Cascade Effect- The amplification of the transduction cascade allows the production of an electrical quantal event even by binding of a single odorant molecule.

Adaptation – At the level of the transduction the physiological process of adaptation occurs.

This is mediated by Ca⁺² acting via calmodulin to desensitize cAMP-gated channels^{1, 10, 11, 12, 13}

Olfactory Pathway: The fibres emerging from the olfactory bulb form the olfactory tract (cranial nerve I). These fibres enter the brain at the junction of the cerebrum and mesencephalon, and divide into a medial olfactory striae and a lateral olfactory striae.

Based on evolutionary studies, the olfactory pathway is divided into :The Very Old Olfactory system- the Medial Olfactory PathwayThe Less Old Olfactory System-the Lateral Olfactory Pathway

The Newer Pathway: **The Very Old Olfactory System-The Medial Pathway**

The **medial olfactory striae** consists of fibres from the anterior olfactory nucleus, which consists of multipolar neurons scattered within the olfactory tract. Some of these fibres terminate in the **septal nuclei**, a group of nuclei located anterior to the hypothalamus. Others cross the midline in the anterior commissure and inhibit mitral cell activity in the contralateral bulb (by exciting granule cells there). The result is a relative enhancement of the more active bulb, providing a directional cue to the source of olfactory information.

In addition, the median forebrain bundle links the olfactory system with areas in the hypothalamus and brainstem.Both these pathways are concerned with primitive responses to olfaction, including licking lips, chewing, salivation, etc. This is the most ancient of the olfactory pathways.

Less Old Olfactory System –The Lateral Pathway: The lateral olfactory striae terminates in the **piriform lobe** of the anterior temporal cortex . The human piriform lobe includes the cortical part of the amygdala, the uncus, and the anterior end of the parahippocampalgyrus This pathway is concerned with smell preferences (liking and disliking a particular odour), and aversion to unpleasant odours.

The Newer Pathway: A part of the olfactory tract terminates in **dorsomedian nucleus of the thalamus**, and from then projects on to the **orbitofrontal cortex**. This is the highest pathway for olfactory discrimination concerned with the conscious analysis of odour^{14,15} (Fig. 5 to be inserted here).

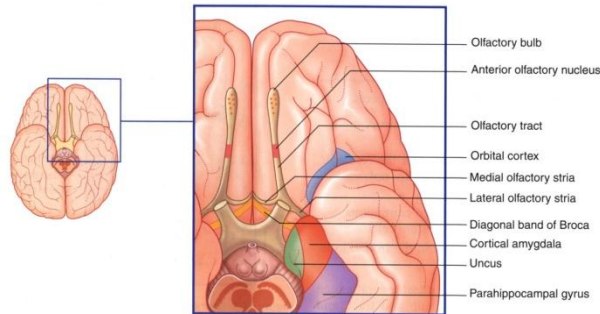


Fig.5. Olfactory pathway and olfactory cortex

Targetting Of Odorant Receptors To The Olfactory Cortex: The olfactory receptors are organized in a topographical manner in the olfactory bulb. However, such topographical representation is lacking in the olfactory cortex. Instead, odorant receptors seem to be mapped to multiple, discrete clusters of neurons in the olfactory cortex. Studies were carried out in transgenic mice using barley lectin as a neuronal tracer. Two olfactory receptors M5 and M20 were studied. It was found that mitral cells carrying input from these receptors form synapses in most olfactory cortical areas and are organized in discrete clusters. Moreover, by comparing the location of neuronal clusters in different animals, it was found that there is a stereotyped map of sensory inputs to the olfactory cortex, where odorant receptors are targeted to **multiple, discrete, but partially overlapping clusters of olfactory neurons**¹⁶.

Abnormalities In Odor Detection: Anosmia (inability to smell) and hyposmia or hypesthesia (diminished olfactory sensitivity) can result from simple nasal congestion or be a sign of more serious problem including damage to the olfactory nerves due to fractures of the cribriform plate, tumors such as neuroblastoma or meningiomas, or infections (such as abscesses). Alzheimer's disease can also damage the olfactory nerves. Aging is also

associated with abnormalities in smell sensation; more than 75% of humans over the age of 80 have an impaired ability to identify smells.

Hyperosmia (enhanced olfactory sensitivity) is less common than loss of smell, but pregnant women commonly become oversensitive to smell. Dysosmia(distorted sense of smell) can be caused by several disorders including sinus infections, partial damage to the olfactory nerves, and poor dental hygiene.

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Meditation [Dhyan] Versus Relaxation A Review With Comprehensive Bibliography

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Abstract: A voluminous amount of research on the multi-faceted complex process of meditation is now available. Meditation [Dhyan], an ancient Indian art and science of healing, has an immense potential to liberate the mankind from the Stress Associated Diseases [SADs] which, today, are addressed as Non-infectious Chronic Diseases [NCDs]. But unfortunately the Conclusion from the currently available research are tentative because of the several errors in the study design. The guidelines suggested in this text may be useful in futuristic research which may bring the dream of trans-personal Psychologists to combine “Eastern Consciousness approach” with the “Western Precisely scientific tackling”. When that happens, it shall bring a better tomorrow in the present Health scenario.

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Introduction:“Of the greatest errors today is that the physicians do not take the soul into account for therapy”, thus lamented Hippocrates, the Father of Modern Medicine. The same error is happening once again. One hundred and ninety six Sutras by the sage Patanjali promise four conquests- of grey hair or baldness, of dim vision[cataract of refractive errors],of ageing[wit, vitality, vigour and vision]till the last breath and that of diseases by Sadhana [regular practice]. Dhyan and Dharana [today’s Mindfulness Meditation] are two out of eight components of Patanjali Kriya Yog or Indian Integral Yog which addresses physical, mental, emotional, social, moral and spiritual dimensions of Total Health. Five thousand years old Bhagavad Gita, today the most powerful book on psychotherapy,³ gives the most precise definition and information about the soul. One thousand years old Charak Sanhita deals effectively with the concepts of “Health promotion” and “Whole Person Medicine”. Great wheel of time has turned a full circle. Time has come to re-visit these ancient scriptures as NCDs are rising in alarming proportions taking the toll of young and productive population.

Ancient Indian spiritual wisdom describes the present Kali-yug as an era of mass-confusion. The following areas represent such area of “Mass confusion” while addressing the topic of Meditation. –1] Spiritual means dealing with Spirit or Atman [Soul].But in India it is always confused with Hindu religion which becomes a

great obstacle in meditation research. Religion is a code of ethical and moral values in life followed by a sect of humanity in accordance with the “Message” received from God by the God’s messengers [Wahi].The Path of Shreyas, Sirat al mustaqim or The Straight Path is when the human beings follow this code. The Path of Preyas is Devil’s Path which leads to a life of pain and suffering after initial rapid gains, gives a “High Achiever’s syndrome. ”The soul on this Path lost in the pursuit of sensual pleasures and transient materialistic gains, commits the crime of Kufra which means neglecting The God or Supreme Consciousness.

2] Meditation involving spiritual evolution and transformation of nature [Vrutti] is confused with a plethora of “Relaxation techniques” because of the lack of precise definition of Meditation. Christian devotional prayer forms like Orison or Philokalia and Mantra –chanting are often confusedly called as meditation.²

3] Several forms of meditation are in existence and many of them carry different nomenclature for the same process, eg. Vipassana is also known as “Insight meditation” or “Art of Living.”Sri Sri Ravishankar’s Sudershan Kriya is today famous as Art Of Living.

4] USA today has 32 Institutes of Mind-Body Medicine investigating the ancient healing science. USA became the first country in 2001 to include teaching and training in spiritual medicine as a compulsory part of UG and PG

curriculum, after WHO added the spiritual as the fourth dimension of Total Health in 1984 due to an Indian initiative. But in India i.e. Bharat Spiritual Medicine, even today remains "OUT OF SYLLABUS" in all of the Indian medical Universities. So the postgraduates shun the topic of Meditation for research. The Task Force of Indian Psychiatry Society, in 2009, set its first task as inclusion of spiritual medicine in UG syllabus, without success even in 2013³.

5] Meditation research demands precise knowledge about the God, Soul, Mind [Mana], Intellect [Chaturai], Wisdom [Saar-asaar Buddhi] consciousness [Chitta], seven Energy – Chakras [Muladhar ,Swadhishtan , Manipura , Anahat , Vishuddhi , Agya and Sahasara], Prana [Life-force] in the form of coiled serpent [Kundalini] and Body-aura. These entities are empirical or metaphysical. That means they are existing but the Science the Infant as termed by Albert Einstein, is unable to demonstrate them. Science [Vigyan or Vighatit gyan] always has a fractionated knowledge. Therefore, the progress in science takes the man from the areas of greater errors to those with lesser errors. But whatever the stage of progress, an area always remains UNKNOWN TO SCIENCE. This is the Domain of God where miracles happen.

Agya-Chakra is the famous Third Eye or Spiritual Eye in the scriptures through which The God's Messengers received the Divine signals. Pineal gland which exists in the same plane today is known as The God's spot and the modern psychiatrists believe that it is the seat of The Soul. The piezochromatic crystals and its structure like the human eye suggests that Pineal gland is involved in processing the photons [Light energy particles]in some way converting them into Divine signals.

6] Value of unpublished research or findings is immense in Meditation research. This has been highlighted by an unique "THE QI GONG DATABASE" which contains more than 1000 abstracts of UNPUBLISHED PAPERS on just one aspect of an ancient Meditative practice in China. This bibliography is one of the richest

sources of information on Chinese Meditation. Best & Taylor's physiology, especially Bijlani's textbook, have exhaustive chapters on yoga and Brahma kumar Dr. Chandrashekhar's innovation highlight the need for creating an "INDIAN DATABASE ON ANCIENT YOGA PRACTICES."

Recently, Russian technique called Kirlian Body aura photography has been able to establish the existence of metaphysical body-aura, but the cosmic energy-flow experienced by some long-duration Brahma Kumaris meditators remained an enigma. BK Dr. Chandrashekhar , who by Volcanic meditation got himself cured of an end-stage cancer, Diabetes and incurable Hepatitis C, devised an ingenious use of Universal scanner, demonstrates the increase Body-aura as well as the removal of the blocks in different Energy-chakras after intense meditation.[UNPUBLISHED].

7] Mind is an enigma and it is "experiential i.e. all of its knowledge is based on "Experience [Anubhuti] and Mystical experiences [Sakshatkars]. Spiritual knowledge is a conglomerate of "experiences" and "Mystical experiences" of the highly evolved and enlightened souls.[Yoga-siddhas].But the Bhrom [Hallucinations] due to the psychedelic drugs and the Mystical experiences occurring in the same area of the cerebral cortex creates as yet unresolved confusion.

8] A very serious obstacle is SCIENTISM, a pseudophilosophy that firmly believes that whatever has been demonstrated by Science is the UNTIMATE TRUTH. So the super natural powers ascribed to Yoga-siddhas like Yogic flying, levitation, walking on water or fire, astral travel in the form of a white beam of light, Parakaya pravesh [transposing the Prana from own to bring life into the dead],suspended animation[extreme hypometabolic state] and clairvoyance remains a matter of belief and faith for a mind-set [Vrutti] afflicted with Scientism.

8] Meditation is a transformation of mind-set [vrutti] by transforming the quality of thoughts. So Buddha says-"We are what we think. All that

we are arises with our thoughts. With our thoughts, we make the world.[Byron]. Bhagavad Gita tells us-“the thought forms the seed of our karma [action] and destiny. ”Vrutti decides perception, attitude, behaviour and habits³.

Two latest branches of modern medicine, Psycho-neuro-immunology [PNI]⁶ and Psycho-oncology⁷ prove that negative thoughts like stress and toxic emotions like hatred or jealousy are the weapons for Self-destruction by NCDs. The positive thoughts and emotions like purity, love, hope, bliss and peace are wonderful instruments for healing. Dr. Massaru Emoto's⁹ water crystallography and discovery of Ultradean rhythms which are akin to “Pranik healing mechanisms in ancient scriptures, in 2003 provide the scientific evidence.

9] More than 200 types of meditations are now available. Some of them come in commercial-packages. Commerce and spirituality do not go together.], though spirituality could be a part of value-based commerce. The exact steps in these meditations, some of which are called Mindfulness programmes, are never revealed. So any attempt at comparison remains tentative and not conclusive.

Current data shows that only five are evidence-based mindfulness meditations-Vipassana of Buddhism, Preksha Dhyana of Jainism, Japanese Zen, Brahma kumaris Rajayoga and Art Of Living³.A focused research using state of art equipments and neuro-hormone assays may bring out very meaningful research. All the meditations are done with eyes closed except the Zen and BK-Rajayoga. This is unique. Inspite of the sensory inputs through open eyes, the consciousness does not react and get tainted. It remains relatively free from thought-fluctuations. This indicates the ability of the mind to selectively block the undesirable inputs by a hitherto unknown mechanism, that develops in the long-term meditators.

Precise Definition Of Meditation: The US National Centre for Complementary and Alternative Medicine [NCCAM2005] defined meditation as “A conscious mental process that induces asset of physiological changes termed

as Biological Relaxation Response [BRR- Dr. Herbert Benson].”This definition is largely responsible for confusing Meditation as merely a relaxation technique.

The US NCCAM [2006] reviewed the definition. “Meditation is a process in which the person learns to focus his attention on a single positive thought or a point and to suspend the stream of thoughts which are often negative]that normally occupy his mind. This practice results in greater physical relaxation, mental calmness and psychological balance. Sage Patanjali prescribes Vrutti-nirodh for achieving this single point focus of thoughts [Ekagra Chitta] for transformation and spiritual evolution. Dr. Herbert Benson, an American cardiologist and the founder of first Institute of Mind-Body Medicine in USA, in 1987 termed this totally relaxed as well as focused mental state as ‘THE ZONE, ’This new concept of “suspension of thoughts” raises an important question. Whether a shift in consciousness from a state of multiple thoughts to focus to suspension of thought- A NON-THOUGHT CONSCIOUSNESS, implies that a new physiological paradigm should be included in Meditation Research?¹⁴. Sage Patanjali asks to focus on thoughtless interval between two thoughts and to increase it by sadhana [regular practice]¹. BK-Rajayoga concepts tell [believed to be obtained from Shiva through mystical experiences to Brahma Baba, a renowned diamond merchant who became enlightened] that a “Thoughtless situation is impossible”. A vacuum created by deletion of negative thoughts has to be filled in by positive thoughts by a technique called Rajayoga, revealed by Supreme Soul [Param-atma] for the benefit of the mankind at this particular point of time called as an era of Confluence [Sangam Yug] which heralds the beginning of Golden age[Sat-yug].

BK-Rajayoga technique has three very easy steps which incorporate three very powerful psychiatric techniques for mind-empowerment – Neuro-linguisticprogramming[NLP] for developing a “Passion Quotient PQ”, positive autosuggestions and visualization. A sadhana [regular practice] of just half an hour daily for

three months brings about transformation by rewriting the negatively transcribed CD of the mind. Miraculous cures and de-addiction then happen.[Unpublished.].BK-Rajayoga Aim at attaining the highest, purest and most powerful Brahma type of consciousness [Prakruti or personality] described in Charak Sanhita.

The authors propose that the following may be considered as a candidate for a flawless definition of Meditation – Meditation [Dhyan] is one of the component of eight-fold kriya yog of Patanjali that transforms the consciousness from the basal and satanic Rajasik-Tamasik state of the man to an elevated divine, peaceful, loveful, blissful, powerful and pure Satvik consciousness or soul-consciousness that empowers the mind so much that it can remain calm under any adverse circumstances and retain its spiritual equipoise in grief and bliss. A state of mind that is permanently stabilized in soul-consciousness is described as Sthit-pragnya state in Bhagavad Gita. Turia consciousness is when the knowledge of the past and future becomes known to the person.

Living example of Sthit-pragnya state is 97 years old Janaki Dadi of Brahma kumaris, who has been certified as the most stable mind in the whole world by two independent teams of Neurologists from USA and Australia¹⁵.

A PRELIMINARY KNOWLEDGE OF ANCIENT INDIAN SPIRITUAL WISDOM

Such knowledge shall facilitate to understand certain often repeated terms while dealing with the topic of Meditation.

Patanjali Sutra: Sage Patanjali says” Restraint of turbulent mind [turbulent due to negative thoughts and toxic emotions characterizing RAJASIK-Tamasik consciousness] is a step towards Self-realization and subsequently God-realization. ”He further describes Chitta [consciousness], Mana [mind], Vrutti [Prakruti, Nature] and Purusha [Self ,Purusha] in minutest details. A human being is BMSO, Body-Mind-Soul-Organism or a trinity of mind, body and soul. Consciousness in BMSO, a part and parcel of cosmic consciousness, is fluid and untainted. It does not have an existence of its own unless

it comes in contact with Purusha [soul].It depends on Purusha for its manifestation. It branches into different types of “Thought-waves” on coming in contact with the objects which attract the mind¹.

Buddhi [wisdom],a part of Divine consciousness, analyses this input and decides about action[Karma]. This “inner voice” shouts its loudest if the analysis tells that the action shall be wrong. The reflections [Manan-chintan] that begin in Mind before and after the action, give “Experience” and knowledge [Gyan]. Thus the Mind is experiential because all its knowledge is based on the “Experiences” of the Purusha. Whole of spiritual knowledge is the conglomerate of “Experiences’ and “Mystical experiences” of the highly evolved and enlightened souls. In Purusha, two different facets of Consciousness [microcosm] come into existence-

1] Divine consciousness [Divya chitta]or the Spiritualist Mind. It is pure, powerful and very wise, the storehouse of the knowledge gained through past several births .Thus it has immense potential for problem-solving and infinite tasks. Normally it serves subservient role. The scriptures describe it as Kaak Bhrushandi, the eternal, timeless, ageless and very wise crow.

2] Tainted consciousness or the Scientist mind- It is transient, turbulent and restless as it is busy in the pursuit of fulfilment of desires [Thought-waves] created by the objects that attract the Chitta. So the spiritual wisdom tells us that a thought or emotion can be good or bad. But the desire is always bad because it does not allow the Purusha to rest until it is satisfied and the next desire forms no sooner the first one is satiated.

Edward De Bono’s¹⁷ Twin Hemisphere theory provides the scientific evidence about two minds. Scientist Mind in the dominant left hemisphere [in right-handed person] does analytical and logical linear thinking and demands “Scientific proof” for having Belief and Faith. The Spiritualist Mind, in the other

hemisphere functions on belief and faith and is responsible for intuition, innovation and creativity by Lateral thinking, an "Out Of Box" thinking.. It is associated with Emotional Intelligence E.Q.⁸. The women have right hemispheric predominance and hence they are better than men in the skills for Man-management, an important criterion in Human Resource Development.

Meditation quietens the Scientist Mind full of Vikalpa, Vikar, Vasana [Negative thoughts] and Vikshepa [waste thoughts]. So the lust, anger, greed, jealousy, hatred, stress, tension, anxiety, worry, fear and frustrations disappear. Scriptures call this state as Antar-mauna [Inner silence]. At this point of time Spiritualist Mind [Soul consciousness] becomes active.

Yogic Practices Involved In Physical And Mental Empowerment : The yogic practices involved in this process could be divided into two categories-

1] Hath yoga and 2] Gyan Yoga or Rajayoga¹⁶. Overall eight interlinked components are involved in the integral yoga.

Hath-yoga consists of Asanas [Yogic postures for strengthening and relaxing], Pranayam [Yogic breath control technique which activates Prana, Life-force] and Kriyas [yogic practices involving external and internal cleaning known as Shaucha], Kriyas are six in number [Shat-karma]

- 1) Neti [nose-cleansing]
- 2) Dhauti [stomach cleansing]
- 3) Basti [colon cleansing]
- 4) Nauli [abdominal churning and cleansing]
- 5) kapalbhati [Head cleansing]
- 6) Trataka [Eye cleansing and strengthening].

Rajayoga consists of Yama, Niyama, Dhyana, Dharana, Pratyahar and Samadhi [Kaivalya] . Patanjali tells that diligent practice of five Yama and five Niyama can give Vacha-siddhi [Spoken words becoming a reality] and Sankalpa-siddhi [Mere thoughts becoming a reality]¹. The mind-set afflicted by Scientism shall say "Impossible." But accepting the concept with an open mind, judging it on the anvil of Wisdom [Not intellect] whether any harm shall come, and then putting it to practice and self-experiments to gain the

"Experience" [Anubhuti] shall very easily result in the belief [Bhav] and faith [Shruddha] in the Supreme consciousness and supernatural powers [Siddhis] that one may acquire with constant connection with the Supreme [Nirantar Dhyana]. That is why Ishwer-pranidhan or the total and trusting surrender to the Divinity is most important amongst five Niyamas.

Bhagavad Gita: Bhagavad Gita divides the sojourn of the soul in a life-span into four parts- 1] Karma yoga 2] Japa yoga 3] Bhakti yoga and 4] Gyan yoga or Rajayoga.

A common phobia that prevails today due to faulty interpretation of the scriptures [BK-concepts call it as Mana-mat], is that Gyan-yoga is dangerous as one may attain great heights or may suddenly fall to the lowest nadir. But the spiritual reality is that each soul has to pass through all the four stages.

Karma Yoga- Karma theory of two alternatives in Gita tells that a man is provided with two choices at every step of the life- Right and Wrong. Here the Right or Wrong is in accordance with the eternal moral and ethical values which are common for the whole mankind regardless of the religion. Right choice gives good karma [action] and accumulates Good Karmik Account [GKA]. Bad karma [Vikarma] adds to the already existing huge Bad Karmik Load [BKL]. A soul conscious state results in Sankalpa [positive thoughts] and good karma adding to GKA. The Body-conscious state of mind results in Vikalpa [Negative thoughts and toxic emotions] Vikarma [Bad acts] adding to BKL. Health, Happiness, harmony, peace, success and prosperity in life are due to GKA, The pain, suffering, diseases, defects, disharmony, turmoil and even premature deaths are the shedding of BKL. Both the accounts are independent. One does not neutralize the other. The Bhog [the consequence of GKA or BKA] continues till the exhaustion of accounts. Intense meditation burns out the BKL as per BK-concepts. The cure of end-stage cancer, Hepatitis C and Diabetes in BK Dr. Chandrashekhar could be

easily explained according to spiritual concepts, but not by science. The present life-scenario in which grossly bad people seem to be having a rich life is due to the GKA of past birth carried to this birth in the form of Traits[Sanskars, Spiritual genome].But then suddenly ,during last phase of life, BKL comes into force. Then the most powerful and the extremely rich, inspite of the best medical treatment, dies a very painful and pitiable death. Purusharth [Spiritual effort] in the form of meditation is required to ensure at least painless and instant death after a full life, with no suffering to Self and others.

2] Japa Yoga- When in trouble a man starts chanting the name of God, All merciful God, seeing that His beloved and lost child, has once again started chanting His Holy name, removes the trouble. Now the person develops belief and faith and his mechanical chanting turns into a song full of love and enjoyment.

3] This is the beginning of Bhakti yoga.

4] Gyan Yoga- Means the person acquires the real knowledge about The Self [Self-realization] and about God.[God-realization].This is the Ultimate Truth of life.

BK-Rajayoga is also known as Sahaj [easy] Rajayoga because of the precision and the simplicity of the Knowledge, Soul is a conscient, metaphysical point of light situated in the centre of the forehead. About God there are so many misconceptions that only God Himself can remove the confusion. BK-concepts tell that the God has descended on this planet and teaching us an easy technique [Vidhi] while giving knowledge about Himself and about our true Self. No wonder He is called as Vidhata for He is asking us, "Do you know the Vidhi without which Siddhi [super human powers] is not possible. He is formless and so beyond life and death. [Ajanma].So any body-form can never be Param-atma. Yoga [yuj, connection] is when soul the conscient point of light connects with Him, also a conscient point of light.

Sir Aurobindo, the last of the Yoga-siddha divides consciousness into three components- Supreme consciousness, Supra-mental consciousness and basal limited human consciousness.

Charak Sanhita : One thousand years old Charak Sanhita is the first treatise on latest concepts in Medicine about "Health Promotion" and "Whole Person Medicine." It describes fifteen types of Prakruti [personalities] according to the level of consciousness. Each of these 15 types receives a different therapeutic approach involving Herbs, Metals and Meditation. Three main types of consciousness are- 1] Satvik 2] Rajasik and 3] Tamasik. Satvik has five subtypes, the highest being Brahma type. Rajasik has five subtypes with different grades of tainted consciousness. Tamasik has three subtypes with different grades sloth, laziness and violent desires. The highest, purest and most powerful in Satvik is Brahma type Prakruti. This is Eastern consciousness oriented approach.³

Western approach focuses on body. So Sheldon describes only 3 types of Prakruti called Morphotypes- Ecto, Meso and endomorph and their relationship with diseases.

Five Body-sheaths and their relevance- Charak describes five body-sheaths around the central Purusha-1] Most superficial Annamaya kosh 2] Pranamay kosh 3] Manamaya kosh 4] Gyan-vigyanmaya kosh and the innermost, Anandmaya kosh. All the drugs including those used in mental diseases, act only unto Annamaya kosh. This may explain why the incurable diseases [NCDs] are on rise. Pranayam generates Prana to remove impurities from Pranamaya kosh thus curing asthma, allergies and auto-immune disorders¹²¹.The action probably is by destroying the Free radicals formed due to stress and causing oxidative damage. Meditation removes the impurities from manamaya kosh and thus contributes to mental health. Gyan-vigyanmaya kosh is the famous inner voice or Saar-asaar Buddhi [wisdom] which rings warning bells when Purusha is about to commit wrong. Mirror

neurons may be responsible for the gut feeling. If all the Koshas are pure then the Purusha dwells in Anandamaya kosha, the ever lasting bliss [Sat-Chit-Anand]. These sheaths are unknown to the modern medical science.

Types Of Meditation : Various types of meditations [Transcendental meditation of Maharshi Mahesh Yogi, Vipassana, Prekha, A.O.L, Zen, Indian, Chinese Tai chi, Tibetan, Korean, Christian devotional type, Biofeedback respiratory type and Sufi meditation] could be classified into two broad categories –

- 1) Concentrative and
- 2) Mindfulness types.

1] Concentrative – is a “Relaxation response oriented Meditation” in which there is a decrease in respiratory and heart rates, Blood pressure; increase in Galvanic Skin Resistance [GSR] and alpha wave activity in the brain. Focus on a flame, flower or object, repetition of a Mantra or a prayer, chanting, autosuggestions or visualization are used in this form of meditation. This type is based on the definition given by US National Centre for Complementary Alternative Medicine [NCCAM] in 2005.¹¹

2] Mindfulness or Experience-oriented Meditation- Dr. Richard Davidson, Professor of Psychiatry, Wisconsin University in 2003, coined the term Mindfulness while working on Buddhist Vipassana meditation for health benefits.¹⁹ This is also known as Mental silence – oriented Meditation.¹⁴ This type is based on the revised definition by NCCAM in 2006¹³. Katha Upanishad describes **Mental Silence** as a state when the five senses and the Mind are still and the reason rests itself in silence¹⁴.

Patanjali describes Mental Silence as “The development of the awareness about “The silent void” pervading the emptiness between two thoughts. Then one can develop the skill of expanding this “Void” by thought-subjugation which leads to the transformation [of Vrutti from the basal and tainted to the elevated Satvik or soul-consciousness].

This “Non-thought Consciousness” [Nirvichar Samadhi] results in mental calmness, relaxation, psychological balance and Well Being.” Non-thought consciousness is the major theme in the most effective Zen meditation²⁰.

BK-RAJAYOGA CONCEPTS : BK-concepts [founded on divine directions by mystical experiences to a human conduit] believe that a “Non-thought consciousness” is impossible. Law of Nature tells that any emptiness gets quickly filled up. So Rajayoga brings about transformation by using the inherent qualities of Purusha [soul] as the positive thoughts [peaceful, loveful, blissful, pure, and powerful] which are used as CD-writer to rewrite the negatively corrupted CD of the Mind. A relatively permanent Soul-consciousness ensues within a maximum of three months. This is a boon for Meditation research. The mind develops the power to block undesirable inputs through open eyes within three months allowing the consciousness to remain untainted. The unique “Thought-graph machine” in S.P.A.R.C. wing of Brahma kumaris clearly shows this transformation. Unfortunately the presently available scientific instruments in the Medical colleges, are unable to precisely grade “experiential variables.” for a meaningful research in Transpersonal psychology.^{21,22,23} The “Thought-graph” machine functions on a computer programme which could be made available in various medical colleges and research institutes until more refined instruments become available.

Two instruments available with Brahma Kumaris S.P.A.R.C. wing may herald the beginning of a new era of highly refined instruments. A novel “Thought-graph machine” with a basic and advanced programme, shows a fish in ocean moving forwards in the ocean with deepening meditation, progressing to a mermaid and man stage and finally showing an angel with wings. Second instrument involves the innovative use of Universal scanner to demonstrate the Energy-chakras and Body aura. Dadi Janaki of Brahma kumaris, when tested by Kirlian body aura photography with gas diffusion

visualization showed expanding Body-aura with deepening meditation¹⁵.

BK-Rajayoga is an evidenced based meditation similar in results [unpublished] to Mindfulness Based Stress Reduction [MBSR] of Kabat-Zinn,^{91,104} and Spiritually Augmented Cognitive Behavioural Therapy [SACBT]³. Both have become established as powerful psychotherapies. Hundred percent regressions of hundred percent blocks, even the calcified blocks in coronary vessels, with BK-Rajayoga 3-D programme in 2011, is a miracle⁸⁷. The 3-D programme or Rajayoga capsule consists of 1) meditation 4am to 5am [Amrit-vela, Brahma-muhurth] 2) Satvik vegetarian diet and walk and 3) purity of thoughts by constant guidance from the Supreme Soul in the form of Muralis [Celestial messages from Shiva, the Supreme soul through a human conduit, Brahma Baba]. This ensures a perpetual God-conscious state.

Responses To Meditation: The responses could be classified into six categories- 1] Psychological 2] Phenomenological [Experiential], 3] Physiological 4] Metabolic [Biochemical] 5] Autonomic Nervous System and 6] Brain physiological responses.

1] PSYCHOLOGICAL RESPONSES

Meditation enhances psychological Well-being^{25,26,27}. Many studies reported reduction in both specific as well as non-specific anxiety^{28,29}, specific phobias of enclosed spaces, of examinations, of being alone³⁰, and of heart attack-cardio neurosis³¹. Drug and alcohol use may be reduced^{13,29,32}. Hospitalized psychiatry patients with a variety of mental disorders may benefit from daily meditation³³. Several studies report about psychological benefits for successful rehabilitation after myocardial infarction³⁴, treatment of bronchial asthma^{35,37,121,125} and insomnia³⁶ and to reduce blood pressure.^{37,38,39,40} Positive changes have been observed in healthy non-clinical population. Regular meditators change remarkably in the direction of enhanced confidence, Self-esteem,⁴³ Self-control and spiritual experience³⁹, Self-actualization and

empathy^{41,42}. Thus mediation has considerable therapeutic potential.³⁰ in cancer⁷.

The only drawback is that Meditation practice [sadhana] has to be regular and for a long time.- ranging from for 3 months to 5 years. The benefits from meditation for less than 2 years are almost similar to non-meditative Self-strategies like Relaxation training or self-hypnosis, visualization and Neuro-Linguistic Programming [NLP] without God-consciousness.^{44,45, 46, 47, 48}

There are some instances in which inspite of shorter duration of practice, the Meditators reported that their "Subjective Experiences" were deeper and more meaningful than in those using "Self-regulation strategies, even though the "Objectivetest" did not reveal significant differences.^{49,50,51} Indian astrological Horoscopes of an individual classify persons into three categories- 1] Deva-gana [Deity-like full of virtues] 2] Manushya-gana [Human qualities] and Rakshasa-gana [Devilish traits]. It may be worthwhile to investigate if the "Short-term Meditators" showing "Deeper Experiences" [Early Responders] belong to Deva-gana. The extensive discussion about Integral Psychology and Consciousness research appears in Ken Wilber's "Spirit and consciousness."⁵²

TWO UNUSUAL INEXPLICABLE INSTANCES

1] Individual consciousness having effect on atmospheric consciousness- A group of meditators met regularly and meditated upon a single thought about peace in the world. Within a few months the crimes, violence, rapes and riots in Washington DC reduced by a magical 72%. When the meditation-sessions were stopped, the crime rate once again rose to the original level.⁵³

2] Dr. Hew Len's modification of Hawaiian Ho'oponopono [wishing well]:- Dr. Len was posted in one notorious psychiatric ward housing the most difficult cases with violent tendencies. No doctor could stay for more than 3 months. Staff turn over was rapid. Dr. Len did an innovation. In addition to the standard therapy, he administered something unusual. After the rounds he would sit in his chamber, take each patient's bed-record and addressed

with it with the words 'I am sorry. I love you' for some time. Within few months shackled patients were allowed to move freely. Heavy sedation for others was discontinued. Soon the staff outnumbered the patients. Today, the ward has been closed.⁵⁴

Russian thought-experiments have shown [Faraday cage experiment] that the thought-vibrations are very powerful and they can travel in the atmosphere for an infinite distance. It is possible that healing thoughts with laser beam single point focus [as told by sage Patanjali] may have brought these miracles.

2] PHENOMENOLOGICAL [EXPERIENTIAL]

RESPONSES: Such studies are relatively few but quite important^{55,56,41,57,58,59,60-64}. The experiential responses included 1] intense and labile emotions 2] awareness about how difficult it is to control the mind 3] losing concentration or becoming lost in fantasy 4] Experience of Self-transcendence and unity with others 5] a wide range of psychological insights or intuitive phenomena 6] reduced defensiveness and increased openness of the mind to the experience of peace, love, hope, happiness or power and 7] an altered state of consciousness from the restless to the peaceful and even mystical experiences [Sakshatkars]. Almost any "Experience" may occur during meditation when done with "Openness" and "Sensitivity." Patanjali describes sensitivity as ishwer-pranidhan, the total and unconditional surrender to the Supreme.¹

Some studies have reported some disturbing experiences eg. Tension, anger, perpetual changes in the sense about self and reality. But these are usually short-lived and remit spontaneously.⁶⁵⁻⁶⁹ In some cases, the "experiences" acted as psychological purging of repressed memories, past trauma and conflicts giving a beneficial effect.

Holtzman ink blot test and Rorschach effects provide objective evidence for the subjective phenomena eg. Capacity for empathy.^{41,46,70}, increase in field independence^{71,72}, increased and significant shifts in Rorschach effects⁷³ and synesthesia⁷⁴. The state of Synesthesia is a cross-

modality perception in which one sense-modality eg. Sound is experienced in other sense-modalities eg. sight, touch, smell and taste. It is very rare.

3] PHYSIOLOGICAL RESPONSES : Three kind of responses happen-

1] Biological Relaxation Response [BRR]- is notable finding described by Dr. Herbert Benson, an American cardiologist¹². This is a totally relaxed physical state which is associated with a totally relaxed as well totally focused mental state, "The zone." [Ekagra-chitta]. [Beyond Relaxation response]. Another book "With your maximum mind" in 1987,⁷⁵, reveals that the Relaxation Response when combined with hopefulness and mental strength derived from patient's Religio-spiritual beliefs and values gave much greater relief from stress and alcohol consumption. First Institute of Mind-Body Medicine [Behavioral Medicine] was founded in the same year. The Institute offers a one-week training programme for stress management for Healthcare Professionals. A similar one week's foundation course is available free of cost through more than 8500 BK-centres in 135 countries. The conference by the institute in 1995 "Spirituality and healing in Medicine" was unique. The book "The power and Biology of Belief" 1996⁷⁶ renames the "placebo effect" as "Remembered Wellness." This changes the negative perception with which Medical science perceives the Placebo effect. It now envisages its possible use as a powerful "Psychological tool" for therapy.

2] Improvement in immune functioning, potentiation of Natural Killer Cells and reversion of immune-suppression happens.¹⁹ Greater increase in anti-influenza antibodies found after vaccination⁸⁵.

3] Heart rate variability test [Breathing sinus arrhythmia] amplitudes increased significantly.^{54,77}

4] METABOLIC [BIOCHEMICAL] RESPONSES

Several Biochemical markers have been identified

1] Earliest ones include reduction in Basal Metabolic Rate [BMR] and Oxygen- consumption^{78, 79}

2] Unique patterns of blood levels of neuro-hormones-

Reduction in plasma lactate levels⁸⁰⁻⁸³, salivary and plasma cortisol levels^{84,85}, increase in plasma arginine-vasopressin,⁸⁶ “Feel Good Hormones” –GABA, Serotonin, Dihydro-epi-androsteron [DHEA] and enzyme choline esterase, encephalin, endorphins, melatonin, Brain Derived Neurotrophic Factor [BDNF] in 2003⁸⁸ and possibly Stem Cell Activation Factor [SCAF].The SCAF is in conceptual stage. But miraculous instances of rejuvenation may be a pointer to its existence.

Enkephalin – an immune-potentiator restores homeostasis and gives a “Reverse Transport of cholesterol, which may be the reason for miraculous disappearance of 100% blocks in coronaries.⁸⁷

Endorphin – a powerful natural pain killer and mood elevator. This may explain the beneficial effects of meditation in chronic pain,^{24, 94, 114, 120}in reduction of psychological distress in cancer patients⁸⁹, doubling of life-span and even cancer-free state⁷ Anxiety-panic disorders^{17, 90} in dermatological disorder with psychosomatic element like Psoriasis⁹¹, and in depression^{92, 93}.

BDNF [2003] is a recent discovery. It gives the miracle of hitherto unknown neurogenesis-regeneration of neurons providing a new strategy in Dementia including Alzheimer’s. Newer anti-depressants act by raising BDNF levels.^{53,88}

Melatonin – secreted by Pineal gland controls sleep – wake cycle and is a powerful anti-cancer agent as it blocks certain intermediate stages of cell-proliferation. Its production is highest at night and it is “Psycho-sensitive i.e. its production is enhanced by psychological intervention. A significant increase is observed in meditators. Intense and volcanic meditation gives highly enhanced levels of melatonin.⁹⁴This may explain the miraculous cures of Hepatitis C, Diabetes and end-stage cancer in the case of BK Dr. Chandrashekar. Melatonin has become an important marker in for different psychosomatic interventions including

Meditation for assessing the relevance of a particular therapy, especially in prostate and breast cancers. Meditation practice effectively cures insomnia⁹⁵.

The pineal gland is known as God’s spot as psychiatrists now believe that it is the seat of the soul.³Recent discovery of finding similarity in the structures of eye and the pineal gland and that of piezoelectric and piezochromatic crystals in the pineal is strange.¹²⁵ It envisages that a gland embedded in total darkness has the capacity to process photons or light-energy particles. It may explain how God’s messengers receive Divine signals, “Messages” for the benefit of the humanity. This is a common belief in almost all the philosophies.¹²⁶

5] RESPONSES OF AUTONOMIC NERVOUS SYSTEM [ANS]

Galvanic Skin Resistance [GSR] provides a measure of ANS-reactivity and stress-reactivity. GSR becomes reduced after a meditative practice.^{49, 96, 101} and more stable skin resistance observed⁹⁷.

6] RESPONSES OF THE BRAIN

These responses could be divided into three categories –

1] Electroencephalograph [EEG] patterns 2] Brain-function involving “Experiences” and 3] Assessment of focused concentration [Ekagra-chitta state].

EEG PATTERNS IN MEDITATORS

Three EEG patterns have been observed –

1] Slower alpha waves [8-13 cycles per second] preponderance
2] Greater alpha synchronization or coherence between Right and Left cerebral hemispheres
3] Advanced meditators show Theta wave pattern [4-7 cycles/second]^{78, 98, 99, 123}

These patterns are consistent with deep relaxation. Some meditators may show episodes of drowsiness or sleep. But these are less common than those in controls. Some slowing may persist even during non-meditative phase.⁷⁸

More discreet analysis shows –

- 1) The existence of “Specific patterns of synchronization not only between the two hemispheres but also within the individual hemisphere.”⁸²
- 2) Faster H-reflex recovery
- 3) Shorter latencies of auditory Evoked Potential [EP]^{86, 98, 101}
- 4) EEG response to repeated sounds [alpha-blocking or habituation] is absent in meditators.
- 5) High resolution EEG investigation shows anterior and frontal theta and lower alpha waves reflect emotionally positive state and an “Internalized attention”.¹²²

EEG Coherence Or Synchronization: The greater coherence suggests enhanced functional integration of operation and greater equalization of the work load in the two hemispheres.^{58,97,123} There is enhancement of Lateral thinking involved in intuition, innovation and creativity by the Right hemisphere and lessening of Linear thinking by Left hemisphere [in the right-handed persons] involved in raising questions and doubts and analysis leading to a profusion or diarrhoea of thoughts [waste and negative] and constipation of action¹⁰³. This is the famous “Mental silence” [Antar-mauna].

The slower alpha waves indicating “Resting brain activity” in the left Frontal/Central regions is greater in the meditators than in controls. This accounts for more positive and adaptive emotional styles [denoting Satvik/soul-consciousness]. Meditators may exhibit enhanced ability in the skills localized in Right hemisphere eg.- ability to remember and discriminate musical tones¹⁰⁴. In addition, EEG patterns may show greater capacity of the person to shift the consciousness from left to right or vice versa in response to the demands of a specific tasks [indicating fast adaptation and quick and correct instant decisions].¹⁰⁵

EEG –RESPONSE TO REPEATED SOUND [Alpha blocking and Habituation]-

Meditative practice of long duration [five years or more] confers an ability of continuous open receptivity to all stimuli eg repeated sound or others without showing Habituation indicated

by “Alpha blocking.” [This is famous “Yoga-nidra” in ancient scriptures indicating that only very few neurons are active and remaining are in rejuvenating rest]. During meditation session or a Relaxation strategy in use, a bell is rung at at fixed intervals. Non-meditators showed alpha-blocking and habituation within three to five rings. The alpha blocking did not happen in the meditators who practiced for five or more years.¹⁰⁰

2] BRAIN-FUNCTION STUDIES INVOLVING EXPERIENCE [ANUBHUTI]: Various experiences that happen in a meditative process are four in number-

- 1] Wellness¹⁰⁶
- 2] Relaxation⁸⁵
- 3] Heightened alertness and attention along with physiological rest^{102,4} a “Transcending Experience”, This is defined as taking the mind away from the prevailing thought [which are often negative or a waste or painful] to an elevated [Shreshtha] state of consciousness with finer, refined, powerful, pure and positive thoughts [described as Satvik or Soul-consciousness in Bhagavad Gita].

Transcending Experience- differs from other “Experiences” in that it shows some unique features eg. 1] significantly lower respiratory rates, 2] Higher amplitudes in respiratory sinus arrhythmia 3] higher EEG alpha amplitude and 4] greater alpha coherence.

These patterns show that a “Transcending Pattern may involve “Smearing” of recognized physiological patterns. Thus it becomes imperative for a meaningful and precise “Meditation research” to simultaneously study “The EEG patterns” along with an ANS pattern and “Subjective experience” throughout a meditation session.

- 3] ASSESSMENT OF BRAIN-FUNCTION INVOLVING FOCUSED CONCENTRATION [EKAGRA CHITTA STATE]: This response to meditation was studied using Single-Photon-Emission-Computed-Tomography [SPECT] for measuring regional Cerebral Blood Flow [rCBF].

Significantly increased rCBF was found in inferior and orbital frontal cortex which indicated focused concentration. Thalamic increases indicate an overall increase in cortical activity during meditation. Significantly higher rCBF was also found in Dorso-Lateral Pre-frontal Cortex [DLPFC]. Its correlation with reduced rCBF in left superior parietal lobe indicates the "Altered sense of space" during meditation.⁶⁸ This may be one of the components of "Transcendental Consciousness" experienced during sleep by the meditators.^{68,123}

Patanjali Sutras describe a concept of "Yoganidra or "Wakeful Consciousness" in a state of deep sleep or/more precisely, rejuvenating/rest.⁵ The "Unique EEG Signature" during meditation supports the claim that it is possible to develop an "Alert Mental State of Transcendental Consciousness] during deep sleep, which Western Psychologists have long dismissed as impossible. The "Alert Experience" has also been observed in "Lucid-Dreaming" and "Lucid Non-dream" states. The development of lucidity offer a valuable support to the concept of phenomenon called "Spiritual Enlightenment" in the form of mystical experiences [Sakshatkars} and Clairvoyance [Trikaal-darshi] in ancient Indian scriptures.

In conclusion, all of such findings open up an entirely new field of NEURO-THEOSOPHY OR PSYCHO-PHYSIOLOGY on the lines of Psycho-neuro-immunology or Psycho- oncology.

SUGGESTED GUIDELINES FOR THE FUTURISTIC STUDY-DESIGNS FOR MEDITATION

1] Formulation of a precise definition of Meditation to differentiate this complex process with multi-faceted benefits from the "Self-regulated Relaxation strategies."

2] The studies need to include phenomenological or "Experiential evidences" in the study along with "ANS" and "physio-psychological responses."

3] Facet of "Self-liberation" [from pain, suffering and transcendence] which remains the original purpose of "Indian Integral Yoga"

[Patanjali] may also be taken into account. This means that there is a need to clearly understand the phenomenon called as Consciousness[Chitta] and its various forms.eg.God-consciousness, Soul-consciousness,Body-consciousness, Non-thought consciousness, supra-mental consciousness, Transcendental consciousness The process of Self-liberation includes development of virtues [Divya-guna].

Some of the studies include these Divya-guna- eg 1] Compassion, co-operation, mutual understanding and empathy [great need of these virtues in doctors today],^{41,108}, 2] Taking responsibility for the acts [Karma], improvement in Self-actualization⁹⁷, 3] Sense of coherence and Stress-hardiness^{24, 114, 118}, Happiness in life¹¹⁷, increased autonomy and independence⁴³, a positive sense of control³⁹, increased "Moral Maturity"⁴², and increased spirituality.^{109, 124} Positive behavioural effects include 1] Heightened perception [visual sensitivity and auditory activity, improvement in "Reaction Time" and responsive motor skills ,increased field independence, increased concentration and attention, 2],improvement in all aspects of intelligence eg. School grades, learning ability, and short-tem and long-term recall and memory,^{110,111,112} and some forms of creativity¹¹⁹.

4] Precise definition of Self – The term "Self" is being used very loosely eg.Self-actualization, Self-determination, Self-empowerment, Self-regulated etc. without the clarity in understanding the real meaning of Self. So a reference to Bhagavad Gita, Patanjali Sutra and BK-Rajayoga concepts, which are a precise and easy to understand re-mix of knowledge from Gita and Patanjali, appears to be necessary in Meditation research.

5] Lack of exact details about a meditation practice often quoted as a "Mindfulness Programme" in different studies remains a unresolved enigma making the comparisons of different studies very difficult. The step-wise details need to be specified.

6] The studies need to specify about whether the Meditation process under study is a “Relaxation oriented practice” or “Experience oriented and mental-silence oriented Meditation” to make the Conclusion more meaningful.

7] Four categories of participants may be included – 1] Non-meditators 2] Non-meditators practicing “Self-regulated Relaxation technique 3] Meditators of short duration [less than 2 years] and 4] Meditators of long duration [five years or more].Time-frame of the meditative practice is very important.

8] Shifts of consciousness – eg Non-thought-consciousness, Body-consciousness which include Rajasik and Tamasik consciousness, Satvik or Soul-consciousness, Transcendental consciousness, God-consciousness” need to be included to match the Western scientific approach with the Eastern Consciousness oriented strategies.

A common error that needs rectification- is “Pathologizing Meditative Experiences”. The psychiatrists or the clinicians who are not aware about the “Trans-personal possibilities” easily misdiagnose a transpersonal experience as psychosis or neurosis. “Trans-personal progression” and “Elevation of consciousness” are often quickly dismissed as “Pre-personal Regression”. Alternatively a psychosis may be mistaken for “Spiritual Opening and spiritual evolution”. All of these could be devastating for the participants,^{114,115,116} and tragic for Meditation research.

9] Other often repeated errors include lack of randomization, lack of follow-up, improper measurements of the constructs and very small sample-size.

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Obesity And Type 2 Diabetes Mellitus In Adolescents - A Review

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Abstract: Obesity is highly prevalent in the modern world and it is associated with the development of a number of serious medical complications, like type 2 diabetes and cardiovascular diseases. Earlier, type 2 diabetes mellitus (T2DM) was regarded as a disease occurring in adults, while type 1 diabetes mellitus (T1DM) occurs in children and adolescents. This is true that T2DM is still more prevalent in adults, but there is increasing evidence that onset of type 2 diabetes in youth is frequently observed. Obesity increases the risk of T2DM by causing insulin resistance and directly or indirectly affecting the ability of the pancreas to secrete adequate amount of insulin. However, several risk factors have been identified as contributors to the development of type 2 diabetes in adolescents. These factors include ethnicity, genetic, unhealthy diet, inadequate sleep, physical inactivity and increased body fat and abdominal fat. There is no clear explanation of how these factors increase risk, but they appear to act in an additive fashion and create problems during the critical period of adolescent development. So efforts should be done to reduce the obesity will lower the risk of type 2 diabetes in children and adolescents.

Key Words: Obesity, Type 2 diabetes, Adolescent

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Introduction: Obesity is associated with significant health problems in adults have been well recognized but little attention has been paid to childhood and adolescent obesity. Obesity has been a rapidly developing medical and public health problems over the past few decades and excess body weight is the sixth most important risk factor contributing to the overall burden of disease worldwide¹. Obese and overweight population has been increased more dramatically in economically developed countries and in urbanized populations.

Developing countries, like India, undergoing a rapid nutritional transition, from prevalence of underweight children to overweight children due to changes in quality of food, availability of high calorie food and sedentary life style². As the prevalence of childhood obesity increases, its health implications are becoming more evident^{3,4}. Childhood obesity frequently persists into adulthood. Many of the metabolic and cardiovascular complications of obesity are already present during childhood and are closely related to the presence of insulin resistance/hyperinsulinemia, the most common abnormality of obesity⁵. Over the past 20 years, Pediatric diabetologists and other health workers have recognized an emerging epidemic of type 2 diabetes among children and

adolescents. This is due to increase prevalence of obesity⁶.

A study indicates that the conversion into diabetes from prediabetic conditions is enhanced by low thresholds for the risk factors such as age, BMI and upper body adiposity. Indians have a genetic phenotype characterized by low BMI, but with high upper body adiposity, high body fat percentage and high level of insulin resistance⁷. With this low BMI, but with high body fat percentage, there is increased prevalence rate of metabolic perturbations and DM, which is one of the cardiovascular risk factors.

Risk Factors For Type 2 Diabetes Mellitus: The prevalence of overweight⁸ and central adiposity⁹ in childhood and adolescence has increased dramatically in recent years. Excess adiposity is considered a major risk factor for development of type 2 diabetes in youth^{10,11}. Cross-sectional, longitudinal and experimental studies conducted in human populations across the world identified the various risk factors for youth type 2 diabetes mellitus. The important risk factors are listed below:

A. Non-Modifiable Risk Factors

1. Age
2. Ethnicity

3. Genetic Influence and family history

B. Modifiable Risk Factors

1. Unhealthy Life Style

- Unhealthy Diet
- Sleep Disorders/ Inadequate Sleep
- Physical Inactivity

2. Obesity

3. Hypertension

Influence of age on blood glucose level: Not long ago, type 2 diabetes mellitus (T2DM) was regarded as a disease of adulthood, with type 1 diabetes (T1DM) accounting for almost all cases seen in children and adolescents¹². While it is true that T2DM is still more prevalent in adults, there is increasing evidence that onset in youth is frequently observed¹³. This relatively new phenomenon, strongly associated with the escalating prevalence of obesity, brings a serious new aspect to the diabetes epidemic.

Ethnic influence of blood glucose level: The highest incidence of T2DM in youth in the USA is evident in African-Americans, Native Americans, especially Pima Indians, and Hispanics^{14,15,17}. Studies have shown that Black children and Hispanic youth are hyperinsulinemic and insulin-resistant compared with their white peers^{18,19}. These racial differences could be attributable to genetic differences²⁰ or to environmental/cultural differences¹⁸. Moreover, differences in adiponectin levels, lower in Blacks, may be a biological marker which predisposes them to a greater risk of insulin resistance^{21,22}. In the presence of such racial differences in risk of T2DM, it remains to be determined if the natural history and the progression to T2DM differ between different racial groups.

Genetic influence on blood glucose level: Although few susceptibility genes have been identified so far, a very recent finding points towards a gene locus that dramatically increases the risk of T2DM in Icelanders, Danes and a US cohort, specifically a variant of transcription factor 7-like 2 (TCF7L2) gene²³. The genetic component of T2DM is evidenced by the strong heritability of the disease²⁴. A strong family history of T2DM is present in most

pediatric patients regardless of ethnic background²⁵. The studies demonstrated that black African-American children with a family history of type 2 diabetes have 25% lower insulin-stimulated glucose disposal compared with black children without a family history of type 2 diabetes²⁶. White children who do not have diabetes, but have a positive family history of the disease, have lower insulin sensitivity with inadequate β cell compensation in insulin secretion compared with youngsters without a family history of diabetes²⁷.

Unhealthy diet and blood glucose level:

Adoption of a western lifestyle is strongly associated with type 2 diabetes. Obesity and lack of physical activity are known to be major determinants, but evidence also suggests that dietary factors play a role in the development of type 2 diabetes²⁸. People eat meals mixing different foods, instead of isolated nutrients, giving several nutrients a chance to interact. These interactions between nutrients may potentially confound dietary studies. Several epidemiological studies conducted in relatively homogenous populations (predominantly white cohorts) have evaluated associations between dietary patterns and type 2 diabetes²⁹⁻³³. Generally, studies show that dietary patterns characterized by high whole grain, fruit/vegetable and low-fat dairy intake are inversely associated with type 2 diabetes risk. Analogously, dietary patterns characterized by high intake of red or processed meats, refined grains, fried foods and foods containing high amounts of added sugars are associated with greater type 2 diabetes risk. Study of Nettleton JA using participants from the Multi-Ethnic Study of Atherosclerosis (MESA) has evaluated that multiple food groups collectively influence type 2 diabetes risk beyond that of the individual food groups themselves³⁴.

Sleep duration and blood glucose level: The experimental study by Spiegel et al.³⁵ showed that restricted sleep in 11 healthy young men to 4 h per night for 6 nights and then allowed them to have a sleep recovery period of 6 nights. Despite the short duration of partial sleep deprivation, the subjects in that study

demonstrated impaired glucose tolerance, higher cortisol levels, increased sympathetic nervous system activity. Another study demonstrated that there was a reduction in leptin secretion in the sleep-deprived individuals versus the recovery state³⁶. The Nurses Health Study in 2003³⁷ showed that Long and short sleep durations were associated with an increased risk of diabetes. Community based prospective study by Gottlieb DJ et al. showed metabolic effects of habitual sleep restriction. A sleep duration of 6 hours or less and long sleep duration of 9 hours or more, both are associated with increased prevalence of diabetes and impaired glucose tolerance³⁸. A prospective cohort study of middle-aged and elderly men by Yaggi HK in 2006³⁹ observed that there is a significant U-shaped relationship between self-reported sleep duration and incidence of type 2 diabetes. Men reporting either short (≤ 5 or 6 h of sleep per night) or long (>8 h of sleep per night) sleep duration were at significantly increased risk of developing diabetes. These elevated risks remained after adjustment for age, hypertension, smoking status, self-rated health status, and education. Short and long sleep durations increase the risk of developing diabetes, independent of confounding factors. Thus sleep duration may represent a novel risk factor for diabetes.

These results suggest that habitually short sleep results in a reduction in insulin sensitivity, and therefore, could be a risk factor for the later development of diabetes. In contrast to that our study indicates that inadequate sleep duration at night (< 7 hrs) does not affect the blood glucose level of the Gujarati Indian adolescents⁴⁰. The studies also indicate a possible association between sleep duration and risk of being overweight or obese in adolescents. Short sleep could lead to weight gain, but overweight or obesity could also lead to an inability to obtain sufficient amounts of sleep. Another study by us indicates that the sleep deprivation affects the body composition of the Gujarati adolescents and predisposes them to overweight and obesity⁴¹. So probable mechanism may be that the sleep deprivation leads to overweight and obesity and

subsequently leads to diabetes. As another study by us in 2009 showed that body fat percentage affects the blood glucose level in adolescents⁴².

Nurses health study observed that short self-reported sleep duration was significantly associated with the diagnosis of diabetes until BMI is controlled but, once BMI was added into the model, the association between diabetes diagnosis and short sleep was no longer significant. This finding could be due to two reasons. First, short sleep may lead to diabetes due to weight gain, as a high BMI may worsen sleep quality by creating a prediabetic state with increasing urination. Second, sleep restriction may directly lead to the development of diabetes through its effects on weight. Hypothesis behind this is that, if chronic self-imposed sleep restriction occurs that leads to reductions in leptin, so appetite and weight gain may be increased. This could thus represent a physiologic mechanism whereby sleep restriction may predispose to weight gain and subsequently contribute to the development of diabetes³⁷.

Physical activity and blood glucose level:

Obesity and physical inactivity are well-known risk factors for the development of type 2 diabetes⁴³⁻⁴⁵. However Rana JS et al. found that obesity and physical inactivity independently contribute to the development of type 2 diabetes; however, the magnitude of risk contributed by obesity is much greater than that imparted by lack of physical activity⁴⁶. Epidemiologic studies and clinical trials suggest a strong association between physical inactivity and incident type 2 diabetes^{45,47,48}.

The Da Qing Impaired glucose tolerance (IGT) and Diabetes Study⁴⁷ was the first randomized trial evaluating lifestyle interventions for the prevention of type 2 diabetes. In this study, 577 people with IGT from 33 clinics were randomized, by clinic, to diet only, exercise only, diet plus exercise, or control. After 6 years of follow-up, cumulative incidence of type 2 diabetes was 68% in control, 44% in diet only, 41% in exercise only, and 46% in diet plus

exercise groups. This study provides evidence that both diet and exercise can be effective diabetes prevention modalities, although their effects were not additive.

More evidence for the effectiveness of lifestyle interventions comes from two randomized controlled trials: the Finnish Diabetes Prevention Study^{49,50} and the U.S. Diabetes Prevention Program (DPP)^{51,52}. In the Finnish Diabetes Prevention Study^{49,50}, 522 overweight subjects, aged 40–65 years, with IGT were randomly assigned to a lifestyle intervention or control group. The goals were to reduce weight by at least 5%; perform moderate-intensity exercise at least 30 min/day; limit total and saturated fat intake to <30 and <10%, respectively, of energy consumed; and increase fiber intake to ≥ 15 g/1,000 kcal. Intervention group subjects had 1-h meetings with a dietitian seven times in the first year and every 3 months subsequently. Subjects in the intervention group were also offered an individualized exercise plan, thrice-weekly supervised facility-based aerobic and resistance exercise for 6–12 months free of charge. The cumulative incidence of type 2 diabetes was 11% in the intervention group and 23% in the control group.

Obesity and poor physical fitness constitute a health problem affecting an increasing number of children also. The Diabetes Prevention Program demonstrated a reduction in the incidence of diabetes in high-risk adults with lifestyle intervention. For children, the most successful programs are those that incorporate additional exercise or promoting healthy nutritional changes into the children's lifestyles, such as within the family or the school environment. Carrel AL showed that children who enrolled in fitness-oriented gym classes showed greater loss of body fat, increase in cardiovascular fitness, and improvement in fasting insulin levels than control subjects⁵³.

The study by Ferguson MA⁵⁴ on 79 obese, but otherwise healthy children to determine the effect of exercise training (ET) on components of the insulin resistance syndrome (IRS) in

obese children found that Plasma triglycerides, fasting insulin and percentage body fat of the IRS are improved as a result of 4 months of ET in obese children. However, the benefits of ET are lost when obese children become less active. The cross sectional study on 421 black and white high school students⁵⁵ to observe how moderate and vigorous intensities of physical activity (PA) are associated with cardiovascular fitness (CVF) and percentage of body fat (%BF) showed that a higher index for CVF was associated with higher amounts of moderate and vigorous PA. Lower %BF was associated with higher amounts of vigorous PA but not with the amount of moderate PA. This suggests that adolescents who engaged in relatively large amounts of vigorous exercise were likely to be fit and lean and so there consequences like diabetes become also less.

Obesity and blood glucose level: Globalization has profound effects on health worldwide and we face huge public health challenge from both obesity and type 2 diabetes, from childhood to old age. Obesity has reached epidemic proportions globally. There is a strong association between obesity and type 2 diabetes mellitus, in both genders and all ethnic groups. Body composition especially the amount of adipose tissue has a significant effect on type 2 diabetes. The risk of diabetes increases with increasing BMI values in men and women. Data from the Nurses' Health Study showed an age-adjusted relative risk of 40 for diabetes in women with a BMI ≥ 31 kg/m², compared with women with a BMI <22 kg/m²⁵⁶). A similar risk was shown for men in the Health Professionals Follow-up Study: a BMI of ≥ 35 kg/m² was associated with an age-adjusted relative risk for diabetes of 60.9, compared with a BMI of <23 kg/m².⁴³ In addition, weight gain appears to precede the development of diabetes.

The importance of obesity as a risk factor for diabetes in the presence of other risk factors is underlined by a recent report from Israel. In a cohort of relatively young men in the Israel Defence Forces who were subjected to regular physical examinations, the combination of a

fasting plasma glucose in the high-normal range (91–99 mg/dl) and a BMI of $>30 \text{ kg/m}^2$ was associated with a hazard ratio of 8.29 for developing diabetes, compared to those men with a BMI $<25 \text{ kg/m}^2$ and a fasting plasma glucose $<86 \text{ mg/dl}$ ⁵⁷. Increases in abdominal fat mass, weight gain since young adulthood, and a sedentary lifestyle are additional obesity-related risk factors for diabetes^{56,58}.

The CAD and coronary risk factors hypercholesterolemia, hypertension, diabetes mellitus and sedentary life style were significantly associated with high and moderate body fat percent despite low body mass index⁵⁹. Another studies suggested that insulin sensitivity has gender dependent changes during puberty. It is, thus, possible that these pubertal changes in insulin sensitivity relate to changes in body composition⁶⁰.

Obesity and blood glucose level in Adolescents: Overweight/obesity continues to increase in children and adolescents. Overweight children and adolescents are now being diagnosed with impaired glucose tolerance and type 2 diabetes, and they show early signs of the insulin resistance syndrome and cardiovascular risk. Several risk factors have been identified as contributors to the development of type 2 diabetes and cardiovascular risk in youth and one of these factors include increased body fat and abdominal fat. National Health and Nutrition Examination Study (NHANES) 1999–2000 data suggest that the prevalence of overweight was 15.5% among 12 to 19-year-olds, 15.3% among 6 to 11-year-olds, and 10.4% among 2 to 5-year-olds, compared with 10.5%, 11.3%, and 7.2%, respectively, in 1988-1994 (NHANES)⁶¹. Other studies show steady increases in overweight and obesity over the period 1986–1998, especially in Hispanic and African-American children⁶². By 1998, the prevalence of a BMI above the 85th percentile for age and gender had risen to 35% in Hispanic and African-American children and just over 20% in Caucasian children⁶². Although no national data are available, the prevalence of risk of overweight is also widespread in India. The

overall prevalence of obesity and overweight was 11.1% and 14.2% respectively. The prevalence of obesity as well as overweight was higher in boys as compared to girls (12.4% vs 9.9%, 15.7% vs 12.9%). Prevalence of obesity decreased significantly with age, from 18.5% at 9 years to 7.6% at 14 years, rising at 15 years to 12.1%. Significantly more children from higher socio-economic status were obese and overweight than those from lower socio-economic status groups⁶³.

Of even greater concern is the fact that type 2 diabetes has now emerged as a critical health issue in overweight children, especially within minority overweight African-American, Hispanic American, and Native American adolescents⁶⁴. Several clinical observations suggest a large increase in the incidence of type 2 diabetes in children and adolescents¹¹, with one study reporting a 10-fold increase between 1982 and 1994¹⁴.

Many population-based studies conducted in high-risk pediatric populations estimated the prevalence of type 2 diabetes. The prevalence estimates of type 2 diabetes were 5% (CI 3.2–6.9) for Pima Indians aged 15–19 living in Arizona¹⁶. From 1966–1976 to 1987–1996, the prevalence increased fourfold for Pima Indian children aged 10 to 14 years and sixfold for children aged 15 to 19 years. The Third National Health and Nutrition Examination Survey (1988–1994) examined a representative sample of the U.S. population, which included adolescents aged 12–19 years who had serum glucose measured and estimated prevalence of diabetes. The estimated prevalence of diabetes per 100 adolescents ages 12–19 years was 0.41% , the prevalence of impaired fasting glucose was 1.76% and the prevalence of elevated HbA_{1c} was 0.39%⁶⁵.

The clearest factor contributing to increased risk of type 2 diabetes and cardiovascular disease in children and adolescents is increased body fat, and possibly specific depots of body fat. Some of the earliest evidence for this came from the Bogalusa Heart study that showed weak, but significant correlations ($r = 0.3\text{--}0.4$) in

children between central body fat (measured by skinfolds) and fasting insulin⁶⁶. Later work⁶⁷ using more precise measures of body fat found higher correlations in 10-yr-old children between percentage body fat and fasting insulin ($r = 0.78$). Additional studies using other measures, in addition to fasting insulin, showed that insulin and the insulin-to-glucose ratio were significantly higher in obese versus control group boys during a oral glucose tolerance test⁶⁸. The study by Gower BA in 1999 showed that visceral fat has unique metabolic effects on fasting insulin but not insulin sensitivity and that this effect was independent of other fat compartments and also has shown high inverse correlations between insulin sensitivity and body fat mass across the spectrum of lean and obese prepubertal boys and girls²⁰. Another study was done by Goran MI to examine whether total body fat in general or visceral fat in particular was associated with greater metabolic risk in Caucasian and African-American children⁶⁹. The influence of total body fat and visceral fat on insulin parameters was examined by comparing subgroups of children with high or low fat vs. high or low visceral fat and showed that body fat in general is the predominant factor influencing insulin sensitivity, but visceral fat may have additional effects on fasting insulin. Similar effects were shown in a later longitudinal study⁷⁰. These data tend to support the hypothesis that in children, total body fat mass may influence insulin sensitivity, whereas visceral fat may influence fasting insulin.

Summary: Overweight/obesity continues to increase in children and adolescents. Overweight children and adolescents are now being diagnosed with impaired glucose tolerance and type 2 diabetes, and they show early signs of the insulin resistance syndrome and cardiovascular risk. Several risk factors have been identified as contributors to the development of type 2 diabetes and cardiovascular risk in youth. These factors include ethnicity (with greater risk in African-American, Hispanic, and Native American children), genetic, unhealthy diet, inadequate sleep, physical inactivity and increased body fat

and abdominal fat. There is no clear explanation of how these factors increase risk, but they appear to act in an additive fashion. We hypothesize that the constellation of these risk factors may be especially problematic during the critical period of adolescent development, especially in individuals who may have compromised-cell function and an inability to compensate for severe insulin resistance.

Efforts to reduce childhood obesity could play an important role in preventing the spread of type 2 diabetes mellitus in the pediatric population. Government and communities should take care to cultivate environments where children are encouraged to make healthy lifestyle choices. Children should be educated on appropriate diet and exercise habits from preschool through high school. In-school intervention efforts may include 30 to 45 minutes of vigorous physical activity two or three times per week. Serious long-term approaches for primary prevention are needed to address this growing problem.

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Abstracts

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Effect Of Age And Gender On Median Nerve Conduction Study

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Background And Objectives: A number of physiological variables are known to affect the results of nerve conduction study. The purpose of the present study was to investigate the effect of age and gender on Median nerve conduction study. **Materials And Method:** Place of study: Electrophysiology Laboratory, Dispur Hospitals, Guwahati Period of study: 1st August, 2012 to 30th September, 2012. The clinical and electrophysiological records of 174 patients who attended the laboratory for nerve conduction study during the study period were evaluated retrospectively. 125 patients were excluded on the basis of the following Exclusion criteria: 1. History of systemic disease – Diabetes Mellitus, Hypothyroidism, Hypertension, Systemic neurological disorder 2. History of neurological symptoms involving upper limbs 3. Neurological examination showing involvement of upper limb nerves The remaining 49 patients (23 males and 26 females) with a mean age of 55.73 ± 11.80 years were included in the study. The following electrophysiological parameters were studied: 1. Median motor nerve conduction: Distal Latency, Amplitude and Conduction Velocity 2. Median sensory nerve conduction: Onset Latency, Amplitude and Conduction Velocity 3. Median F-wave Latency **Results:** 1. The Median CMAP amplitude was higher in males ($8.25 \pm 2.39 \mu\text{V}$) compared to females ($6.52 \pm 2.30 \mu\text{V}$) 2. F-wave Latency was longer in males ($27.52 \pm 1.85 \text{ms}$) compared to females ($25.52 \pm 1.86 \text{ms}$) 3. Median SNAP amplitude was higher in females ($27.71 \pm 14.77 \mu\text{V}$) compared to males ($23.70 \pm 11.37 \mu\text{V}$) 4. Subjects were divided into 4 age-groups. It was seen that with increasing age, Latencies became longer, Amplitudes became smaller and Conduction became slower. 5. A moderate negative correlation was found between age and the following parameters: a) Median motor nerve conduction velocity ($r = -0.362$) b) Median SNAP

amplitude ($r = -0.424$) c) Median sensory nerve conduction velocity ($r = -0.381$) 6. A strong positive correlation was found between age and F-wave latency ($r = 0.509$) **Conclusion:** Age and gender have been shown to affect the nerve conduction study parameters. A follow-up study with a large number of healthy subjects and including nerve conduction studies of other nerves (Peroneal, Ulnar, Sural) will help establish a better understanding of the impact of different physiological variables on nerve conduction study.

Effect Of Age And Sex On Hearing By Pure Tone Audiometry

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Background and objectives: Hearing loss is known to vary from place to place and country to country in both the sexes with increasing age. There is scarcity of such information in India, and even no study was available from the Ghaziabad belt of north India. This consideration prompted the undertaking of a study on hearing impairment in the local population in various age groups at Ghaziabad in both sexes. **Materials and Method:** Total sample of 150 cases were taken into consideration falling between the Age group of 15 yrs – 80- Yrs of either sex coming to outpatient department of Otorhinolaryngology at Santosh Medical College and Hospital, Ghaziabad. Sample population was divided into four group's basis age. Group I: 15 yrs – 25 yrs, Group II: 26 yrs – 40 yrs, Group III: 41 yrs – 60 yrs, Group IV: 61 yrs – 80 yrs. Hearing tests were carried out in a sound proof room. Selection of cases was done on certain inclusion and exclusion criteria. Selected patients medical and occupational history was taken into consideration along with general physical examination, systemic examination and local ear examination. Tuning fork test and pure tone audiometry was done by the portable audiometer-ELKON EDA 3N3 audiometer. **Observation and results:** Women had better hearing than men, but with advancement of age both in men and women abnormal fall in hearing threshold was seen. Gradual mean drop

in hearing takes less time in women at old age than in men, suggesting faster decrease in hearing acuity at old age in women. Hearing loss most pronounced at higher frequencies for both sexes at old age but men had on the average 10 dB greater hearing loss at 8000 Hz than women. **Interpretation and conclusion:** In men at higher frequencies from 2000 to 8000 Hz in Group III and IV there was more fall in hearing threshold., women at lower frequencies of 125 to 1000 Hz have more decrease in hearing threshold than men. This implies that between age of 41 to 80 years women hear better at higher frequency and men hear better at lower frequencies. Ratio of hearing impairment between male/female from 41 to 60 years (Group III) is 1.35, whereas from 61 to 80 years (Group IV) it is 1.16, meaning that men have more often hearing loss with advancing age than women. This may be because males receive more noise exposure than females or may be females are biologically superior to males in high frequency hearing. This study will also help us in deciding compensation to those workers who are working in places having noise pollution at Ghaziabad and developed hearing loss more than expected as per their age.

Birth Weight And Lung Functions In Male Adolescents

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The aim of this comparative retrospective cohort study was to examine the associations between birth weight and lung function in cohort of 70 adolescent male children aged 12–16 years. The subjects, born in nursing homes located in vicinity of the institution having their complete birth records were traced. They were male children between ages of 12–16 years. Lung function parameters were measured using a portable spirometer DATOSPIR 120 B. The corrected mean difference (95% confidence interval) in forced vital capacity (FVC) was –0.19 ml (–0.55 to 0.16) this was significantly lower in low birth weight group (LBW) as compared to normal birth weight children. All other lung

function parameters were not significantly different in the two groups. We did not find a significant association between birth weight at term and lung function parameters in the adolescent age group. While mean FVC which was found to be lower in LBW group in our study might be due to programming in infancy rather than intrauterine life. Our results did not support Barker Hypothesis according to which adverse influences during intrauterine life result in increased disease risk in ‘adulthood.

Key words: birth weight lung functions adolescents

Attitude Of Students Towards Physiology In A South Indian Medical College

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Medical education is currently undergoing noticeable transformation. Medical educationists have long argued that medical students are “adult learners” who should take an active role in their own education, rather than being passive learners. Objective of this study is to evaluate the study habits of medical students regarding how they learn the basic science physiology & suggest how that may be improved. Two hundred and seventy six medical students of SVMC, Tirupati were asked to fill in a questionnaire enquiring about different aspects of how they learn physiology. Out of 276, 143 were 1st year & 133 were 2nd year medical undergraduates. 96% of students said that lectures are essential. 86% were of the opinion that they need tutorials to learn physiology but only 67% will attend if no attendance is taken. 86% of 1st year & 89% of 2nd year students said that practical classes are very useful. Both juniors and seniors preferred Textbook of Medical Physiology by Guyton as main reference, 59% use internet to get physiology information, 6% have ever referred a scientific journal and 61% are interested to attend a conference in their undergraduate period. Only 19% approach teachers in case of difficulty and 79% make use of question papers

of previous exams to guide them study physiology. In conclusion, students are sure that studying physiology is relevant to their goal of becoming doctors. They are motivated and practice a mixture of learning styles that are partly teacher – centered and partly student – centered. Use of references, consultation among themselves to solve problems and use of online resources are some of the student – centered activities, but the teacher – centered activities like lectures still play a major role to motivate & guide them in learning physiology.

Comparative Study Of Heart Rate Recovery In Active And Passive Positions After A Submaximal Exercise

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Aim and objectives: Physical exercise is associated with parasympathetic withdrawal and increased sympathetic activity resulting in heart rate increase. Post-exercise heart rate recovery (HRR) and heart rate variability (HRV) are commonly used to assess non-invasive cardiac autonomic regulation and more particularly reactivation parasympathetic function. The purpose of this study was to compare the effect of two different post-exercise recovery Method, active and passive, on the heart rate (HR) after a submaximal exercise test.

Materials and Method: Thirty healthy male students of mean age 25 +/- 5 (20-30) years were enrolled in this study. Each participant performed a submaximal cycle exercise test on two occasions followed by 5 min: 1) active (cycling) recovery in the upright seated position, 2) supine position. The heart rate recovery (HRR) was assessed as the difference between the peak exercise HR and the HR recorded following 60 seconds of recovery (HRR60).

Results: It showed supine recovery resulted in significantly lower HRR60 ($p < 0.01$). Significant difference was found in HRR for active recovery in the seated position and the supine position ($p < 0.05$). **Conclusion:** HR following 60 seconds of recovery was less in supine position

compared to upright seated position. The supine position accelerated HRR compared with the seated position. Active recovery in the upright seated position was associated with slower HRR compared with supine recovery.

Key words: Heart Rate Recovery, active recovery, physical exercise.

Effect Of Exposure Of Cleaning Agents On Pulmonary Function Tests In Safai Karamchari

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The health conditions of workers all over the world vary widely, depending on the geographical location, type of employment and the patterns of work including chemicals, biological agents, physical factors and adverse ergonomic conditions. In recent years cleaning agents has been identified as a risk because of an increased incidence of asthma and asthma like symptoms among cleaning workers. The aim of present study was to evaluate lung functions among Safai Karamchari and to compare pulmonary function parameters with the control group. 30 Safai Karamchari who work at the NIMS university Hospital and equal number of control subjects were included for the study. The case and control subjects had similar age, sex and non smoking habits. The questionnaires were administered to know the duration and type of exposure. The pulmonary function tests were recorded by using computerized spirometry. Dynamic lung volumes and capacities (FEV_1 and FVC) were significantly reduced, $FEF_{25\%-75\%}$ and FEV_1/FVC ratio were also reduced in Safai Karamchari when compare with control. Hence the cleaning agents produce changes in the lung functions of Safai Karamchari. And are risk factors for development of respiratory diseases like asthma. The further study is needed to identify the specific exposures responsible for altered lung functions in Safai Karamchari working in hospitals.

Key Words: Pulmonary Function test, Safai Karamchari, Cleaning agents

Study Of Body Composition In Different Age Group People Having Sedentary Lifestyle

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Body Fat is essential, but too much body fat results in obesity. Energy intake in excess of energy output leads to fat deposition. Aim of our study was to assess body fat % by Bioelectrical Impedance Analysis (BIA) method, to compare body fat % between different age groups and to discuss the effect of advancing age on body fat %. The study was carried out in 120 subjects with sedentary life style which were categorized into four groups according to age (Group I - 20 to 29 yrs, Group II - 30 to 39 yrs, Group III - 40 to 49 yrs, Group IV - 50 to 59 yrs). Body fat % was assessed by Bioelectrical Impedance Analysis method. We found that with advancing age body fat % was increased; but increase in body fat % was statistically more significant when compared between Group I and Group II which may be because of lack of exercise, fad diets and stress.

Key Words: Body Fat, BIA, Sedentary Lifestyle.

Evaluating Body Composition By Bio-Electric Impedance Analysis In Ambulatory Type 2 Diabetics Of An Urban Area Of Gujarat, India

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Background & Objectives: Obesity and type 2 diabetes are closely related and as such both affect components of body composition which can be studied by various non-invasive tools available. There is a spectrum of Method available to assess body fat and muscle composition as simple as BMI and as advanced

as MRI. Bio-electrical impedance analysis (BIA) is a simple, validated, cost-effective, fairly accurate and objective method to assess distribution of the same and it is really handy one for evaluating type 2 diabetics for whom managing optimum body composition is a part of therapeutic aim and a measure of prognostic betterment. **Aim:** We try to study body composition of type 2 diabetics in comparison to matched controls and to correlate differences observed if any. **Materials and Method:** A heterogeneous sample of 70 under treatment ambulatory type2 diabetics of either sex (38 males and 32 females) with known glycaemic and lipidaemic control and equal number of age and sex matched controls were taken from our city. After baseline assessment direct measurement was done by instrument Omron KaradaScan (Model HBF -510, Japan) using principle of tetra poplar bioelectrical impedance analysis (BIA), we derive measures of body composition in both groups and compare them for statistical significance. **Result:** Present type 2 diabetic study group had mean age, duration of disease 53 and 3 years respectively, higher body weight, BMI with poor glycaemic control (in 13 for HbA1c, in 37 for FBS and in 35 for PP2BS), good lipidaemic control (in 53 of 70). We found significantly higher subcutaneous fat (30.52% versus 25.07%), visceral fat (11.41% versus 7.79%), total body fat (33.67% versus 28.43%) and lesser mass of skeletal muscle (23.35% versus 31.20%) in type 2 diabetics as compared to matched controls. This excess fat and lesser muscle mass pattern persisted even after matching diabetic and non-diabetic by BMI. Females had statistically significant more subcutaneous fat (34.30% versus 27.35%), total body fat (36.85% versus 30.99%) as compared to males; with lesser skeletal muscle mass, more visceral fat and BMI all of which were not statistically significant.

Conclusion: BIA revealed that type 2 diabetics with good lipidaemic have excess total body and ectopic fat on expense of skeletal muscle mass with female disadvantage that can be attributed to poor glycaemic control. It persisted in diabetics as against non-diabetic even on taking comparable BMI. This altered

body composition points out deranged fat and protein metabolism and type 2 diabetes should be considered something beyond abnormal glucose homeostasis. Body composition analysis can be included as a strategy in managing metabolic derangements of type 2 diabetes and for setting and achieving optimum therapeutic goal.

Arterial Stiffness In Normal Pregnancy

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Background: Pregnancy is accompanied by different physiological adaptations in the cardiovascular system. However, information on central blood pressures, wave reflection, arterial stiffness in uncomplicated pregnancy compared with non-pregnant women is limited. Increase in carotid-femoral & brachial-ankle pulse wave velocity [CFPWV & baPWV] is an indirect indicator of increased arterial stiffness.

Aim And Objectives: This study was aimed to evaluate various pulse wave velocities to define arterial stiffness during various trimester of normal pregnancy. This may give basic data to compare with diseases where arterial stiffness is altered during various stages of pregnancy.

Materials And Method: The study was conducted in Department of Physiology and Obstetrics & Gynecology, BPS Govt. Medical College for women, Khanpur Kalan, Sonapat. Pregnant women were enrolled and central pressure pulse profile & CFPWV and baPWV were measured in their first trimester (n=30), second trimester (n=20) & third trimester (n=20) by Periscope™ and compared with thirty healthy age matched non-pregnant controls. All subjects were normotensives and normoglycemics. **Results:** In comparison with non-pregnant participants, pregnant women in first trimester had significantly reduced CFPWV and decreased baPWV [non-significantly]. Women in second and third trimesters had non-significant increase in their CFPWV & baPWV but shows increasing PWV trend from second to

third trimester when compared with controls. **Conclusion:** Women in the second and third trimester of pregnancy have slightly higher arterial stiffness in comparison with healthy non-pregnant, age matched controls. The current study may help in future prediction & stratification of hypertensive disorder in pregnancy.

Key Words: Pregnancy, Arterial Stiffness, Pulse Wave Velocity, Periscope

Effect Of Antioxidants (Vitamin E & C) And Ocimum Sanctum(Tulsi) On Blood Glucose And Serum Lipids In Diabetic And Hypertensive Patients

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Objective of the study:Diabetes and hypertension are frequently occurring and closely related diseases. Hypotensive and hypoglycemic effect of antioxidants(vit. E&C) and tulsi leaves have been reported. Attempts have been made to determine quantitatively the effects of antioxidants and tulsi on serum lipids and blood sugar level and its possible role as a substitute for oral hypoglycemic and hypotensive drugs. **Aim:** To explore the hypotensive and hypoglycemic effect of antioxidants (vit. E&C) and tulsi leaves in diabetic and hypertensive patients. **Materials and Method:** Eighty known patients of diabetes and hypertension, in the age group of 34-75 yrs were divided into control(n=20) and three study groups(n=20 each).In both groups BMI,HR,SBP,DBP,Lipid profile and blood sugar(fasting and PP) were recorded.The study groups was subjected to undergo antioxidants(Vitamin C (Tab- CELIN 500 mg of GlaxoSmithKline Drug Company),Vitamin E(Tab-EVINAL 400 mg of Alembic Limited) and tulsi (Tab-TULASI 250 mg of Himalaya Herbal Healthcare Pharmaceutical Company) ,Dosage of antioxidants is one Tab O.D each and B.D for tulsi for 45 days.After 45 days all parameters were re-recorded. **Result and Conclusion:** In this study, we observed a significant (<0.01) reduction in SBP,DBP, PR, Tc,

Tg,LDL,VLDL and Tc/HDL in comparison between Pre and Post supplementation Parameters. While on comparing the study group with control groups we observed a significant reduction in SBP,DBP,PR,Tc, Tg and VLDL. We did not find any statistically significant change in Blood Sugar-(Fasting and P.P), HDL,LDL,Tc/HDLand LDL/HDL.The results suggests that antioxidants (vit E&C) and tulsii (Ocimum Sanctum) has hypotensive effect markedly.

A Comparative Spiometric Assessment Of Forced Vital Capacity (F.V.C.) Amongst School Children Of Industrial & Non Industrial Areas Of Raipur (C.G.)

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Aim and Objectives: To study & compare the Forced Vital Capacity (F.V.C.) parameters in school children of Industrial area and non Industrial area & assess the degree of lung function impairment amongst school children of industrial area. **Materials and Method:** The study was conducted in a school of industrial area (Birgaon, Urla) & non industrial area (Mana Camp) from Apr. to Aug. 2012 in Raipur (C.G.). Children included were healthy 200 cases & 200 controls between 11-18 yrs. Exclusion criteria include children having previous h/o PTB and RTI 4 weeks prior to spirometry. Computerized Spirometric evaluation done through HELIOS 501 after measurement of Height & Weight.

Results: On Comparison of Cases with Controls, Spirometric parameter FVC, FVC in relation with Age, FEV₁, FEV₁/FVC & Lung Age were found to be significant (p <0.05). PEF_R, FEF_{25%-75%}, FEF_{25%} & FEF_{50%} were Not significant (p >0.05).

Conclusion: There were significant deficit in Spirometric parameters indicative of mixed pattern (both restrictive and obstructive) lung impairment in industrial area children.

Key Words: Forced Vital Capacity, Obstructive, Restrictive, Spirometry.

A Study Of Relation Between Body Mass Index And Audiovisual Reaction Time In Healthy Young Males

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Background: Reaction time is the time taken by an individual to react to a stimulus. It is an indirect index of processing capabilities of the Central Nervous System and is affected by a various factors. **Aim &Objective:** The present study was undertaken to see the effect of Body Mass Index on auditory and visual reaction time in healthy young males (17 - 25 years) with the help of audio-visual reaction time apparatus. **Method:** 120 healthy young male subjects were divided into 3 groups according to their body mass index (Kg/m²): Group 1: Normal (BMI 18.5 – 24.99), Group 2: Underweight (BMI < 18.5), Group 3: Overweight (BMI > 25). Data were analyzed by using one – way ANOVA with post – hoc Tukeys HSD test. **Results:** It was found that both auditory reaction time and visual reaction time were longer and highly significant (p<.001) in group 2 and group 3 in comparison to group 1. **Conclusion:** Thus, body mass index of an individual affects audio-visual reaction time.

KEY-WORDS: Auditory Reaction Time; Body Mass Index; Visual Reaction Time.

Assessment Of Physical And Chemical Properties Of Saliva In Caries Free And Caries Active Groups And Their Correlations

Dipti Soni Jaipuriar

Introduction: Dental caries is an infectious disease resulting in demineralisation & destruction of tooth structure by acid forming bacteria found in dental plaque. Saliva plays a key role in maintaining the oral health by its physical and chemical properties. Earlier studies have indicated variations in these properties in disease processes. **Aim And Objectives:** The

purpose of the study was to compare the physical and the chemical properties of saliva in caries free and caries active group. The study was aimed to detect the presence of streptococcus mutans in saliva in the subjects (monoclonal antibodies) ; along with -salivary amylase, pH, buffering capacity, calcium, phosphorus, and α -amylase concentrations. **Method:** The study involved 40 children aged between 4 – 11 years . The subjects were divided into two equal groups A & B. Group A (caries free) and Group B (caries-active) was formed after screening these children for caries status (scored using DMFS). Prior to the study ,groups were informed about the procedures to be undertaken and proper consent was taken. Saliva sample (unstimulated saliva) was collected for the investigations of physical and chemical properties. **Results And Conclusion:** The results of our study were found to be statistically significant . The study has shown a definite relationship between the presence of streptococcus mutans and the physical properties of saliva in caries active subjects. It was found that calcium, phosphorus, amylase and mutans have association with caries activity and the disease process . Hence it can be concluded that the components of saliva and its pH & buffering capacity contribute to the maintenance of oral health . They can be studied , for understanding the disease process and preventive measures

A Comparative Study Of Visual & Auditory Short Term Memory In Children & To Evaluate The Rapidity & Specificity Of Response Of Children To Both Visual & Auditory Inputs (Assessing Working Memory Status)

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Background & Objectives: The process of retention and storage of any kind of information is known as Memory. In our study we are trying to find out which form of memory

is accurate & can be recalled best; hence present study was conducted to compare the Visual & Auditory Short term memory (STM) in children & to evaluate the rapidity & specificity of response of children to both Visual & Auditory inputs (assessing Working memory status). **Materials and Method:** After appropriate consent from parents & school teachers; the study comprised of 100(50 males,50 females) Healthy Children aged 11-15years of National Higher Secondary School, Raipur(C.G.). Children having infirmities (Visual or Auditory) were excluded. Reaction time for audiovisual exposures to recalling is noted. **Results:** There is a strong difference between visual STM and auditory STM ($p < 0.001$). The mean reaction time is more for long words than short words. Short words are remembered more accurately than long words. The memory task performance increases with age. **Interpretation & Conclusion:** The visual STM have a longer and more accurate duration than auditory STM. STM and working memory plays an important role in the learning processes of school children. **Key Words:** Auditory short-term memory, Visual short-term memory, Working memory.

Comparison Of Motor And Sensory Nerve Conduction In Upper Limb Of Diabetics And Non Diabetics

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MAMC Agroha, Hisar

Background: The physiological properties of nerve and muscle are usually modified due to patho physiological changes resulting from many diseases like diabetes. Impaired mobility & compromised manual dexterity leading to difficulties in daily life. Hand function in diabetes affected mainly due to involvement of median nerve. Diabetic neuropathy, the common complication of diabetes can be assessed electro physiologically by nerve conduction studies. **Aim:** A motor and sensory nerve conduction study of upper limb nerves in diabetics and non diabetics. **Materials & Method:** Both motor as well as sensory component of median and ulnar nerve was

tested on 40 male subjects marked as cases suffering from Type II diabetes and attending diabetic clinic in the department of Medicine MAMC Agroha and compared with 40 age matched controls. Distal latency, Amplitude and conduction velocity were measured by using computerized RMS EMG EP II and surface electrodes in the department of Physiology at Agroha. **Result:** On comparing the parameters of Nerve conduction studies it was found that distal latency of both nerves were higher in diabetics than non diabetics with statistically significant difference ($P < 0.001$). Nerve conduction studies also showed decreased amplitude and conduction velocity in cases ($P < 0.01$). All the parameters were found correlated with blood sugar level in Diabetics.

Prevalence Of Underweight Status Among Secondary School Male Children From Low Socioeconomic Status In Aurangabad Maharashtra: A Crossover Pilot Study

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Background: World Health Organization has stated in their estimations that under nutrition is a contributing factor for about one third of all the child deaths. Under nutrition can cause developmental delays among the children and adolescents, lead to poor school performance and cause school dropouts. Aim: This pilot study was done to estimate the status of Body Mass Index in secondary school children from low socioeconomic status in Aurangabad district of Maharashtra **Material & Method:** Study Design: Cross-sectional study, Site: Department of Physiology, Government Medical College, Aurangabad, Maharashtra. Approval of Institutional Ethics Committee was taken prior to start of the study. Secondary school children (Standard VIII to X) from one of the schools of Aurangabad falling under low socioeconomic strata of society were included in the current pilot study. It was a boys only school. 38 boys were selected by simple random sampling

technique from Standard VIII to Standard X students. Body weight was measured on electronic weighing scale using standard procedure & height was done using stadiometer. BMI for age was assessed using the WHO reference scale for classification of normal weight, underweight & overweight children. **Results:** Among the male 38 school students from Standard VIII to Standard X, only one student was overweight. Twenty three students fell under normal BMI for age category as per WHO nomogram data. However 14 students had BMI less than normal. Thus, a significant proportion of students were in underweight category. The percentage of underweight students was 36.84% with 95% Confidence Interval of $36.84\% \pm 15.34\%$. So, the range for the true population proportion for underweight students among secondary school children from low socioeconomic status in Aurangabad is 21.5% to 52.18%. **Conclusion:** A high percentage of students among secondary school children from low socioeconomic status in Aurangabad are underweight. Considering the health & education impact to society & nation from such a scenario, there is urgent need to estimate the prevalence of such disorders at mass scale by larger studies & to take appropriate action.

Key Words: Body Mass Index, school children, underweight

A Review On Acupuncture Therapy For Migraine Treatment

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Nowadays, chronic daily headache is a major problem in children and adolescents. It may be started as occasional tension-type headache and evolved into daily tension-type headache. Some of these headaches began as episodic migraine and morphed over time into daily headaches, with episodic superimposed stronger migraine's features. Migraine is a common, complex, chronic, neurovascular disorders which is characterized by attacks of

severe headache and autonomic nervous system dysfunction. Migraine headache increases in frequency and decreases in severity over time. The pain builds up over a period of 1-2 hours, progressing posterior and becoming diffuse. Migraine treatment involves abortive and prophylactic therapies which are includes as analgesic, NSAIDs, antiepileptic, β - blockers, tricyclic antidepressant etc. These have various side effects also. Acupuncture is effective in the treatment for migraine. Acupuncture is a part of Traditional Chinese Medicine (TCM). Acupuncture is more effective than routine care in the treatment of migraines with fewer adverse effects than prophylactic drug treatments. Acupuncture blocks either peripheral nerve directly or blocks the release of brain stress chemicals. Key words: Headache, Chronic, Migraine, Acupuncture, Analgesic, Nerve.

A Study Of Prevalence Of Refractive Errors And Factors Affecting It In Medical Student

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Background: Now a days we find more and more children and adolescents wearing spectacles. There has been a dramatic rise in prevalence of refractive errors especially myopia in children and adolescents. Now a days there is also increased duration of watching TV, computer use, cell phones use, video gaming and also increased competition in educational field so there have been increased duration of reading which may result in refractive errors. The present study was undertaken to explore the prevalence of refractive errors among medical students as well as to study factors affecting it which can be of use for its prevention and arrest of further progression. **Aim:** To study the prevalence of refractive errors among medical students and factors affecting it. **Method:** A total of 100 students participated in the study. Age group was 17-22 years. The students were grouped depending on the presence or absence of refractive errors i.e. Spectacle nonuser and spectacle user as group I and group II

respectively. Participant were asked to fill up a questionnaire regarding their different habits i.e. family history of refractory error, reading duration, duration of TV watching, computer use, play/texting with cell phones and sleep duration. Chi square test was used to compare proportions and students' t test was used to compare the means. **Results:** Refractive errors has been increased among medical students strongly associated with higher proportion of watching TV, computer or cell phones use, reading duration and presence of family history. **Conclusion:** This study concludes that there is increased prevalence of refractive errors among medical students.

Role Of Brainstem Auditory Evoked Response In Forensic Science

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BAEP is an important test used in clinical practice. It is used to diagnose auditory threshold changes and to characterize the type of hearing loss. As it does not depends on voluntary response from the subject its role in forensic sciences becomes relevant for the assessment of type of hearing loss in medicolegal cases for conductive or sensorineural, nature of injury, in cases of malingering, pinpointing the neuronal pathway involved in hearing loss and whether the victim had hearing loss before the injury. This study presents latencies of wave I, II, III, IV and V, interpeak latencies of wave I-III, I-V, III-V and amplitudes of waves I-Ia, V-Va and absolute amplitude R in 100 healthy normal hearing medical students of same age group comprising of 50 females and 50 male for comparison of inter gender difference, for the purpose of establishing normal values in the institute. In the present study, it has been concluded that there is highly significant difference in the waves and interpeak latencies III, V and I-V between females and males. It was also found that the duration of wave I showed statistically highly significant differences and V-Va showed significant difference between left and right ear in females. Also it was found that the duration

of wave I showed statistically highly significant difference in males.

Key Words: Brainstem auditory evoked response, wave latencies, interpeak latencies, forensic medicine

Effect Of Listening To Vedic Mantra On Blood Pressure

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The effect on Systolic Blood Pressure (SBP) and Diastolic Blood Pressure (DBP) due to listening of Vedic mantra has been studied on three different groups of people. The overall study on all the 3 groups put together has shown significant decrease in both the SBP (average = 6.2 mm Hg, $p < 0.001$) and DBP (average = 1.8 mm Hg, $p < 0.05$). In the first group comprising of females (N = 15) in the age group of 17-21 years and no prior exposure to the Vedic mantra, there is significant decrease in SBP (average = 3.7 mm Hg, $p < 0.05$) and insignificant change in DBP. In the second group comprising males (N = 10) in the same age group of 17-21 years, with no prior exposure to the Vedic mantra, a significant decrease in both SBP (average = 9.2 mm Hg, $p = 0.0015$) and in DBP (average = 4.1 mm Hg, $p = 0.035$) was observed. In the third group which is comprised of males in the age group > 35 years and who had prior exposure to the Vedic mantra (N = 10), it has been found that there is significant decrease in both the SBP (average = 9.0 mm Hg, $p = 0.003$) and DBP (average = 3.8 mm Hg, $p = 0.005$).

Key Words: SBP, DBP, Vedic Mantra

Medical School Examination Pressure And Their Relationship To Depression

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Aim: To determine the prevalence of depression among first year medical students at a private medical college taking gender differences into account. **Method:** A cross-sectional study was carried out on 150 first year medical students who had spent more than 6 months in a private medical college and had no self reported physical illness. We assessed the students during a period without and during a period with examinations. Anthropometric and demographic variables of the students included age, gender, weight, height and BMI. Prevalence of depression was assessed using a structured validated questionnaire, The Hamilton Depression Scale (HAM-D) with a cut-off score of 7 for a total of 17 items. They were subjected to the questionnaire both prior to and during the examination and data analysis was done using SPSS v.17. **Results:** All 150 students including 88 boys and 62 girls completed the questionnaire. A high prevalence of depression amongst medical students was found. The mean age of the students was 18 years. Girls had more significant increases in depression scores than did the boys. There was a significant association between the prevalence of depression and examination period. **Conclusion:** It was seen that medical students constitute a vulnerable group for the prevalence of psychiatric morbidity in the form of depression as far as examination stress is concerned.

Key Words: examination stress, depression, medical students

The Influence Of Fatigue On Attention And Performance **Afreen Begum H Itagi*, Nagaraja S**, Suresh Y Bondade*****

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Aim & Objectives: Exercise-induced fatigue is not always peripheral and it is the brain that causes the sensation of fatigue either due to decrease of metabolic resources OR due to central activation process that regulates attention and performance. This cognitive fatigue study was undertaken to observe the

effect of an exhausting physical exercise on cognitive performance. **Method:** A total of 30 healthy young adult subjects were included in the study. The study was conducted in two phases with at least a week gap between the phases. The participants answered a Multidimensional Fatigue Inventory (MFI-20) questionnaire before and after cognitive task performance in each phase. In phase I (control trial) participants were given to perform cognitive tasks like “Stroop Test, Trial Making Test and Mini Mental State Examination”, after which the event related potential(ERP) data was processed using P300 component by standard auditory “oddball paradigm” on computerized evoked potential recorder (RMS EMG MK-2) using 10/20 system just to know the engagement of attention. In Phase II (exercise trial) participants were instructed to cycle as hard as they could, till they could not continue anymore which was followed by performance of cognitive tasks and recording of P300 evoked potential as in phase I. Paired t-test and two way ANOVA test were used to analyze the measures of variables between two phases. **Results:** Fatigue related subjective measures (MFI-20) showed both mental and physical fatigue was significantly greater in the exercise-involved cognitive trial than the control trial. Participants subjected to control trial performed better in terms of higher percentage accuracy but with slow reaction time. The mean % accuracy was 93.4 ± 2.1 % in control trial and 88.1 ± 1.3 % in exercise trial. The mean reaction time was 470 ± 19.1 ms in control trial and 405.2 ± 16.2 ms in exercise trail. The mean P300 latency was $404 (\pm 82)$ in control trial and $382 (\pm 67)$ in exercise trial reflecting faster reaction time in exercise-involved cognitive trails. **Conclusion:** Participants experienced more fatigue physically and mentally during the exercise involved cognitive tasks. This implies that fatigue, performance and attention are interdependent and one should work harder to sustain performance levels which would intensify the development of fatigue.

Study Of Relation Between Motor Nerve Conduction Velocity And Height In Healthy Individuals

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Background & objectives: Nerve conduction velocity is being used as a widespread measure of diagnosis of nerve function abnormalities. Dependence of nerve conduction parameters on intrinsic factors like age and sex, as well as extrinsic factors like temperature is well known. Lateralization of various cerebral functions like speech, language, visuospatial relations, analysis of face, recognition of musical themes and use of hand for fine motor movements have also been studied. The aim of this study is to compare the nerve conduction velocity of different subjects with different height using median nerve and find out whether there is any difference in relation between motor nerve conduction velocity and height. **Method:** The study was carried out in students of B J Medical College by the use of standard 2 channel physiograph. Comparison of motor nerve conduction velocity between subjects of different height was done under equation of Pearson correlation. **Results:** There are several factors which affect nerve conduction velocity. Some skills like music, sports activities are also due to hemispheric difference. Age and sex affect nerve conduction velocity. Here we compare the relation between height and motor nerve conduction velocity. On comparison of motor nerve conduction velocity of median nerve with different height of the subjects the study shows that there is significant decrement in nerve conduction velocity with increase in height of subjects. **Interpretation & conclusion:** From the results we can conclude that there is inverse correlation between height and nerve conduction velocity of subjects.

Key Words: Height, Nerve conduction velocity, Median nerve

An Evidence Based Review Of Effectiveness Of Continuous Positive Airway Pressure (CPAP) In The Treatment Of Sleep Apnea

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Introduction: Sleep apnea is a sleep disorder characterized by abnormal pauses in breathing or instances of low breathing during sleep. There are three forms of sleep apnea viz, central sleep apnea (CSA), Obstructive sleep apnea (OSA) and complex or mixed sleep apnea. OSA is the most common category of sleep breathing disorder. There is significant evidence that continuous positive airway pressure (CPAP) results in definite benefit in sleep apnea, improving the overall quality of life and longer survival. **Methodology:** Literature searches were carried out using PubMed <http://www.ncbi.nlm.nih.gov/pubmed> and http://scholar.google.com/advanced_scholar_search. The database was searched using the terms “sleep apnea” and “continuous positive airway pressure AND sleep apnea”. Publications involving the role of CPAP in the treatment of sleep apnea were identified with priority given to case control and cohort studies. Only articles published in English language were selected in inclusion.

Clinical Evidence of CPAP effectiveness: From the literature searches, 8 publications were identified for inclusion in the following evaluation of clinical evidence of continuous positive airway pressure (CPAP) effectiveness in the treatment of sleep apnea. Out of these 8 publications, 4 were on beneficial aspects of CPAP in sleep apnea, 2 on CPAP, 1 on multiple risk factors with OSA and the remaining 1 was on usage compliance of CPAP by sleep apnea patients. Evidences suggest that risk of OSA increases with body weight, active smoking, age

and diabetes². OSA patients should also be screened carefully for depressive disorders³. CPAP therapy improves factors involved in atherosclerosis and exerts beneficial effects on lipids thereby reducing the risk of cardiovascular disease, systemic hypertension, stroke and ischemic heart disease⁴. Long term therapy has a protective effect against death from cardiovascular disease⁵. CPAP therapy is helpful in treating depression in OSA patients. CPAP therapy also improves daytime sleeplessness & reducing the number of sleep deprived accidents⁶. Though a certain number of OSA patients continue to experience (RES) residual excessive sleepiness when using CPAP.

Acceptance and Adherence to CPAP:

Acceptance refers to the patient's perception and willingness for continuous positive airway pressure (CPAP) therapy. Acceptance is the first step to adherence. Estimates for its acceptance are optimal as compared to the adherence which is suboptimal. Patients are less likely to use CPAP therapy on long term basis⁷.

Outcome: OSA is claimed to be an important cause of premature death and disability. There is definite clinical effectiveness of continuous positive airway pressure (CPAP) therapy in the treatment of most patients with sleep apnea⁸.

Conclusion: Continuous positive airway pressure (CPAP) is the most consistent, safe and effective treatment for obstructive sleep apnea (OSA). It reduces the cardiovascular risk and mortality associated with OSA thereby improving the overall quality of life. In future, CPAP therapy may be the mainstay of treatment of OSA.

Evaluation Of Autonomic Function Tests In Leprosy

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Materials and Method: The study was conducted in the Autonomic testing lab in the Department of Physiology, Maulana Azad

Medical College after obtaining clearance from the institutional ethical committee. 60 patients of leprosy were recruited from the leprosy clinic of the Department of Dermatology of Lok Nayak Hospital. The patients were divided into two groups as per Ridley Jopling classification. 30 age and sex matched healthy individuals served as controls. Autonomic function tests evaluating both sympathetic and parasympathetic reactivity were carried out along with evaluation of peripheral sweating response. **Results:** Results of the tests were recorded as mean \pm SEM and the statistical analysis of the data was done by applying ANOVA. The p-value <0.05 was considered statistically significant. Both inter-group and intra-group comparisons were made for each parameter. **Conclusion:** Variations in both sympathetic and parasympathetic reactivity were seen in patients with lepromatous leprosy.

Study Of Pulmonary Function Tests In Type 2 Diabetes Mellitus

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Background: The incidence of type 2 Diabetes Mellitus is on the rise in developing countries. Since diabetes affects almost all systems of the body, much importance is given to microangiopathy, macroangiopathy, retinopathy and nephropathy. The most neglected system in diabetes is the respiratory system. Hence, this study was done to determine the respiratory muscle weakness in Type 2 Diabetes Mellitus. **Objective:** To study the effects of Type 2 Diabetes mellitus on pulmonary function. **Method:** A total of 100 subjects, in which the cases were Type 2 Diabetes Mellitus patients (n=50) and the control group were healthy individuals (n=50) in the age group of 45-70 years. Written consent were taken from them. The following pulmonary function parameters were recorded. Forced Vital Capacity (FVC), Forced Expiratory volume in one second (FEV1), Forced Expiratory Volume percent (FEV1/FVC%), Peak Expiratory Flow Rate (PEFR) by using computerized spirometer. **Result:** After pulmonary function

test, mean FVC of the diabetic patients was (2.29 \pm 0.39) as compared to control (2.89 \pm 0.39) with (p=0.000). Mean FEV1 was found to be (1.96 \pm 0.51) in diabetic patients as compared to control (2.52 \pm 0.36) with (p=0.000) and Mean PEFR was found to be (5.42 \pm 1.50) in patients as compared to controls (6.62 \pm 1.51) with (p=0.000). Mean FEV1/FVC in diabetic patients was (85.86 \pm 10.43) whereas in control it was (87.94 \pm 6.68) with (p=0.240). Diabetic patients showed a significant reduction in the forced vital capacity (FVC), forced expiratory volume in one second (FEV1) and peak expiratory flow rate relative to their matched controls. However, there were no significant difference in forced expiratory ratio (FEV1/FVC%). **Interpretation & Conclusion:** We conclude that diabetics show a decrease in PFT values compared to non-diabetics. The findings of present study suggest that, lung is a target organ for damage in diabetes.

Evaluating Glycaemic Control And Its Correlation With Peripheral Artery Disease (PAD) In Ambulatory Type 2 Diabetes Mellitus (T2DM) Subjects Of An Urban Area Of Gujarat, India

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Background : Type 2 diabetes mellitus (T2DM) causes hyperglycaemia and insulin resistance that increases risk for peripheral artery diseases (PAD) that can be measured by simple yet validated tool ankle brachial pressure index (ABPI). By present study, we tried to correlate the glycaemic control with PAD and to find its significance, if any. **Materials and Method:** We recruit 147 under treatment ambulatory T2DM patients with minimum 1 year of duration of disease representing varying socioeconomical strata. FBS, PP2BS and HbA1c were measured at accredited laboratory and glycaemic control was defined as per ADA 2012 criteria. PAD was

tested by ABPI using vascular Doppler to assess peripheral artery disease (PAD) following standard protocol, defined as $ABPI \leq 0.9$ and compared amongst group based on glycaemic control. **Result:** We found glycaemic control in just one third of the subjects that correlate negatively with ABI values for all three parameter (OR: HbA1c -3.00, FBS- 2.88, PP2BS-2.13). Odds Risk for PAD in poorly controlled glycaemics proved to be highest for HbA1c and statistically significant for FBS(P value: HbA1c - 0.033, FBS- 0.016, PP2BS-0.042). **Conclusion :** Poor glycaemic control and under-use of ABPI assessment for PAD need to be rectified and all means of glycaemic control are correlated with PAD ,where FBS is better predictor than HbA1c.

Consanguineous Marriages: A Risk Factor For Sensorineural Hearing Impairment

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In consanguineous or close marriages, the ancestors are common. The prevalence of consanguinity and rates of first cousin marriage vary widely within and between populations and communities, depending on ethnicity, religion, culture and geography. In populations of North Africa, West Asia and South India, consanguineous marriages are culturally and socially favoured and constitute 20–50% of all marriages. The siblings of consanguineous marriages have a significantly higher incidence of autosomal recessive diseases including hearing impairment. The aim of this study was to find the strength of association of family history and consanguinity with permanent hearing impairment in infants and preschool children's. This descriptive cross-section study was conducted for a period of one year among the children's who attended pediatric OPD of Bapuji Hospital and Chigateri General Hospital, attached to J.J.M. Medical College, Davangere,

Karnataka. 150 infants and preschool children aged between 1 month - 5 years were included in the study. Parent interview was carried out to collect details of family history of hearing impairment and consanguinity. The study showed that consanguineous marriage accounted for 74.7% (112) of affected cases, of which no BERA response was recorded in 30.4 % (34). Consanguineous group had increased wave V threshold when compared to the control group. Absolute latency of wave V and interpeak latency of wave I-III was also prolonged in the cases. The incidence of hereditary hearing impairment is common in developing countries compared to developed countries. A well planned counseling program to create awareness regarding the adverse effects of consanguineous marriages will be helpful in preventing hereditary hearing impairment. Education of the public in general and of primary health personnel in particular is an important pillar in clarifying the health and social effects of consanguineous marriages.

Key words: Consanguinity, Hearing impairment, Brainstem Evoked Response Audiometry (BERA)

Hematological Parameters Study In Both Male & Female College tudents

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Study of Hematological parameters like complete blood cell count is a frequently used laboratory test performed to support the diagnosis of several disease, periodic health examination and pre-operative evolution. The values of hematological parameters are affected by a number of factors even in apparently healthy population .These include age, sex, body structure, nutritional, environmental and social factors with ethnic backgrounds. This study has been conducted in order to determine any effect of sex variation on hematological parameters (erythrocytes, leukocytes and platelets) of Young Adult Student. 40 female & 40 male college students who are apparently healthy have participated in this study voluntarily. After being informed, blood samples of subjects have been taken on an empty stomach in laboratory between 9:00-

10:00 in the morning. Levels of Leukocytes (WBC), Erythrocytes (RBC) and Platelets (PLT) parameters have been determined by using automatic blood count device (Sysmex-Kx-21). Significance level has been recognized at $p < 0.05$. Results showed that difference between the levels of leukocyte parameters; erythrocyte parameters; Haemoglobin, and RDW, platelet count of the two studied groups is statistically significant ($p < 0.05$). Although some blood cells of male & female subjects in the same age group were in the reference range, it is thought that their being high or low in number is related to variant condition followed for long duration of time. Key words: Male, Female, Blood cell, Haemoglobin

Prevalence Of Anemia In Copd Patients Of Jodhpur Distt.

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Background - Anæmia, is commonly seen in COPD and increasingly being recognized as a risk factor associated with increased mortality. Occurrence and prevalence of anemia in COPD less studied. **Objective** -The aim of the study was to investigate the prevalence of anemia in COPD patients. **Method** - The present study was conducted on 50 normal healthy controls and 150 COPD patients selected from Pulmonary medicine Department of LN Rathi Memorial Hospital Jodhpur. Each one of them was subjected to PFT assessment and various hematological parameters to determine anemia status of patient e.g. Hb, Hct, MCV, MCH, S. Iron, TIBC and S. Ferritin. Data thus obtained were compared with controls by Student's t-test. **Result** - Our results show that anemia is present in 44.67% patients. All PFT parameters were found to be significantly low [p -value < 0.0001] in anemic, nonanemic and overall COPD patients. Hb, Hct, MCV, MCH, S. Iron, and S. Ferritin values measured were very significantly low in anemic and overall patients but not in nonanemic patients. TIBC values

show reverse trend i.e. high in anemics & all COPD patients but normal in nonanemics. **Conclusion** - This study indicate high prevalence of microcytic anemia in COPD patients.

Effect Of Yogasanas On Blood Glucose Level And Glycosylated Haemoglobin Level In Diabetes Mellitus Type-2 Patients

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Introduction Diabetes mellitus (DM) refers to a group of common metabolic disorders that share the phenotype of hyperglycemia. The metabolic dysregulation associated with DM causes secondary pathophysiologic changes in multiple organ systems that impose a tremendous burden on the individual with diabetes and on the health care system. The incidence of Type 2 DM is also increasing with the increase in age, physical inactivity and sedentary life style. Yoga is a way of life which includes changes in mental attitude, diet and stress. **Aim and objectives:** To assess and compare the effect of yogasanas on fasting blood glucose, postprandial glucose and Hb_{A1C} level (glycosylated haemoglobin) before and after intervention (Yogasanas) in Diabetics. **Material and method:** The study was conducted in the department of Physiology in collaboration with the department of medicine of S.M.S. Hospital of S.M.S. Medical college, Jaipur. After taking written consent, uncomplicated Diabetes mellitus type 2 patients were selected in the age group of 35-55 years with duration 1-10 years. The subjects were prescribed medicine (Oral Hypoglycaemic Drug) and diet. They were divided into test group (40) (who underwent yoga practice) and control (40) (who did not undergo yoga practice). Test group were taught yogasanas in the sequence for three continuous months 40-45 minutes 5 days in a week in the morning by yoga expert. Blood sample for fasting blood glucose, postprandial

blood glucose and HbA1c were estimated before the starting and end of every month of the study period for study and control group.

Result & conclusion: There was a statistically significant decrease in fasting blood glucose in test group [145.687 ± 23.44 to 95.14 ± 19.49] postprandial glucose also decreases in test group [185.97 ± 30.62 to 136 ± 21.45]. The Glycosylated haemoglobin decreased from [9.07 ± 1.72 to 7.09 ± 0.89]. There were no significant changes in control group. These findings suggest that yogasanas have a beneficial effect on glycaemic control in mild to moderate Type 2 diabetes and decrease the dosage of oral hypoglycaemic drugs.

Key Words: Yogasanas, Diabetes, Glycosylated haemoglobin.

Study Of Arterial Properties In Natural And Surgical Menopause

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Objective: Menopause is associated with associated with increased cardiovascular disease(CVD) risk. Arterial stiffness, a biomarker of vascular aging, increases the risk for CVD. The study was aimed to determine whether hysterectomy (surgical menopause) is associated with arterial stiffness in healthy postmenopausal women. **Method:** We conducted a cross-sectional prospective study including natural postmenopausal women (N= 52; 54 ± 3.5 year, Mean \pm SD) and women with hysterectomy (N=30; 44 ± 4.7 year). Arterial stiffness and pulse wave velocity was measured by Periscopy TM. **Results:** Carotid femoral pulse wave velocity (cfPWV), Brachial Ankle Pulse wave velocity (baPWV), were significantly higher in surgical menopausal women compared to women with natural menopause (1448.6 ± 114.3 cm/second and 1649 ± 118.8 versus 1240.6 ± 93.3 cm/second and 1284 ± 100.3 , respectively, both $P < 0.05$). There were no differences in traditional cardiovascular risk factors (i.e., adiposity, blood pressure and lipids profile and plasma glucose level) between the

groups. After adjustment for age, menopause duration and blood pressure surgical menopausal status remained a significant predictor of arterial stiffness. **Conclusion:** These results indicate that hysterectomy status (with or without BLO) is associated with greater arterial stiffening in estrogen-deficient postmenopausal women. The greater arterial stiffening with hysterectomy was not related to an adverse CVD risk profile. Large artery stiffening may be an important mechanism by which hysterectomy increases the risk of CVD in postmenopausal women.

Key Words: Arterial stiffness, Menopause, Periscope

Faculty Perceptions Of The Strengths, Weaknesses And Future Prospects Of The Current Medical Undergraduate Experimental Physiologycurriculum In Gujarat

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Introduction: Over the past several years, an opinion has emerged in India that the current practical curricula in medical schools fail to meet many of the objectives for which they were instituted. Hence, this study has assessed the perception of physiology faculty members regarding the current experimental physiology curriculum in one Indian state, Gujarat.

Methodology: A questionnaire based survey was sent in sealed covers to physiology departments of 14 out of the 16 medical colleges in Gujarat. Responses were obtained from 13 colleges, and about 90% (110) of the faculty members responded. **Results:** The faculty were of the opinion that many of the topics currently taught in experimental physiology (amphibian nerve-muscle and heart muscle experiments) were outdated and clinically irrelevant. Therefore, the faculty advocated that duration of teaching time devoted to some of these topics should be reduced and topics with clinical relevance should be introduced at the undergraduate level. The faculty also felt that more emphasis should be laid on highlighting the clinical aspect

related to each concept taught in experimental physiology. Moreover, a majority of faculty members were in favour of replacing the current practice in Gujarat of teaching experimental physiology only by explanation of graphs obtained from experiments conducted in the previous years, with computer assisted learning in small groups. **Conclusion:** Thus, the faculty members suggested that there is an imperative need to implement radical changes in the experimental physiology curriculum which should be in consonance with patient care for the doctors of tomorrow to render better health care services.

Key words : faculty, curriculum, needs assessment, experimental physiology

A Myth Busted: Is The Athletic Performance & Psychodynamic Processes Which Affect The Performance Of A Female Affected By Different Phases Of Menstrual Cycle?-A Cross-Sectional Study

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A female has a unique kaleidoscope of changing hormonal profile throughout her biological life cycle. From an intervention perspective, identifying modifiable factors that maximize the successful initiation of females in psychophysiological studies & specific athletic training with regard to menstrual cycle phase is of importance, hence this study was initiated.

Objectives: The hypotheses of the study was fourfold- 1) The greatest discrepancies in aerobic & anaerobic performance would occur in the luteal phase of the cycle. 2) Females would be the least economical as determined by time to exhaustion on a treadmill, during the luteal phase. 3) Females would have a higher RPE (marker of psychodynamic processes) during an equivalent relevant intensity exercise during the luteal phase. 4) Females would have higher ventilatory responses during the luteal phase as measured by spirometric indices. This study elucidated the impact of cyclical changes

in gonadal hormones during different phases of menstrual cycle on Aerobic, Anaerobic & Psychological response to exercise. **Method:** Thirty eumenorrhic females aged (18-20yrs) from 1st year M.B.B.S studying in J.N.M.C were enrolled in the study after institutional ethical clearance, written & informed consent. Those demonstrating contraindication for exercise, amenorrhoea, users of OC pills & those who exercised 3 or more days a week were excluded. Basal body temperature was noted. On the 10th (follicular phase) & 20th (luteal phase) days of menstrual cycle $\dot{V}O_2$ max, HR (Naviquire software), Ventilatory responses (Helios spirometer) & RPE were taken in an incremental exercise using Balke protocol on a treadmill. Subjects exercised at an all out intensities & treadmill inclination which increased every 2 min by 2.5%. RPE using Borg scale were obtained at exhaustion. Subjects were then given rest for around 30 min & then anaerobic power, capacity & fatigue index was measured using the 30 sec Wingate test on a bicycle ergometer. STATISTICAL ANALYSIS: SPSS software version 17 was used. Data was expressed as Mean \pm SD & Students paired t test was used. Subjective data was analyzed using Wilcoxon signed rank test. $p < 0.05$ was considered statistically significant. **Results:** HR resting showed (78.8 bpm) in follicular phase while (84 bpm) in luteal phase while post exercise HR was (110 bpm) in follicular vs (129 bpm) in luteal phase. $\dot{V}O_2$ max was (51.7 ml/kg/min) in follicular phase while (60.2 ml/kg/min). PEFR was (4 L/sec) in follicular phase as compared to (5.1 L/sec). RPE values were (8 [7-10.25]) in follicular phase while (12 [11-13]) in luteal phase. Time to exhaustion was (10.6 min) in follicular phase while (7.7 min) in the luteal phase. Anaerobic capacity was (368.76 W) in follicular vs (393.6 W) in luteal phase, Fatigue index was (40) in follicular phase vs (34) in luteal phase. **Conclusion:** A higher Aerobic fitness was seen during follicular phase while a greater HR, Ventilation, fatigue on a treadmill & RPE was noted during luteal phase. Anaerobic capacity showed greater values during the luteal phase while anaerobic fatigue was higher in the follicular phase. Thus, the luteal phase has a deleterious effect on aerobic exercise

performance through a potentially increased cardiovascular & psychological strain. Practical implications of our study may be individualization of aerobic & anaerobic fitness schedules according to their menstrual cycle.

Cardioprotective Effect Of Moringa Oleifera Alcoholic Leaf Extract On Isoproterenol Induced Myocardial Infarction In Rabbits

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Objective: To study the cardioprotective effect of Moringa oleifera alcoholic leaf extract on B.P., ECG, Serum cardiac markers, lipid profile and histopathology in normal and isoproterenol induced myocardial infarction in rabbits.

Material And Method: Alcoholic extract of M.oleifera (family- Moringaceae also known as drumstick tree or sahinjan) leaves was prepared using soxhlet apparatus and absolute ethyl alcohol as a solvent. Albino-rabbits (2-2.5 kg) of either sex were divided into four groups of six each. Group 1- served as control, Group 2- received isoproterenol (3mg/kg ip), Group3- received M.oleifera alcoholic leaf extract (200mg/kg,orally) for 30 days + isoproterenol (3 mg/kg ip, single dose), Group4- received M.oleifera alcoholic leaf extract (200mg/kg,orally) for 60 days + isoproterenol (3mg/kg/single dose). Blood samples were taken from marginal ear vein initially, after 30 days and after 60 days for lipid profile and s. cardiac markers. B.P. was recorded by stethom's stain gauge pressure transducer connected to femoral artery. Extent of myocardial damage was assessed electrophysiologically (ECG lead II) biochemically (AST, Troponin-I, CPK-MB) and histopathologically. **Results:** Isoproterenol administration resulted in myocardial infarction ,characterized by ST segment changes, elevation of serum cardiac biomarkers such as AST, Troponin -I and CPK-MB, increased lipid profile except HDL-C and histopathological changes in rabbit heart (necrosis, fatty changes,

hemorrhage).Pretreatment with M. oleifera alcoholic leaf extract prevented the ST segment changes,decrease lipid profile except HDL-Cand reduced serum biomarkers values .Histology of M. oleifera protected rabbit heart showed less cardiac lesions. **Conclusion:** M. oleifera alcoholic leaf extract reverses isoproterenol induced myocardial damage in rabbits.

Key Words: Moringa oleifera, Alcoholic Leaf Extract, Isoproterenol, Rabbits

A Cross Sectional Study On Correlation Of Sleep Quality With Physical Fitness And Body Mass Index Among Young Adults

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Introduction: Sleep is a vital part of one's daily life. To maintain proper sleep quality is very much essential as any derangement of sleep quality may suggest underlying medical problems or it may lead to some serious complications, and may even be directly or indirectly associated with mortality. Factors relating to anxiety and stress are common contributors to poor sleep quality which is very common in the young adult population. The most useful instrument to measure sleep quality is Pittsburgh Sleep Quality Index (PSQI). Physical fitness should be given importance from the very young age to avoid serious complications in the later life. Studies have shown relationship between physical fitness and sleep quality. There are various techniques to assess one's physical, especially cardiovascular fitness. Harvard step test is one such universally accepted technique. Body Mass Index (BMI) is an important tool for diagnosing obesity and malnutrition. Higher BMI in young age often leads to various systemic and metabolic complications in future life. **Aim and objectives:** Our study Aim to study the correlation of sleep quality with physical fitness and BMI among young adults. The large study is going on; only a part completed till now is intended to be presented here. **Method and**

materials: This is a cross sectional study. 30 young adults in the age group of 18 to 24 years were randomly selected. Sleep quality was assessed using PSQI, which measures different components such as sleep latency, sleep duration, sleep efficiency, use of sleep medications, sleep disturbances and daytime dysfunction. Physical fitness was scored with the help of Harvard step test, the final score of which gives the level of one's cardiovascular fitness as poor, average, good and excellent. . BMI was calculated using the Quetelet's Index which says BMI is weight in kgs divided by squared height in meters, i.e; $BMI = \text{Wt. (kg)} / (\text{Ht (m)})^2$. **Results:** The average of PSQI score, BMI and Fitness score were found to be 4.03 ± 2.345 , 25.45 ± 3.02 and 39.23 ± 19.06 respectively. We evaluated the mean distribution of PSQI scores according to BMI which showed that mean PSQI score to be 2.8 with BMI of 20-24.; 4.71 with BMI of 25-29 and 4.25 with BMI of 30-34. Our results showed no significant correlation between sleep quality and physical fitness though it showed a significant correlation between daytime dysfunction and BMI. **Conclusion:** no significant correlation between sleep quality and physical fitness as well as BMI. Since this is only a part of a large study presently being performed, further modified results are expected at the completion of the study.

Key words: Sleep quality, Physical fitness, BMI

Effects Of Air Pollutants On Lung Function Of Healthy , Non-Smoking Safai-Sewaks In The Age Group Of 18-45 Years

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The present study has been conducted in offices of Patiala, Punjab to assess the various ventilatory norms like- FVC, FEV0.5, FEV1, FEV3, PEFR, FEF25-75%, FEF0.2-1.2%, FEF25%, FEF50%, FEF75%, FEV0.5/ FVC%, FEV1/ FVC%, FEV3/ FVC% and MVV. This study has been conducted on healthy, non Smoking 100 Safai-Sewaks in the age group of 18-45 Years working in the various offices of Patiala, whose job is to

clean and sweep and 100 subjects are used as controls, doing work other than cleaning and sweeping. In the present study there is statistically highly significant decrease in spirometric values of Safai-Sewaks as compared with Controls which is seen in FVC, FEV0.5, FEV1, FEV3, PEFR, FEF0.2-1.2, FEF25%, MVV. There is statistically significant decrease seen in the values of following spirometric parameters while comparing Safai Sewaks with Controls in FEF25%-75%, FEV50%

Comparative Study Of Aerobic And Anaerobic Power In Football Players And Control Group

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Background : Sport performance in football players is determined by Aerobic and Anaerobic power in them. Aerobic power is best indicated by VO2max VO2max is maximum capacity of individuals body to transport and utilize the oxygen during exercise, which reflects the physical fitness of individual. Anaerobic power is power produced without the requirement for oxygen to be present. **Aim:** To determine values of VO2 max and anaerobic power in football player and control group. **Material & Method:** 30 Football players of age between 20-30 years and age and sex matched control group of sedentary medical student was included in the study. VO2max was calculated by Harvard step test and anaerobic power by Sergeant jump reach test. Values were reported as mean \pm 2SD. Football player and control group comparison was analyzed by applying unpaired t test. **Results:** VO2max and anaerobic power in football player was 57.8 ± 4.2 mL/kg/min and 1021.43 ± 151.33 watts. In control group VO2max and anaerobic power was 43.5 ± 3.1 mL/kg/min and 849.71 ± 131.45 watts. There was significant increase in VO2max and anaerobic power in football players as compared to control group. **Conclusion:** The significant differences probably results from the character of exercise and conducted training in the considered disciplines in football players. **Key words:** VO2max, Sergeant jump reach test, Anaerobic power, Harvard step test

Antidromic Sensory Nerve Conduction Study of Sural Nerve Among Leprosy Patients

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Introduction: Leprosy neuropathy is characterized by initial involvement of the small nerve fibers, later followed by involvement of the large fibers, when routine nerve conduction studies become abnormal. Sural nerve is main sensory supplying of the foot and mostly ulcer occurs due to neuropathy of lower limb. Early assessment of sural nerve is more important in leprosy. **Aim:** - To assess the sensory nerve conduction study parameters of the Sural nerve in cases of clinically manifest leprosy with or without nerve damage. **Method:** IRB permission taken prior to this study. We were applied the Antidromic SNCS near nerve technique at 14 cm distance between Active electrode and stimulating electrode to the Bilateral Sural nerve of 42 leprosy patients. **Results:** - Sural Nerve was not detected by SNCS in 11(26.19%) Leprosy patient out of 42. This may be due to conduction block. The Mean values of Right Sural Nerve Distal Latency (ms) 5.99 ± 2.56 whereas in Left Sural Nerve distal Mean latency (ms) were 5.27 ± 2.22 , the Mean values of Right Sural Nerve Distal Amplitude (μV) was 37.73 ± 25.27 whereas Left Sural Nerve Distal Amplitude (μV) were 38.73 ± 27.07 , the values of Right Sural Nerve SNCV (m/sec) was 25.60 ± 9.85 whereas in Left Sural Nerve SNCV (m/sec) were 25.80 ± 13.78 . All values were differing from the reference values. Mean Latency of Bilateral Sural nerve was prolonged and SNCv was reduced. That represented demyelinating type of Neuropathy of Sural Nerve. In smear positive leprosy cases, conduction block was higher as 8 out of 19 patients have not detected sural nerve bilaterally, whereas in smear negative cases, 3 out of 23 leprosy patients have not detected sural nerve. This present the effect of smear positivity on conduction block. **Conclusion:** - Demyelinating neuropathy of Sural Nerve is

more common than Axonal Neuropathy in Leprosy cases. Total nerve conduction block might be developed in early stage. Axonal Neuropathy may develop with or without conduction block. To better understand the neurophysiology and physiology of leprosy and to increase the accuracy and precocity of the diagnosis, it will be necessary to investigate patients in the very early stages of the disease and to correlate these findings with the corresponding nerve pathology. Smear positive case are more prone to develop the conduction block than smear negative cases.

Association Of Heart Rate Variability With Cardiovascular Disease Risk Factors In Type 2 Diabetes Mellitus

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Aim & Objectives : Major contributors for increased cardiovascular disease risk (CVDR) in type 2 diabetes mellitus (T2DM) are insulin resistance, waist circumference (WC), body mass index (BMI), age and disease-duration. Heart rate variability (HRV), an index of cardiac autonomic modulation, has been found to be a reliable indicator of CVDR. The present study investigates association of HRV with other independent contributors of CVDR in T2DM. **Materials and Method:** ECG was recorded for 5 min. and HRV was assessed in both time and frequency domain in 33 patients of T2DM. Homeostatic model assessment of insulin resistance (HOMA-IR) was estimated to assess insulin resistance. Measurements were done for WC and BMI calculation. **Results :** We found significant negative correlation between square root of the mean squared differences of adjacent R-R intervals (RMSSD) and HOMA-IR, age and WC; between SD of normal to normal intervals (SDNN) and WC and BMI; between total power and age, WC and BMI; and between high frequency power and HOMA-IR, age and WC (all $p < 0.05$). Multiple regression analysis identifies WC as an independent predictor of

RMSSD. **Conclusion** : In T2DM insulin resistance, age and obesity parameters are inversely associated with HRV, with WC being an independent predictor of it.

The Effect Of Heat Acclimation On The Physiological And Biochemical Responses Generated In Human Body Towards Acute Heat Stress

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Background: During Military operations, soldiers are deployed to regions with high environmental temperatures. This predisposes them to Heat Related Illnesses (HRIs), which include heat exhaustion, heat cramps, heat syncope and heat stroke. To reduce the risk of HRIs, acclimatizing them to heat stress is crucial. Acclimatization generated artificially using Human Climatic Chambers (HCC) etc. is referred to as acclimation. **Objectives:** The current study investigates the effects of acute exertional heat stress on human thermoregulatory, cardiovascular and endocrinological responses and investigates the effect of heat acclimation in conferring adaptation to acute heat stress. **Material and Method:** Institutional Human ethical committee approved the study. Six healthy male participated in the study. They performed Sub-maximal exercise (Standardized step test) in HCC simulated at 45°C, 30% RH for 100 minutes/ day, eight days in a row to attain heat acclimation. Physiological parameters were recorded and blood samples were drawn to obtain plasma for biochemical analysis on three occasions: before beginning of the exercise on day 1(control), after exercise on the first day (acute exertional heat stress) and after exercise on the 8th day (post-acclimation). **Results and conclusion:** Body temperature, sweat loss and rate, cardiovascular analysis, total body water compartmentalization and biochemical analysis were carried out. Significant difference was recorded in all three

groups. Thermoregulatory, cardiovascular and endocrinological enhancement was observed post acclimation. Data indicated that the eight-day acclimation protocol conferred adaptation to acute heat stress.

Cardiac Autonomic Function Test In Different Phases Of Menstrual Cycle Among Young Females Of 18-22 Years Age

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Background: Females undergo many hormonal, psychological and behavioral changes during her reproductive life. Many cyclical changes also occur in different body systems. These changes are attributed to the functions of autonomic nervous system (ANS). There is a fluctuation in autonomic function activity during menstrual cycle. Heart rate variability (HRV) is an emerging noninvasive tool in assessing cardiac autonomic function status. **Aim & Objectives:** To assess the frequency and time domain parameters of the heart rate variability in different phases of menstrual cycle. **Method:** 20 healthy female subjects between the age group of 18-22 years were selected. Computerized ECG system was used for the study. Measures of heart rate variability such as frequency domain parameters namely, LF (low frequency), HF (High frequency) & LF:HF ratio and time domain parameters namely, standard deviation of Normal to normal interval (SDNN), Root mean square successive differences (RMSSD), Percentage of difference between normal RR interval > 50 msec (PNN50) were measured to observe cardiac autonomic function status. Statistical analysis was done by using Student's unpaired t-test. **Results:** Frequency domain parameters, LF (nu) component was significantly higher and HF (nu) component was lower during luteal phase as compared to follicular phase (0.001). Time domain parameters namely, SDNN, RMSSD and PNN50 were increased in follicular phase. No significant change in heart rate and blood pressure during. **Conclusion:** Sympathetic over activity was present in luteal phase and follicular phase showed

parasympathetic hyperactivity. Alterations in cardiac autonomic function status may be due to alteration in balance of ovarian hormones in different phases of menstrual cycle.

Key words: menstrual cycle, Time domain, Frequency domain measures,

Assessment Of Iodine Nutrition Status Among Pregnant Tea Garden Workers In Assam And Its Effect On The Fetus **Mauchumi Baruah**

Background and Aim: Iodine deficiency is one of the major nutritional public health problems in India. Iodine deficiency during pregnancy causes wide spectrum of disorders and congenital malformations (CM) in the fetus. Earlier studies have shown higher prevalence of endemic goiter and CM among the tea garden population in Assam. The present study is aimed to find out the iodine nutritional status among pregnant tea garden workers and its effect on the fetus. **Method:** Estimation of urinary iodine (UI) level in casual urine samples was done in each trimester in 156 pregnant women (age 18-35 years). Detailed history was obtained regarding food habits, source of drinking water, type of salt consumed and obstetrical history. Blood samples from 160 age-matched non-pregnant women from the same community were taken as controls. **Results:** Mean and median UI values were within normal limits in all women. Significantly higher values were noted during the second trimester and among the older women (26-35 years) ($p < 0.05$). Goitre was recorded in 14.1% of the women, mostly among multigravida and younger women. 12 babies were born preterm. Malformations were noted among 16 babies. In the control group 2 women had low UI and high TSH values requiring treatment. **Conclusion:** Normal UI recorded in the study may be because of universal consumption of iodized salt. Presence of goiter in 22 women suggest iodine deficiency in the past or may be caused by goitrogenic food. Factors other than iodine deficiency may be responsible for higher incidence of CMs noted in this study.

Correction Of Vitamin D Deficiency In Prediabetes Using Weekly High Dose Vitamin D3 Supplementation For 3 Months: Randomized Controlled Trial

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Background: Low vitamin D levels predict the development of diabetes. Individuals with diabetes and prediabetes have lower serum 25-OH vitamin D (25-OHD) levels than those without either. Furthermore, higher levels of 25-OHD are associated with lower rates of development of diabetes. **Aim:** To assess whether weekly high dose supplementation of vitamin D3 can be used to correct Hypovitaminosis D in Prediabetes. **Material & Method:** Design: Double Blind placebo controlled Randomized Trial Site: Department of Physiology, Govt Medical College, Aurangabad. Sample size: 120 subjects aged 25 years & above with Hypovitaminosis D and Prediabetes as per American Diabetes Association criteria were randomly assigned to study group with vitamin D supplementation group & control group with placebo administration. Study group were given 60000 IU of vitamin D3 in soft gel form every week for 3 months. Control group were given placebo with similar characteristics. Assessment of serum vitamin D levels using Enzymatic Chemiluminescent Immuno Assay by Cobas e411 before and after supplementation. **Results & Conclusion:** Mean age of subjects in study group (vitamin D supplementation) was 41.12 +/- 7.84 years & in placebo group was 41.6 +/- 6.86 years. Vitamin D levels in study group prior to supplementation were 10.11 +/- 2.73 which were in deficient range. After supplementation with weekly 60000IU, the vitamin D level got corrected to 52.2 +/- 13.14 & the improvement was statistically highly significant with vitamin D levels in normal range. In the placebo group there was no significant change in vitamin D levels before

(13.7+/- 5.68) and after (12.51+/- 4.76). Thus, vitamin D supplementation with 60000 IU weekly in the form of soft gels can be an effective therapy to correct vitamin D deficiency in Prediabetes.

Key Words: vitamin D, Prediabetes

A Study of Lipid Profile and Glycosylated Haemoglobin in Hypertensive Subjects

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Essential hypertension is a complex multifaceted disorder, which may include other abnormalities including dyslipidemia, central obesity, glucose intolerance and hyperinsulinemia. All these may increase the risk of coronary heart disease, stroke and other vascular complications. Worldwide raised blood pressure is estimated to cause 7.5 million deaths, about 12.5 per cent of all annual deaths. A case-control study was carried out on patients attending the General Medicine OPD of J N Medical College, Aligarh. The study was done to assess the levels of lipid profile and glycosylated haemoglobin in hypertensive subjects. We included forty non-diabetic and hypertensive subjects as cases and forty non-diabetic and non-hypertensives as controls. Cardio-vascular parameters, lipid profile, blood sugar and glycosylated haemoglobin were measured for all the subjects. We found a significant decrease in HDL ($p < 0.01$), Significant increase in TC/HDL Ratio ($p < 0.01$) And increase Glycosylated Hb ($p < 0.01$) in non-diabetic hypertensive subjects as compared to non-diabetic, normotensive controls. No significant difference was found in total cholesterol, LDL, VLDL, triglycerides and blood sugar level of cases and controls in our study. The low HDL levels and abnormal TC/HDL ratio should be taken into account while assessing the future risk of coronary heart disease as well as drug therapy of hypertension. The estimation of glycosylated haemoglobin can be beneficial to assess the severity and complications of hypertension and its' prevention.

Key Words: Hypertension, Lipid profile, Glycosylated Hb.

The Study of Autonomic Function Tests In Patients Of Rheumatoid Arthritis By Cardiovascular Analysis System Window Based (Canwin)

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Background and objective: Rheumatoid Arthritis (RA) is a chronic auto-immune disease characterized by painful inflammation of joints and surrounding tissues, leading to long term disability. Although peripheral and central nervous system involvement has been well recognized/documentated in patients with RA, autonomic nervous system (ANS) involvement has rarely been studied and has shown conflicting results. This study was conducted to investigate ANS dysfunction in patients of RA by CANWin using classical Ewing autonomic battery tests. Method: 50 patients of RA between the age group of 20-70 years along with 25 healthy age and sex matched controls of Jodhpur city and surrounding areas were included in study. The evaluation was done by 4 parasympathetic tests including resting heart rate (HR), HR response to deep breathing, standing and valsalva maneuver; and 2 sympathetic tests consisting of blood pressure response to standing and sustained hand grip (SHG) by CANWin analysis system (Window based). Results: Heart rate response to deep breathing (E:I), standing (30:15 ratio) and valsalva was found to be very significantly reduced in patients of RA as compared to that of controls ($P < 0.01$). Mean RHR was more in patients as compared to that in controls, but it was not statistically significant. 10% of RA patients showed fall in systolic BP on standing by more than 20 mm Hg as compared to controls (0%) with significant p-value of < 0.05 . 20% of RA patients showed abnormal low rise in diastolic BP on SHG with significant p-value of < 0.05 . Conclusion: This study has confirmed the presence of cardiac autonomic nervous system dysfunctions including of both sympathetic and parasympathetic, in patients of RA. Hence inclusion of cardiovascular autonomic function

tests in routine clinical examination of patients of RA may be helpful in early detection of autonomic dysfunction in patients of RA, which will help in proper management leading to decreased morbidity and mortality. Antidromic Sensory Nerve Conduction Study of Sural Nerve among Leprosy Patients

Influence of Type 2 Diabetes Mellitus on Dynamic Functions of Lung

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Introduction: The term Diabetes mellitus describes a metabolic cum vascular syndrome of multiple etiologies characterized by chronic hyperglycemia with disturbances of carbohydrate, fat & protein metabolism resulting from defects in insulin secretion, insulin action, or both leading to microangiopathy and macroangiopathy.

Objectives:

To study the influence of type 2 diabetes mellitus on lung functions. **Method:** In this study total 40 subjects with type 2 diabetes mellitus and 40 age and sex matched control (non diabetic) subjects were included. Written consent was obtained from them. All the participants were evaluated for pulmonary function test with simple spirometric tests: Forced Vital Capacity (FVC), Forced Expiratory Volume in the first second (FEV1), Forced Expiratory Volume percent (FEV1/FVC%), Peak Expiratory Flow Rate (PEFR) using Computerized Spirometer (RMS-Helios 401, Transducer No. 400-666), along with anthropometric parameters. The results were compared using unpaired t-test. **Result:** Diabetic patients showed a significant reduction in the forced vital capacity (FVC), forced expiratory volume in one second (FEV1) and peak expiratory flow (PEFR) relative to their matched controls.

Conclusion: Lung function in type 2 diabetic patients is impaired by a decrease in FVC, FEV1 and PEFR, as compared to their matched controls.

Key words: Lung functions, Diabetes mellitus, FVC, FEV1, PEFR

Heart Rate Variability Analysis In Patients With Beta Thalassemia

Major

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Beta (β) Thalassemia is an inherited disorder of hemoglobin synthesis of β chain of globin molecule resulting in chronic hemolytic anemia and requiring lifelong blood transfusion therapy for survival. Cardiac complications represent the leading cause of mortality in patients of thalassemia major. Cardiac involvement in thalassemia patients is generally characterized by iron induced ventricular dysfunctions leading to heart failure. Before the introduction of iron chelation therapy, iron overload from transfusions was a frequent cause of morbidity & mortality in thalassemia patients. Death was often due to cardiac failure which typically began before the patient reached 20 years of age. Iron chelation therapy begun early in life prolongs survival without cardiac disease. Heart rate variability is a non invasive electrocardiographic marker reflecting the activity of sympathetic & vagal components on the sinus node of the heart. In a normal heart with an integer ANS there will be continuous physiological variations of the sinus cycles reflecting a balanced sympathovagal state & a normal HRV. In a damaged heart, the changes in the activity of afferent & efferent fibers of ANS & in the local neural regulation will contribute to the resulting sympathovagal imbalance reflected by a diminished HRV. **Material & Method:** 30 β thalassemia major patients, age ranging between 5-20 yrs of both sexes were recruited from thalassemia day care center of S.M.S. Hospital, Jaipur. 23 healthy control subjects, age and sex matched were selected from amongst the children of S.M.S. Medical College staff & students. The study was performed on the day prior to receiving of blood transfusion in the morning between 10a.m. to 12 noon. The study was approved by institutional ethical committee. Written informed consent was obtained from parents of all patients & from patients above 18

years of age. Heart rate Variability measurement. Impedance peripheral pulse in the right forearm was recorded in the supine posture for 5 minutes after 5 minutes of supine rest in a quiet environment at a room ambient temperature of 24-25°C, breathing quietly with eyes closed. The detection of impedance peripheral pulse was digitally done by Medical Analyzer, Non Invasive Vascular Monitor (Nivomon). The frequency domain parameters of HRV viz total power (TP), high frequency (HF) power, low frequency (LF) power in absolute and normalized units, and LF/HF ratio were analyzed using fast Fourier transform (FFT). (Task Force, 1996). Numerical data are presented as mean ± SD. Statistical analysis was performed using Microsoft Excel software, Microsoft Corporation USA 2003. Comparison of HRV indices between the two study groups was evaluated using 'Z' test for equality of variance. Statistical significance was assigned at $p < 0.05$. **Results:** Total power, low frequency & high frequency power in absolute terms, high frequency power in normalized units were significantly reduced in β thalassemia major patients (p value $< .001$). Low frequency power in normalized units & LF/HF ratio, a marker of sympathovagal balance were significantly increased in thalasseemics (p value $< .001$).

Body Fat And Male Fertility Potential

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Background and objectives: Obesity is rapidly spreading throughout the world including developing countries like India and leading to impairment of multi-organ functioning, besides causing reproductive problems in males and females. Obesity in females and fertility related issues as PCOS, miscarriage, birth defects etc well documented. But number of studies in males lags behind making it desirable to establish more evidence concerning correlation between male body mass with male fertility factors. **Method:** 300 normal, healthy male volunteers of the age group between 20-35 years were included in the study. The indicators of obesity, Body mass index (BMI) and Body fat percentage (BFP) were recorded using Quetlet's

index (weight in kgs / (height in metres)²) and OMRON'S body fat monitor, respectively. Semen sample was produced by masturbation after abstinence of 3-5 days and correlation made between the indicators of obesity and semen parameters (semen volume, sperm count, sperm motility, sperm morphology) by carrying out semen analysis as per the WHO guidelines. **Results:** Both BMI & BFP correlated negatively with semen parameters (semen volume, sperm count, sperm motility, and morphologically normal sperm), in statistically highly significant manner with p value of < 0.0001 in each case. **Interpretation and conclusion:** Increasing body mass status and increasing preference of sedentary lifestyle in males affect overall fertility efficacy of otherwise healthy males. Fortunately, preventive and remedial measures to reduce obesity exists which can be advised to obese males which may revert their normal semen quality and hence fertile potency.

Key words: BFP, BMI, Obesity, Semen Quality

To Study The Relation Of Lipid Profile With Bmi Among 2nd Year Mbbs Students Of Gauhati Medical College

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Aim And Objectives: There has been a rapid increase in the prevalence of cardiovascular disease and diabetes in India, in association with modest overweight and rapid changes in diet and lifestyle. Overweight and obesity with increasing BMI leads to adverse metabolic effects on the lipid parameters. The present study was undertaken to see if there was any relation between the BMI and lipid profile among 2nd yr MBBS students. **Materials And Method:** 30 MBBS students of GMCH were selected as subjects. Among the 30 students 13 were overweight (case) and 17 were normal weight (control). Period of study: August 2013. Fasting lipid profile (TC, TG, HDLc) was tested using enzymatic colorimetric assay, LDLc was calculated using Freidewald's formula and

body mass index(BMI) was calculated by the Quetelet index. Statistical analysis was done using unpaired student t test. **Results:** There was significant increase in the different lipid parameters namely TC(162 ± 7.42 vs 139.06 ± 7.68 , $p<0.05$), TG(136.50 ± 4.68 vs 116.24 ± 3.73 , $p<0.05$) and LDLc(100.92 ± 5.81 vs 78.71 ± 2.82 , $p<0.05$). However no significant difference was observed between HDLc levels.

Conclusion: It can be concluded that there is a positive association between BMI and total cholesterol, triglycerides and LDLc. HDLc showed no difference. Further studies would throw more light on the topic.

Respiratory Sinus Arrhythmia; A Rate Dependent Phenomenon

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Respiration is the most consistent modulator of cardiac activity. Fluctuations in the R-R interval due to respiration are known as Respiratory sinus arrhythmia (RSA). The respiratory rate has its effect on the magnitude of RSA. Studies have shown that magnitude of RSA enhances by slow paced breathing, but in higher RR if it flattens completely, which is not studied much. The present study is trying to examine the RSA with varying respiratory rate.

The Objective of the study was to study the effect of various respiratory rates (6, 10, 15, 20 and 30 breaths/minute) on the magnitude of sinus arrhythmia. The study was conducted in 28 apparently healthy young adult volunteers aged between 17-22 years with no history of previous respiratory cardiovascular illness. The simultaneous recordings of ECG and respiratory movements was done in resting condition, followed by the recordings during paced breathing at five different rates (6, 10 15, 20 and 30 breaths/min). Lead II ECG and respiratory movements were recorded. Each recording were done for duration of five minutes. A human voice based instruction system was used for pacing respiration at different breathing rates. The volunteers were not instructed for controlling or modulating the

depth of the respiration. The relatively stationary signal for one minute for each respiration protocol was selected. Maximum heart rate (HR), minimum HR, delta HR and E:I ratio was calculated for each respiratory rate. The parameters for each breathing rate were compared using one Way ANOVA. The mean resting respiratory rate varied among the individuals. The average HRmax per cycle showed the decline from 6 BPM to 20 BPM then a slight increase, but the resting HRmax was lower than others. No statistically significant difference was found among the groups. The HR min showed a gradual increase towards higher respiratory rate. One Way ANOVA showed the statistically significant difference among the groups ($P=0.0004$). Delta heart rate, showed a sharp decline as the rate of respiration increases. One Way ANOVA revealed that the groups differences are statistically significant. E:I ratio also showed a decline as the rate of respiration increases. The differences among the various rates was statistically significant ($p=< 0.0001$). We found out that as the rate of respiration increases, the magnitude of RSA decreases. It was also observed that with the increase in RR interval, the depth of respiration also increases. This study reveals the importance of rate component of respiration in cardiac health and indicates the necessity of long term behavioural interventions directed at altering breath rate to improve cardiac health.

Key words: Respiratory sinus arrhythmia, respiratory rate

Prevalence & Determinants Of Isolated Systolic Hypertension In Young Healthy Adults

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Background and objectives: ISH is the most common type of hypertension in people over 60 years of age and increase in SBP being the principal characteristic in this population. Interestingly, data from a number of studies suggest that ISH is also prevalent in adolescents

and young adults but findings from previous studies examining this question are inconclusive, so the aim of our study is to know prevalence and determinants of ISH in young healthy individuals. **Method:** We performed a cross section study on 400 young individuals between 18 to 30 years in western Rajasthan. The participants were then subjected to a set of questionnaire which included socio-demography determinants (age, sex, occupation and annual household income), personal habits (dietary habits, smoking, alcohol consumption), past history and family history of hypertension. They were then subjected to the measurement of height, weight, pulse rate, blood pressure, fasting blood sugar and serum cholesterol level. **Results:** In our study 9.25% were hypertensive (systolic, diastolic or both systolic and diastolic) and from this ISH were 4.25%, IDH were 1.5%, SDH were 3.5%, systolic hypertension in 7.75% and diastolic hypertension in 5%. **Interpretation and Conclusion:** ISH have quite high prevalence in young adults and is more common than SDH. Female gender, rural in-habitants, non-vegetarian diet, low socio-economic status, family history of hypertension, smoking, alcoholism, BMI and Serum Cholesterol level are important determinants of ISH in young adults.

Key Words: Isolated systolic hypertension(ISH), isolated diastolic hypertension (IDH), systolic diastolic hypertension (SDH).

Effect Of Age, Gender And Job Profile On Sleep Quality

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Background & Objective: Sleep plays a critical role in immune function, metabolism, memory, learning and a number of other vital functions of body. Good quality sleep is a must for healing and repairing a stressed out central nervous system. There are a number of factors which can affect sleep quality. This study was undertaken to explore the effect of age, gender and job profile on quality of sleep. **Methodology:** In this descriptive study, a total of 80 healthy subjects (43 males and 37

females),(age>50 yrs, n=32 & age<50yrs, n=48) were enrolled. Out of these, 40 subjects were from a corporate company and the rest 40 were from general population. After obtaining informed consent from subjects, detailed history was taken to exclude any acute or chronic disease. This was followed by standard questionnaire to assess sleep quality by Pittsburgh Sleep Quality Index (PSQI). Data was analyzed using student's unpaired t test to compare PSQI scores in males vs. females, low age group (< 50 years) vs. high age group (> 50 years) and individuals working in corporate company vs. non corporate individuals. **Observations & Results:** There was no significant difference observed in the mean PSQI scores of males and females. PSQI scores were significantly more in higher age group as compared to the lower age group individuals. When comparisons were made between corporate individuals and non corporate individuals, the mean PSQI score was higher in corporate individuals but the difference was not significant. **Conclusion:** Gender has no impact on the quality of sleep whereas sleep quality significantly decreases with increasing age. Even if no significant difference was noted between corporate and non-corporate individuals, the PSQI scores were higher in corporate individuals. This difference could be because of the more stressful life of corporate individuals. The results of present study warrant further studies with large number of subjects to draw the final conclusion.

Key Words: PSQI, Sleep Quality

Autonomic Reactivity To Cold Pressor Test In Offsprings Of Hypertensive Parents

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Background and objective: Hypertension is a global burning health problem. Subjects at high risk of future hypertension e.g. the persons of hypertensive family show blood pressure hyper-responsiveness to stress .The aim of this study was to examine the influences of genetic

predisposition to hypertension on the sympathetic nervous system response to the Cold pressor test (CPT). **Method:** A total of 148 young subjects (aged 18-25yrs) selected by random sampling method, divided into two groups 75 subjects without a family history of hypertension (FH-), 73 subjects with a family history of hypertension (FH+). Baseline Blood pressure was recorded, then subject immersed the right hand in cold water up to the wrist for 1 minute. Both Systolic blood pressure (SBP) and Diastolic blood pressures (DBP) were recorded again at the end of 1 minute of immersion and again at 1 minute and 5 minutes after CPT. **Results:** The mean age FH- 19.19 ± 1.62 years and that of FH+ was 19.41 ± 1.84 years ($p = 0.433$). There was no statistically significant difference in the body mass indices in two groups ($p = 0.621$). A statistically significant difference ($p=0.001$) was observed in the SBP differences before and after CPT [mean value 13.99 ± 5.34 in FH- versus 18.155 ± 5.62 in FH+] in between the two groups. No statistical difference was found in the DBP in between the two groups before the test but after the test a DBP in FH+ group was significantly raised as compared to FH- group ($p=0.000$). A highly significant difference ($p=0.000$) was observed in the DBP differences before and after CPT [mean value 13.63 ± 4.83 in FH- versus 17.37 ± 6.65 in FH+] in between the two groups. **Interpretation & Conclusion :** The present study revealed that the young subjects with a family history of hypertension who showed greater responsiveness to diastolic blood pressure due to sympathetic stimulation through Cold pressor test are prone to develop hypertension in future and thus highlighting the importance of genetic factors in determining the sympathetic nervous reactivity to CPT.

Perception Of Noxious Stimuli And Its Electrodermal Correlates

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Background: Sympathetic skin response (SSR) primarily measures changes in skin conductivity mediated by cholinergic sympathetic nervous

activity. Pain includes a sympathetic response that is reflected by SSR. Changes in electrodermal activity in response to pain have been demonstrated in various settings. SSRs therefore have potential in the objective evaluation of noxious stimuli. **Objectives:** To compare and investigate the relationship between SSRs and subjective ratings of pain to electrical noxious stimuli in healthy young adult men and women. **Method:** 60 healthy volunteers (30 males and 30 females) were recruited by purposive sampling from the student community of K. S. Hegde Medical Academy campus based on the exclusion and inclusion criteria. Median nerve of the non-dominant hand was electrically stimulated at the wrist at 5 different levels of pain threshold stimulus (25%, 50%, 100%, 125% and 150%) & SSRs were recorded, analyzed and correlated with numerical pain rating scale. **Results:** Correlation was significant for all subjects at $p < 0.01$ level and for males at $p < 0.05$ level. **Conclusion:** SSRs can be used as an objective method of measuring pain however further study is required.

Key words: Noxious stimuli; SSR; pain; perception

Evaluation Of Pulmonary Function Tests In Smokers And Non-Smokers

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Background: Chronic Obstructive Pulmonary Disease (COPD) is the fourth leading cause of death worldwide. Cigarette smoking is most important etiological factor in development of Chronic Obstructive Pulmonary Disease, which is characterised by airflow limitation. There is decline in the volume of air exhaled within the first second of the forced expiratory volume (FEV_1). There is a dose response relationship between FEV_1 and intensity of cigarette smoking, which is expressed as Pack years. Pack years is the average number of packs of cigarettes smoked per day multiplied by the total number of years of smoking. This dose response relationship between reduced pulmonary functions and cigarette smoking intensity accounts for higher prevalence rates for COPD. Therefore the present study was

conducted to assess Pulmonary Function Tests in smokers and compares them with age and sex matched Non-smokers. **Material & Method:** 50 male chronic smokers having History of smoking since 10 years (Age between 35-70 yrs) was selected for study and 50 non smokers of same age and sex was selected as control group. Smokers having history of diabetes, hypertension, alcoholism, valvular heart diseases were excluded from the study. The Pulmonary Function Tests were recorded in both groups using spirometer Helios-702 (RMS). Parameters recorded were FEV₁, FEV₁/FVC% and FEF (25-75). The results were analysed by using unpaired 't' test (p<0.05). **Result:** In all smokers FEV₁ <60 and FEV₁/FVC < 55%.. (p<0.05). FEV₁ declines by twice as much in smokers than non smokers. This implies that smoking is an etiological factor for obstructive pathology of Lungs. **Interpretation:** Smoke contains nicotine, tar, ammonia, naphthalamine, cadmium, vinyl chloride like substances which are responsible for fibrosis, narrowing of airways, alveolar destruction, accumulation of inflammatory cells, smooth muscle contraction in airways. These contribute to airflow limitation and changes in pulmonary mechanics. **Conclusion:** Smokers are at an increased risk of developing respiratory pathology in the form of Obstructive Lung disease, so stoppage of smoking will definitely help them to live better quality of life.

Key Words: pulmonary function test, chronic obstructive pulmonary disease, smoker, smoking

Heart Rate Variability Changes In Women Exposed To Biomass Fuel Smoke In Rural Areas And Clean Fuel Smoke In Urban Areas Of Haryana

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Background and Objectives: Health burden due to exposure to pollutants released during incomplete combustion of solid fuels in rural indoors equals or even exceeds the burden contributed by urban outdoor exposures. Millions of deaths per year and Disability-

adjusted-life-years are attributed to indoor exposure to biomass fuels. There is paucity of studies on effects of long term exposure to biomass smoke on Cardiovascular health. This study aimed at comparing the Heart rate variability changes in women exposed to biomass fuel smoke in rural areas and clean fuel smoke in urban areas of Haryana and thus assessing Cardiovascular health. **Method:** 30 female subjects of age group 30-45 years of rural areas exposed to biomass fuel smoke with biomass exposure index > 60 (calculated by multiplying the average hours spent on cooking per day and the number of years of cooking) and 30 female subjects of age group 30-45 years of urban areas exposed to clean fuel smoke with biomass exposure index > 60 were subjected to Heart rate variability (HRV) recording using digitalized Polyrite D machine. 5 minutes basal recording of ECG (Lead II) was taken and the variables analysed were SDNN (msec), RMSSD (msec), LF (ms²), LF (nu), HF (ms²) and LF/HF (ms²) ratio. **Results:** SDNN (msec), RMSSD (msec), LF (ms²), LF (nu), HF (ms²), LF/HF (ms²) ratio were lower in rural female subjects exposed to biomass fuel smoke as compared to urban female subjects exposed to clean fuel smoke and this reduction in HRV parameters was statistically significant (p<0.01). **Conclusion:** Heart rate variability is a non-invasive electrocardiographic marker reflecting the activity of the sympathetic and vagal components of the autonomic nervous system on the sinus node of the heart. HRV analyses the tonic baseline autonomic function. Results of the study suggested that long term exposure to biomass smoke adversely affects Autonomic nervous system and Cardiovascular health. Usage of clean fuels as LPG or advanced stoves with chimney/vent is recommended to avoid exposure to biomass fuel smoke.

Heart Rate Variability Analysis In Beta Thalassemia Major Patients Receiving Different Therapeutic Aids

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The purpose of this study was to evaluate heart rate variability (HRV) in beta (β) thalassemia major (TM) patients receiving different therapeutic aids in a hospital based comparative observational study. Day care center of S.M.S. Medical College, Hospital, Jaipur. A total of 56 confirmed beta thalassemia major patients in the age range 5-20 years were examined and the grouping was done on the basis of receiving of regular/irregular blood transfusion along with regular/irregular or no iron chelation therapy. They had no symptoms and signs of cardiovascular disease as assessed clinically and by chest radiograph, routine laboratory profile and echocardiography. All patients underwent recording of impedance peripheral pulse in the right forearm for five minutes. **Results:** All frequency and time domain HRV parameters were found to be significantly reduced in patients receiving irregular/no iron chelation therapy along with regular/irregular blood transfusion. **Conclusion:** TM patients should receive regular iron chelation therapy along with regular blood transfusion so as to prevent/delay iron overload which may influence cardiac autonomic balance.

Key words: Heart rate variability, thalassemia major

Centrifugalization: A Crucial Principle In Development Of The Cerebellum.

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This paper unravels a novel and holistic concept of phylogenetic and ontogenetic development of cerebellum. The concept reconciles and refines the existing understanding and classification of cerebellum and the functional characteristics of different parts of cerebellum. The concept aids in having deeper insight in analysis and comprehension of clinical signs and

symptoms of cerebellar lesions. A thorough review of literature of comparative neuroanatomy, developmental neuroanatomy, comparative neurophysiology, neuroembryology and human adult neuroanatomy, neurophysiology is made to illustrate and substantiate the hypothesis "Centrifugalization is a crucial principle in the development of cerebellum in particular and central nervous system in general"

Effect Of Caffeine On Physical Performance In Young Adults Meghana Gaikwad

Caffeine (1,3,7-trimethylxanthine) is a habitual substance present in a wide variety of beverages and in chocolate-based foods and it is also used as adjuvant in some drugs. There have been numerous reports that caffeine is an ergogenic aid; ingestion of the drug has been shown to increase endurance, particularly in prolonged exercise lasting 30–120 min. The present study was undertaken to study the effects of caffeine in coffee on endurance exercise in young healthy adult males. Twenty young males participated in this single blind (caffeine 5mg•kg⁻¹ body weight) study. Participants underwent two testing sessions separated by 7 days, consisting of handgrip strength test, Rate of perceived exertion scale (RPE) test and an incremental test to exhaustion on treadmill. Paired 't' test revealed significant difference in handgrip strength test, RPE scale, exhaustion time, maximal oxygen uptake (VO₂max) and heart rate ($p > 0.05$) before and after caffeine ingestion. The present study indicates that caffeine consumed 60 minutes before exercise can enhance exercise performance by increasing the total time to fatigue.

A Comparison Of Waist To Stature Ratio And Waist To Hip Ratio For Predicting Type- 2 Diabetes & Hypertension In Adult Population.

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Background and Objectives: Accumulation of fat in the abdominal region is associated with an increased risk of cardiovascular disease, hypertension and diabetes; hence various anthropometric indices that measure abdominal fat (central obesity) are increasingly used in research and clinical settings. Waist to Hip ratio and Waist to Stature ratio are most popular among them, but their predictive power was reported to be variable in different populations; hence present study was carried out to determine better indicator among WSR&WHR, for predicting risk of type -2 Diabetes & hypertension in the study population. **Method:** Total 600 subjects (335 male and 265 female) aged 18 yrs and above from Pandri, Raipur were included in the present cross sectional study. To determine WHR and WSR; Height, waist circumference and hip circumference were measured as per recommendation of "WHO STEPS for surveillance (2008) protocol. Blood glucose and B.P. was measured by standard protocols. Hypertension and Diabetes was defined by JNC-7 and WHO recommendations respectively. Results were analysed by mean, standard deviation, Students T test and Pearson Correlation analysis. **Results:** Mean value of both anthropometric indicators was significantly higher in Hypertensive and Diabetic population than in normal population. Prevalence of Hypertension and Diabetes was more in obese category than non obese category for both indicators. Percentage of hypertensive and diabetic person detected by WSR was higher than WHR. Pearson Correlation analysis showed a positive correlation of both the indicators with Blood glucose level and BP (both SBP & DBP) .WSR had the higher correlation coefficient for both B.P. and blood glucose than WHR. **Conclusion:** WSR was found to be superior to WHR for predicting Diabetes and Hypertension in study population.

Key words: Blood pressure, diabetes, hypertension, waist to hip ratio, waist to stature ratio.

Impact of Pranayama and Omark Meditation on Cognitive and Cardio-respiratory Profile of Mentally Challenged Young Adults

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Purpose: This clinical study was carried out with the aim of investigating whether or not Pranayama (*Nadishodhana & Kapalhati*) and *Aum* chanting practice affects the cognitive performance of mentally challenged young adults. **Material and method:** 80 clinically diagnosed mentally challenged young adults of chronological age between 12 to 25 years attending the same special school were randomly and equally allotted to the control and the study group. Study group children received training by the investigator and performed selected yogic practice for 30 minutes daily during 9 AM to 9.30 AM for 6 days in a week for 3 weeks. Control group children were matched for chronological age, sex, waist-hip ratio, BMI, mental ability and environmental background to that of the study group. They did not participate in yogic practice; instead, were left to carry on with their normal school routine. Cognitive functions were tested for verbal comprehension as per the guidelines provided by Woodcock-Johnson III Tests of Cognitive Abilities (WJ III COG). The selected parameters were measured twice, 1st before the starting of the intervention and later at the end of follow-up period. The various statistical analyses were performed using SPSS version 7.5. Statistical significance was taken to be a p value of less than 0.05. **Results:** Both the study and control groups were comparable (p-value 0.781) in their baseline total score of cognitive function test. At follow-up, improvement was detected in the total scores of both the groups, but, significantly higher degree of improvement was found in yoga practicing group as compared to the control group (p-value 0.001). Verbal comprehension was evaluated for picture vocabulary, verbal analogies and general information. The

significant improvement in general information subcategory was found only in yoga practicing group but not in the control group. The mean scores of both study and control groups in the subcategories of picture vocabulary and verbal analogies were higher after 3 weeks but the improvement in study group was highly significant as compared to control group. **Conclusion:** This study demonstrates the beneficial influences of pranayama and meditation on verbal comprehension. Pranayama and meditation especially affect the general information subcategory which requires semantic memory. Semantic memory formation is achieved through hippocampus and medial temporal lobe. Thus we hypothesize that regular yogic practice of pranayama and meditation may have positive influence on these brain areas in improving semantic memory.

Co-Relation Of Resting Heart Rate And Blood Pressure With General And Visceral Obesity Indices In Young Male Adult Of Western Rajasthan

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Background-Prevalence of Obesity is reaching epidemic proportion in India and is of concern as it increases risk of coronary heart disease, stroke, diabetes and mortality. This study was done to evaluate the association of RHR and BP parameter with general and visceral obesity indices in young adult. **Material and Method-**A cross sectional descriptive study was made on 200 individual. Anthropometric measure were obtained and indices of general obesity body mass index (BMI) and indices of visceral obesity waist circumference (WC) , waist to hip ratio (WHR), waist to stature ratio (WSR), Body fat percentage (BF %) were calculated. RHR in standing and supine position were obtained by

radial pulse. Blood pressure was measure in sitting posture with a standard sphygmomanometer. Pulse pressures (PP), mean arterial pressure (MAP), Rate pressure product (RPP) were calculated. Pearson's correlation (r) between obesity indices and cardiovascular parameter in normal weight and obese were calculated. **Result-** When anthropometric indices of obesity were correlated with SBP, DBP, Pulse Pressure, MAP & RPP although all the indices, (BMI, WC, WHR, WSR, BF%) were positively & significantly correlated with these parameters. On simple linear regression analysis for SBP, DBP, MAP, PP & RPP were significantly correlated with obesity indices. BMI explained 65.1%, 53.4%, 63.3% of variation in SBP, DBP & MAP respectively. whereas WC explained 64.4%, 54% & 63.3% of variation in SBP, DBP & MAP respectively. WHR explained 50.9%, 44.5% & 51.1% of variation in SBP, DBP & MAP respectively. WSR explained 64.2%, 54.7% & 63.7% of variation in SBP, DBP & MAP respectively, and While BF explained 64.3%, 51.4% & 61.7% of SBP, DBP & MAP respectively. On simple linear regression analysis for RHR standing & RHR supine which were significantly correlated with obesity indices, BMI explained 71% & 62.7% variation in RHR standing & RHR supine respectively, Whereas WC explained 74.1% & 65.9% variation in RHR standing & RHR supine respectively. WHR explained 59.6% & 51.8% variation in RHR standing & RHR supine respectively. WSR explained 72.2% & 64.9% variation in RHR standing & RHR supine respectively. BF% explained 70.2% & 64.3% of variation in RHR standing & RHR supine respectively. **Conclusion-** The present study shows significant higher Blood pressures, RHR in overweight & obese young adults. This study also shows a strong correlation between obesity indices & BP parameters in young adult males, BMI being a better predictor of SBP, whereas BMI, WC, WSR & BF% were the major equally significant predictor for variation in DBP. WC was found the major predictor for the variation in RHR standing & RHR supine.

Effect Of Sahaja Yoga Meditation On Autonomic Functions In Subjects Above 40 Years Of Age

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Introduction: - It is generally accepted that sympathetic activity increases and parasympathetic activity decreases progressively with ageing. The plasma concentration of nor epinephrine, as well as efferent sympathetic nerve traffic to skeletal muscle measured by microneurography, increase with age. Sahaja Yoga is a meditation style and new religious movement founded by Nirmala Srivastava. The key experience of Sahaja yoga meditation is a state called "thoughtless awareness" or "mental silence" in which the meditator is fully alert and aware but is free of any unnecessary mental activity. **Aim** To study the effect of Sahaja yoga meditation on autonomic functions in persons above 40 years. Objectives 1. To evaluate the autonomic functions before and after practice of Sahaja yoga meditation in persons above 40 years. 2. To compare the autonomic functions before and after practice of Sahaja yoga meditation in persons above 40 years. **Method and material:** - 50 healthy males and 50 healthy females were selected from JNMC campus and from Wardha. The baseline parameters were recorded for each subject in the morning hours. The autonomic function tests i.e. cold pressor test, sustained handgrip test, valsalva ratio and deep breathing difference were recorded as pre test parameters. The subject practiced meditation for six months after which they were again evaluated for the post test parameters. All the results were analyzed and compared at the pre and post test. Statistical analysis was done by descriptive and inferential statistics using Wilcoxon Signed Rank Test for comparison of all pre and post test parameters. **Result:** Mean age of the subjects was 54.81 ± 9.23 . The mean systolic blood pressure response to sustained handgrip at the pre test was 136.94 ± 14.79 and 144.42 ± 13.85 at the post test. The mean diastolic blood pressure response was 84.26 ± 8.49 and 88.40 ± 8.04 at the pre and post test

respectively. The mean systolic blood pressure rise during CPT was 21.48 ± 4.93 at the pre test which decreased to 16.62 ± 4.57 at the post test. Mean diastolic blood pressure rise during CPT was 17.47 ± 5.50 at the pre test which decreased to 16.07 ± 4.55 . A statistically significant difference was found in the systolic ($z=6.33, p=0.000$) and diastolic ($z=3.38, p=0.000$) pre and post blood pressure response to CPT. Significant difference was found in the systolic ($z=12.35, p=0.000$) and diastolic ($z=10.37, p=0.000$) blood pressure response to SHG. The mean deep breathing difference (DBD) was 22.70 ± 9.11 at the pre test and 25.94 ± 9.08 at the post test. The mean valsalva ratio at the pre and post test was 1.43 ± 0.13 and 1.46 ± 0.13 respectively. There was a significant increase in the Deep breathing difference ($z= 5.40, p=0.000$) and valsalva ratio ($z= 4.17, p=0.000$) at the post test suggesting increase in the parasympathetic activity. **Conclusion:** - Sahaja yoga meditation can be effective in preventing age associated autonomic dysfunction in healthy population and it should be practiced daily for at least 10 min for physical, mental and social well being.

Key words: - Ageing, Sahaja yoga meditation, Autonomic functions.

Effect Of Leisure Time Physical Activity On Heart Rate Variability In Young Healthy Males

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Many studies have demonstrated that a sedentary lifestyle have greater risk for cardiovascular disease. Goal of our study was to determine whether regular exercise increases heart rate variability which is a clinically relevant predictor of cardiovascular morbidity and mortality. The study was conducted on 90 young healthy males of age group 18-25 years. Subjects were divided into three groups according to leisure time physical activity assessed by Metabolic equivalent minutes per week. Group 1 Low- MET score <1500, Group 2 Moderate- MET score 1500-3000, Group 3 High

–MET score >3000. After 15 minutes of rest in supine posture continuous electrocardium for 5 minutes was recorded and heart rate variability was calculated. The results were analyzed for significant differences between groups and within groups by one way ANOVA followed by post hoc Tukey's test. $P < 0.05$ were considered significant. RMSSD was significantly increased between Group 1(low) versus Group 2(moderate) and Group 1(low) versus Group 3(high). Total power was significantly increased between Group 1(low) versus Group 3(high). LF% power was significantly reduced between Group 1(low) versus Group 2(moderate). HF% power was significantly increased between Group 1(low) versus Group 2(moderate). Hence regular physical activity is associated with increased HRV, reduced sympathetic activity and increased parasympathetic tone suggesting physical activity have beneficial effect on cardiac autonomic nervous function. Exploration of relation between physical activity and HRV will aid in understanding a possible mechanism by which physical activity reduces coronary heart disease risk.

Key Words: Heart Rate Variability, Leisure time physical activity, Metabolic equivalent minutes per week, RMSSD, Total Power.

The Study Of Effect Of Food Dust On Pulmonary Functions Of Food Industry Workers

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Background: In India, around 20 million workers are involved in food industry. With rapid industrialization of the developing world, food dust induced lung diseases are poised to become a global health problem.

Aim & Objective: To evaluate and compare the lung functions in subjects exposed to food dust with unexposed once (control groups) and to find out the correlation between duration of exposure with observed respiratory parameters. **Materials and Method:** The

present cross sectional study was conducted in McCain with the help of SPIROLAB II (MIR). A total of 200 individuals, 100 food industry workers and 100 healthy volunteers were included in this study. **Results:** The average FEV1/FVC ratio in food industry workers was 79.07 ± 9.73 , which was significantly lower ($p < 0.0001$) as compared to unexposed subjects 98.04 ± 3.30 . When the FEV1/FVC ratio was studied in correlation with duration of exposure, it was observed that the reduction in FEV1/FVC ratio showed a significant ($p < 0.0001$) positive correlation with exposure time.

Conclusion: In our study an attempt was made to compare pulmonary function between unexposed controls and exposed food industry workers. We must focus on health conditions of the human involving in the manufacturing process and environmental conditions.

Key Words: Spirometer; FEV1/FVC Ratio; food industry Workers

Body Fat Percentage Measured By Anthropometric Method And Bioelectrical Impedance - A Comparative Study

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Introduction And Objective : Health and fitness level of a person is normally indicated by the amount of fat accumulated in the body. Various Method for measuring body fat are available today, but there is no single best method as a bedside tool to indicate the health risk associated with increased body fat. Hence the present study was conducted to document the efficacy of the two commonly used anthropometric Method (BMI and Waist-Height ratio) in assessing the health risk in comparison with body fat measured by Bio-impedance analysis. **Methodology :** 100 healthy male medical students of AIM, B.G.Nagara, in the age group of 18-22 years, who volunteered, were included into the study. The weight (using digital weighing scale with precision of 100 grams) and height (using stadiometer) were

measured. BMI was thus calculated & classified according to South Asian classification. The waist circumference at end expiration was measured at the level of umbilicus using a measuring tape. The body fat % was measured using bioelectrical impedance meter (Stayfit,678). **Results** :It was found that out of the 100 males 63% were found to have increased body fat % (BF% > 19%). BMI and body fat % showed a linear relationship. 33% of men had normal BMI (18.5-22.9) , 22% were underweight and 45% were overweight and obese. 45% of the men with increased BMI showed increased BF %. About 18% of men have increased BF % despite having normal BMI. And 22% of underweight men, however had normal BF %. Rest 15% had normal BMI and BF%. Waist –Height ratio and BF % also showed linear relationship. 58% of men were in healthy category(0.46-0.53). 25% were underweight and 17% were overweight and obese. 17% of men with increased WHtR showed an increased BF %. 36% of men despite having normal WHtR had increased BF %. And 10% of men with WHtR in underweight category showed an increased BF %. Rest 33% had normal WHtR and BF%. **Discussion**: The present study indicates that BMI does not accurately predict BF % and health risks among the Indian population. The sensitivity of BMI as a measure of body fat% is low. The BMI range is not appropriate for comparison of obesity. The cut-offs for BMI may have to be decreased , starting at a lower range. Similarly the sensitivity of waist-height ratio is also low. The cut-offs may have to be decreased. **Conclusion** : The study indicates that nor BMI or waist-height ratio is a definitive tool to assess the body fat%. Probably the results obtained may be because of the small sample size.

Keywords : Body fat%, BMI , waist-height ratio , bioelectrical impedance.

Effects Of Erythropoietin In 6-OHDA-Treated Aged Rat Model Of Parkinson's Disease

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It has been reported that Erythropoietin played important role in prevention of striatal dopaminergic neurons loss against 6-hydroxydopamine (6-OHDA) in young rats. As the degeneration of dopaminergic neurons occurred commonly in aged individuals. The present study was undertaken to investigate the beneficial effects of Erythropoietin against 6-hydroxydopamine neurotoxicity in aged rat model of Parkinson's disease. Literature is silent about it. Sprague-Dawley rats were pretreated with Erythropoietin and subsequently administered the neurotoxin 6-hydroxydopamine into the aged or young rat striatum. Various behavior and immunohistochemical tests were used to investigate the beneficial effects of Erythropoietin. Statistically significant difference was found between post-lesion values of all groups (ANOVA, $P < 0.001$ in apomorphine-induced rotational behavior, staircase test and disengage time; $P < 0.05$ in stepping test, initiation time and postural balance test). Erythropoietin also increased more survival of dopaminergic neurons in the 6-OHDA lesioned striatum. On the basis of changes in these tests, the present study concludes that Erythropoietin enhance beneficial effects in 6-OHDA treated aged and young rat. However less improvement was found in aged rats than young rats.

Key Words: Erythropoietin, 6-hydroxydopamine and aged rat.

A Comparative Study Of Blood Glucose, Lipid Profile And Thyroid Function In Obese Subjects

Neha Saboo

Background & Objectives- In view of life style disease like obesity, hypertension, ischemic heart disease becoming the major cause of mortality and morbidity in Indians it is thought pertinent to undertake this study to assess and compare glucose level, serum lipid profile and

thyroid function in normal and obese subjects. **Material & Method** - The present study had been conducted in the Department of Physiology and Biochemistry, J.L.N. Medical College and Hospital, Ajmer in a Group of 100 subjects with 50 healthy and 50 obese subjects BMI>30 of age group between 20 to 50 year. **Result**- Result was showing as the BMI increases prevalence of raised blood glucose and dyslipidemia increased . Prevalence of raised blood glucose, raised total cholesterol, triglyceride, LDL, VLDL level in following order 32%, 40%, 42%, 44%, 28% and decreased HDL level was found in 54% subjects, most prevalent dyslipidemia was decreased HDL level. **Conclusion**- This study also concludes that obesity increases the risk of hypothyroidism, which was more common in females than males. The low percentage of subjects with normal and controlled parameters suggests that there is a need for awareness programs and lifestyle interventions for the prevention and control of Obesity.

Key Words- Blood glucose, dyslipidemia, obesity, thyroid stimulating hormone

To Determine The Frequency Of Anaemia In Copd Patients And Find Its Impact On Their Health Related Quality Of Life

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Background: Chronic obstructive pulmonary disease (COPD) is characterized by airflow limitation that is usually progressive, not fully reversible and has wide array of extra-pulmonary effects. Various studies from the past have suggested that anaemia of chronic disease is a strong accompaniment of COPD as a comorbidity and when both are present together, they can significantly impair the Health Related Quality of Life of COPD patients. However, there is a little evidence regarding the association of anaemia with HRQL in patients with Chronic Obstructive Pulmonary Disease (COPD). **Method:** This is a prospective observational study conducted in all

consecutive stable COPD patients above 35 years of age, attending the outpatient department of Pulmonary Medicine, Indira Gandhi Medical College Shimla between June 2012 to June 2013. In addition to the demographic data and the anthropometric data, we obtained spirometric data and the Haemoglobin values of the patients. The comorbidities were also ruled out by subjecting the patients to systemic examination and investigations. The Global Initiative for Chronic Obstructive Pulmonary Disease (GOLD) criteria were used to define COPD and World Health Organisation (WHO) criteria to define anaemia. For analyzing the Health Related Quality of Life we used St George Respiratory Questionnaire (SGRQ), to find the (Symptom score, Activity score, Impact score and Total scores). **Results:** It was found that in the entire study population (n=100) there were 32 anaemics. The 32% prevalence of anaemia is much more, then evident from the existing literature and also higher than polycythemia, which is normally considered to be the commonest haematological abnormality associated with COPD. The respondents with anaemia had lesser BMI [20.5(SD3.9)] as compared to non anaemics [22.04(SD3); p=.03]. They also had poor dyspnoea score [(1.7±.7) vs (1.3±.9); p=.05]. The six minute walk distance in anaemics was also lesser [(335.9±72.2) vs (377.3±108.2); p=.05]. These associations were found significant in anaemic COPD patients, thus indicating decreased exercise capacity in them which is an evidence of poor quality of life. Higher total SGRQ scores [37.3(SD18.07)] vs 34.8(SD19.1); p=0.53] were also observed in anaemics. **Conclusion:** Anaemia is a common comorbidity in COPD which is significantly associated with low BMI. These patients also have significant dyspnoea and significantly reduced exercise capacity which can affect quality of life in COPD patients. Thus, patients of COPD should be screened for anaemia and treated for it to improve their quality of life.

Autonomic Function Responses In Different Phases Of Menstrual Cycle

In Low BMI Girls

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Menstrual cycle is accompanied by variations in autonomic functions in different phases up to different degrees. Number of host and environmental factors like strenuous exercise, psychosocial stress, low body fat, endocrine disturbances etc influence menstrual cycle pattern. Any factor which causes disruption of the pattern of menstrual cyclicity in an individual shall also be reflected in their autonomic reactivity. The study was undertaken in 30 healthy, normotensive females of Low BMI (18.5kg/m²) and 30 normal BMI(18.5-24.99 kg/m²) between the age group of 18-25years to observe their autonomic reactivity in three phases of single menstrual cycle. The parameters recorded were E/I ratio, R-R ratio, 30:15 ratio for parasympathetic activity and Handgrip test, Cold pressor test and Lying to standing test for sympathetic activity. Our findings show an increase in the parasympathetic activity in follicular phase and sympathetic activity in luteal phase of menstrual cycle in low BMI girls as compared to normal BMI girls.

Key Words: Autonomic functions, Body mass index, Menstrual cycle

Serum Cortisol Level In Lung Cancer Patients At Various Stages Of Diagnosis

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Introduction: Cortisol is a steroid hormone produced by adrenal glands. It is released in response to stress and a low level of blood glucocorticoids. In humans, the amount of cortisol present in the blood undergoes diurnal variation; the level peaks in morning at 8 a.m.(140-700nmol/L) and reaches its lowest level in evening at 4 p.m. (80-

350nmol/L). Changed patterns of serum cortisol levels have been observed in connection with abnormal ACTH levels, clinical depression and psychological stress. Lung cancer is characterized by uncontrolled growth of lung tissues. Diagnosis of lung cancer is a form of chronic stress so there may be neuroendocrine alteration in patients with lung cancer like elevated serum cortisol level, as cortisol is considered as 'the stress hormone'. A relationship is found between resting cortisol levels and duration of diagnosis of lung cancer. **Aim :** The study was designed to compare the serum cortisol levels in lung cancer patients who have been divided as: Group A: Newly diagnosed lung cancer patients (within 1 week), Group B: Patients diagnosed between 2 to 4 months, Group C: Patients diagnosed for more than 4 months. **Material and Method:** The study was conducted in lung cancer patients (n₁ =150) and controls (n₂=150) between 8:30 a.m.to 9:30 a.m. in Upgraded Department of Physiology, S.M.S.Medical College, Jaipur to estimate serum cortisol level by ELISA (Enzyme Linked Immuno Sorbent Assay) Kit method. **Results:** The differences of mean in 3 groups of lung cancer patients were highly significant (P<0.0001). Mean and standard deviation in groups A, B and C were found 659.2±161.3, 534.5±192 and 236.1±86.42 respectively. The mean and standard deviation in lung cancer patients and controls were 485.1±238.8 and 206.6±92.51. This difference was found statistically highly significant (P=0.000). **Conclusion:** Serum cortisol was high in recently diagnosed lung cancer patients (group A) and it was decreased in group B and in group C it was lowest. The mean cortisol level was greater in the lung cancer patients, but range of individual values within each group does not permit the test to be used diagnostically. This kind of analysis might be useful in the study of hormone secretion in cancer patients and other diseases and to guide therapeutic interventions.

Key words: lung cancer, cortisol, stress.

Bisphenol A Attenuates Phnylbiguanide Evoked Cardio- Pulmonary Reflexes After Chronic Exposure In Anesthetized Rats

Jayanti Pant

Bisphenol A (BPA), an endocrine disruptor, is used in the manufacturing of plastics. BPA is reported to produce a number of reproductive defects and is even associated with behavioural abnormality, diabetes and deranged liver enzymes. However, the knowledge on toxic effects of BPA on cardiovascular system is limited. Therefore the present study was performed to examine the effects of BPA on the cardio-pulmonary reflexes after chronic exposure to BPA. The experiments were performed using adult female rats of Charles Foster strain weighing 150-200 grams after obtaining clearance from the ethical clearance committee of the institute. To study the effect of chronic exposure of BPA, the animals were ingested pellets with BPA (2 µg/kg body weight/day) or without BPA (time-matched control) for 30 days. Further, the animals were anaesthetized with urethane (1.5 gm/kg bw; i.p.) and prepared for recording blood pressure, ECG and respiratory excursions. Phenylbiguanide (PBG) 10 µg/kg body weight was injected through jugular vein to evoke cardio-pulmonary reflexes in these animals. Thereafter, the rats were killed using excess dose of urethane and the lungs and heart were excised and processed for histopathological examination. In time-matched control rats, PBG produced bradycardia, hypotension and tachypnoea over a period of time. In BPA treated group, the PBG-induced heart rate and respiratory frequency changes were attenuated significantly. The histological findings of the lungs revealed emphysematous and consolidative changes in BPA treated group whereas in case of heart, there was rupture of myofibrils with edematous changes. The present results indicate that BPA produces cardiac toxicity by producing chronic changes. The chronic changes manifested as lowered BP and HR along with attenuation of cardio-respiratory reflexes. In addition there were

degenerative changes in lungs and heart to produce the effects of chronic exposure.

Effect Of Electromagnetic Waves Emitted From Mobile Phone On Visual Evoked Potential

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Objective: Electromagnetic Waves (EMW) emitted from Mobile Phone (MP) may cause variety of ocular effects, e.g., cataract, corneal edema, lacrimation of eyes etc. Currently very little information is available on acute effects of EMW emitted from MP on human visual system. So, study is planned to see the effects of EMW emitted from MP on visual evoked potential (VEP). **Materials and Method:** - The present study was conducted on 9 human male healthy subjects in the age group of 20 -40years with duration of exposure to MP around 1hour/day for the last 2-5years. Subjects with history of diabetes, hypertension, drug affecting the autonomic nervous system, visual acuity worse than 6/60 were excluded. **Procedure:** After explaining the whole procedure to the subject, written consent was taken. Recording was done on RMS EMG EP MK-2 machine, using 10/20 system of electrode placement. The electrodes were placed at Cz (active electrode), A1 -A2 (reference electrodes), FPz (ground electrode). In dark room subject was sitting 1 meter away from screen of TV (275/350 mm size) with black and white checks 16/16mm size (subtending an angle of 32 minutes of an arc) were generated on the monitor by an electronic pattern generator. The contrast between black and white checks was 67%. The checks were made to reverse at a rate of 1Hz and 100 responses were recorded. The subject was instructed to fix on small dot at its center with one eye, other eye was closed with hand. Waves of VEP were recorded before and after exposure to MP. Statistical analysis was done by paired "t" test. **Result:** After exposure to MP in left eye, there was significant increase (P<0.001) in latency of P100 wave without affecting the latency of other waves. Although amplitude of P100 - N 75 waves was reduced but not statistically significant. But in right eye, after to MP, latency N 75 (P<0.001) and P100

($P < 0.05$) waves were increased without any alteration in amplitude of P100 –P75 waves. Effect on right eye was slightly different.

Conclusion : EMW emitted from MP may affect the VEP.

Beneficial Effect Of Acute Exercise On Visual Evoked Potential And Reaction Time

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Introduction: –Physical exercise provides multiple benefits to an individual. The beneficial effect of exercise on psychomotor performance is controversial. The present study was undertaken to determine the effect of acute exercise on visual evoked potentials & visual and auditory reaction time. **Aim and objectives:** – This study was conducted to evaluate the effect of Acute Exercise on p100 latency of Visual Evoked Potential and Visual Reaction time. **Materials and Method**– The study was conducted on 50 healthy volunteers in the age group of 18-30 years. Their visual function tests – visual acuity, field of vision, color vision testing and neurological examination were done. Reaction time, P100 latency of Pattern reversal visual evoked potential (VEP) was recorded before and after exercise (done using Bicycle ergo meter). **Result:** –Data was statistically analyzed using appropriate tests. Reaction time, P100 latency was decreased significantly ($P < \text{or} = 0.05$) after acute exercise. **Conclusion:** –This study demonstrated that visual reaction time & Visual Evoked Potential improve after acute exercise irrespective of gender & other physiological factors.

Keywords – Visual Evoked Potential, Visual Reaction time, Acute Exercise.

Correlation Of Obesity And Spirometric Parameters In Central India

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Introduction - Obesity has been associated with many health consequences. It is characterized by a stiffening of the total respiratory system, which is presumed to be due to a combination of effects on lung and chest wall compliance.

Aim And Objectives- To record Forced Vital Capacity (FVC), Forced Expiratory Volume 1 (FEV1), Expiratory Reserve Volume (ERV) and Maximum Mid Expiratory Flow 75/25 in obese patients and to compare it with predicted values of similar non obese individuals.

Material And Method – We have done study in 30 obese patients between age group of 30 -60 years who were referred for spirometry as a part of pre anesthetic pre operative evaluation with no active or significant respiratory complaint with prior consent. Infectious cases were not included in study. PFT has been performed on Master Screen PFT machine from Jaeger Version 02.00 with software version V-781040-057 in department of Respiratory Medicine of Sri Aurobindo Medical College and Post Graduate Institute, Indore MP by qualified PFT technician with assistance of physiologist and reported in consent with pulmonologist.

Result - There is a significant decline in FVC, FEV1 and MMEF 75-25 as compared with the predicted values with respect to their age, sex, weight, height using Udwadia standards. The ratio of FEV1/FVC showed insignificant changes but ERV when compared showed highly significant changes. **Conclusion** - There is a decrease in respiratory function in obese patient. These change in respiratory function in obese persons may be due to the decrease in distensibility of chest wall or decrease in expansion of thoracic cavity. But these patients are asymptomatic so there is need to do more research for deducing normal predicted values for obese individuals.

Effect Of Smoking On Cardiac Autonomic Functions

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Tobacco smoking is a well recognized risk factor for development of hypertension, coronary artery disease, and acute myocardial infarction. Smoking affects the cardiovascular system and global cardiovascular death accounts annually for 18.1 million or 30.8% of all deaths at year 2010. WHO estimates that by 2010, 60% of the world's cardiac patients will be Indian. The term heart rate variability (HRV) conventionally describes the beat-to-beat fluctuations in the HR or the variations in consecutive RR intervals. Measurement of HRV has received a great deal of attention because abnormalities in HRV after myocardial infarction (MI) are strongly associated with an increased risk for death. The study examined the effects of tobacco consumption on blood pressure, Pulse Rate, ECG & Heart Rate Variability (HRV). The pulse rate in non smokers was 75 (SEM +/-7.82) and in smokers was 87 (SEM +/-16.53) & was found to be significant statistically ($p=0.0007$): Nicotine causes an increase in heart rate by stimulating release of endogenous adrenergic neuro transmitters. Smoking appears to induce increased sympathetic discharge and leads to an increase in plasma levels of the adrenomedullary hormones. The systolic blood pressure in non smokers was 120 mm of Hg and in smokers 140 mm of Hg. The diastolic blood pressure in the non smokers was 70 mm of Hg and in smokers was 90 mm of Hg. The difference between non smokers and smokers as expressed by the p value ($p= >0.0001$) was found to be statistically significant. Increase in the systolic blood pressure is due to increased contractility of the heart. The increase in diastolic blood pressure in smokers is due to an increase in peripheral resistance caused by an increase in sympathetic stimulation. Smoking also injures blood vessels walls and speeds up the process of hardening of arteries i.e. Atherosclerosis. All these factors lead to an increase in the peripheral resistance and hence the diastolic pressure. The study also evaluated

the effects of smoking on ECG & Heart Rate Variability. No statistically significant differences were found between smokers and non smokers. The exact reason for this is unknown. One reason could be the duration of smoking in these individuals. Most of the smokers were with a maximum history of 2 years smoking & they also smoked less number of cigarettes in a day. Some studies have shown that the effects of nicotine on HRV & ECG require smoking at least 20 cigarettes per day & for at least 5 years. This study does show that smoking a few even for a short duration can increase both the heart rate & blood pressure & remains a risk factor for future cardiovascular disease.

Harvard Step Test: Old Question Revisited

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Jodhpur.

The Harvard Step Test (HST) has been extensively used for screening of physical fitness. Aside its popularity, numerous critical evaluations of its validity have appeared. Miller and Elbel (1946) thought a height of 20 inch for the stool to be too high for the subject to maintain a constant body rhythm. Seltzer (1946) noted a low correlation between the HST index and the length of the lower limbs. Elbel et al. (1958) considered the length of the leg to be a factor influencing the index score. Keen and Sloan (1958) considered stature and leg length as factors which might influence the HST. Karpovich (1965) found that some of the drawbacks of the HST are that it may produce acute local muscular fatigue and that the bench is too high. Young Indian men often report pain in the lower limbs causing premature exhaustion while performing the HST for the measurement of PFI (Bandyopadhyay, 2007). Still HST is being used with 40 cm step height for Indian population. Scores in this test depend on post exercise 30 second pulse count and duration of effort. The height of subjects may affect the duration of effort and therefore the score. Less PHI in short healthy subjects may be due to muscle fatigue rather than

cardio-respiratory impairment. The purpose of this study was to determine whether the height of the subject has an effect on the PFI (Physical fitness Index) Scores of the HST. Although it is recognized that many parameters may influence the validation of the HST, this study dealt only with the height. This is a preliminary study conducted in 78 healthy volunteers (M \pm SD age 18.42 \pm 1.10, height 1.66 \pm .09 and weight 60.15 \pm 10.22). Among them 46 were males and 32 were females. The study was conducted during routine practical sessions of first year MBBS students between 2 pm to 4 pm in clinical laboratory of Department of Physiology of AIIMS, Jodhpur. They were having almost similar routine in terms of physical activity and were having meals from the same mess since 6 months. All subjects were apparently healthy with no significant history of medical illness. Verbal informed consent of individuals was taken. Height of subjects was taken by standard metre scale in centimeters and weight was taken by standard weighing balance in kilograms. BMI was calculated. They performed the Harvard step test following the standard protocol. Analysis of data using spearman correlation test showed significant effect of subject height on duration of exercise ($r=.5158$, p value= <0.001) and on score ($r=.4260$, p value= <0.001) while correlation of score with BMI was not found significant. Our study suggests that the Harvard step test should be modified in terms of height of step used, according to the height of subject. Also there other variable like stepping cadence and knee angle which may affect the score, should also be considered while interpreting the scores.

Key words: Harvard step test, Physical fitness index

Autonomic Neuropathic Changes In Type 1 Diabetes Mellitus With Duration Of Disease

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Introduction: Diabetes is the most common endocrine metabolic disorder. Duration of

Diabetes affects the quality and longevity. Autonomic neuropathy is postulated to be an indicator of impending demise. **Aim & Objectives:** To study the effect of duration of disease on autonomic nervous system. **Materials and Method:** The present study was conducted on 50 Diabetics and 25 healthy attendants served as controls. The patients were divided into two major groups i.e. Type 1 and control and two subgroups (< 5 years of duration, >5 years of duration). Autonomic nervous system activity was assessed in the physiology department. Sympathetic activity was measured by cold pressor test, hand grip test, and blood pressure response to standing. Parasympathetic activity was measured by S/L ratio, 30/15 ratio, valsalva ratio and I/E ratio. The results were statistically analyzed. **Conclusion:** Changes in sympathetic activity as observed by changes in SBP, CPT & HGT were significantly ($p < 0.001$) affected in IDDM and by the duration of disease (<5 yrs vs >5 yrs) as compared to normal. Significant changes in parasympathetic activity (30:15 ratio, DBT, S/L ratio) were observed in diabetics as compared to normal which progressed with duration of disease (<5 yrs vs >5 yrs, $p < 0.05$) With early detection of Autonomic neuropathy, use of aggressive approach in management of Diabetes Mellitus would reduce mortality and morbidity in these patients.

Evaluation Of Pulmonary Functions Of Road- Side Shopkeepers Exposed To Traffic-Related Air Pollution

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Introduction: Air pollution generated by motor vehicle exhaust has become a major cause of scientific and public concern world-wide. The rapid and marked increase in motor vehicular traffic and its associated gaseous pollutants in the urban areas have caused a sharp increase in prevalence of respiratory allergies. Road traffic produce volatile organic compounds, suspended particulate matter, oxides of

sulphur, oxides of nitrogen and carbon monoxide which makes adverse health effects on exposed population. Shopkeepers nearer to various traffic junctions through which maximum numbers of vehicles pass and they are more prone to develop health hazards of automobile exhaust on respiratory system. Several research works has confirmed the effects of air pollutants on respiratory function of human being. But in India almost no studies done to know the effects of air pollution on residents, shopkeepers or school children who are residing in close proximity with busy road crossings and exposed to dust and traffic pollution. In view of this, our study is aimed to know the effects of dust and traffic pollutants on pulmonary functions of road side shopkeepers. **Aim & Objectives:** To assess the impact of dust and traffic related air pollution on pulmonary functions of the exposed, non-smoking shopkeepers at busy road-crossings. To compare pulmonary functions with age and sex matched non-smoking, non-exposed individuals. **Materials & Method:** Cross-sectional study was conducted on 60 healthy adults aged 20-40 years. 30 shopkeepers working from 9am to 9pm daily and exposed to dust and traffic pollution residing nearer to busy road-crossings of Bijapur city. Control group is 30 age and sex matched non-smoking, non-exposed healthy subjects who are working in shops away from the road traffic pollution. Control group of population was selected from the area located away from highway and other busy streets of the city to ensure that they are coming minimum in contact of road traffic. Each subject was explained about the purpose and procedure to be adapted in the study. After taking informed consent, thorough physical examination is done. Anthropometric parameters, Physiological Parameters, Pulmonary function test were recorded in both control and subjects using standard techniques. Statistical analysis is done using SPSS. **Results:** We observed a significant reduction of FVC [subjects- 2.63 ± 0.40 , control- 2.63 ± 0.40 , (p-0.03)] and FEV_1 [subjects- 2.47 ± 0.59 , control- 1.75 ± 0.42 , (p-0.000)] and an insignificant reduction of PEFr [subjects- 506.00 ± 34.07 , control- 488.66 ± 27.89 , (p-0.610)]

in road side shopkeepers continuously exposed to dust and traffic pollution. The results of the study indicate reduction in the lung function efficiency among the shopkeepers exposed to higher traffic pollution. **Conclusion:** The results of the study indicate reduction in the lung function efficiency among the shopkeepers exposed to higher traffic pollution.

Key Words: Traffic air pollution, shopkeepers, FVC, FEV_1 , PEFr.

Screening Of Tuberculosis Patients For Diabetes Mellitus In India

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Objective: People with Diabetes Mellitus (DM) have a significantly increased risk of developing active tuberculosis (TB) and also experience more adverse treatment outcomes. As there is a high burden of both DM and TB in India, this study aimed to assess feasibility and results of screening TB patients for DM within the routine health care setting. **Method:** Agreement on how to screen, monitor and record was reached in October 2011 at a stakeholders' meeting, and training was carried out for staff in the facilities in December 2011 and January 2012.. The pilot project was carried out on 100 patients diagnosed with TB. **Result:** Of 100 TB patients diagnosed for TB treatment in participating facilities, 98% were assessed for diabetes and 13% were found to have DM; of these, 8% had a previously known diagnosis of DM and 5% were newly diagnosed. **Conclusion:** This pilot project shows that it is important and feasible to screen TB patients for DM in the routine setting, resulting in earlier identification of DM in some patients as well as better management of comorbidity. A policy decision has since been made by the National TB Control Programme of India to implement this intervention country-wide.

Comparative Effect Of Slow Hyperventilation & Slow Shallow Breathing On Concentration & Affect Of Young Healthy Volunteers

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Aim: 1. To study the effect of slow hyperventilation and slow shallow breathing on concentration and affect
2. To compare the effects of both on the affective responses **Method:** 60 healthy volunteers, 18 – 20 yrs of age were recruited for the study. After obtaining informed consent, and negative interpretation, they were divided in to two groups (A, B). Affect assessed. During 1st week, group A were asked to perform slow hyperventilation for 3 min and group B were asked to perform slow shallow breathing. Responses of affect are assessed by appropriate questionnaire & concentration was tested by i) brief tests of attention ii) d2 test. On the 3rd week, the subjects were asked to perform the alternative practice and the tests repeated. **Result:** Slow shallow breathing: decreased anxiety immediate attention span: enhanced ($p > 0.05$) concentration endurance: increased ($p > 0.05$) Slow hyperventilation: no change in affect / increased anxiety immediate attention: Enhanced ($p < 0.05$) concentration endurance: increased ($p > 0.05$) **Conclusion:** Slow shallow breathing, though reduces the anxiety, enhancement of concentration is minimal in comparison with slow hyperventilation technique. This study needs further work involving patients of ADHD, anxiety disorders and panic attack.

A Preliminary Study To Compare The Effect Of Gabapentin, Topiramate, Levetiracetam And Zonisamide For Neuropathic Pain In Rats

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Background: Neuropathic pain syndrome is a frequently occurring, disabling disease. Many

anticancer drugs which are used to treat solid tumors cause neuropathic pain as their dose limiting side effect. Current treatment options are still relatively poor. **Aim:** The aim of this study is to compare the effect of newer antiepileptic drugs in treatment of neuropathic pain induced by anticancer drug (vincristine) in albino rats. **Materials and Method:** Neuropathic pain was induced by injecting vincristine (100 $\mu\text{g}/\text{kg}$) intraperitoneally daily for 14 days in rats. Behavioural testing for thermal hyperalgesia was assessed 24 hours after each injection by the hot-plate method. After 14 days rats were divided into five groups of six animal each. Group I was treated with distilled water as control group, group II was treated with oral gabapentin (60 mg/kg), group III received oral topiramate (40 mg/kg), group IV was treated with oral levetiracetam (120 mg/kg) and group V received zonisamide (50 mg/kg). The antihyperalgesic effect of drugs was assessed by the hot-plate method 24 hours after each administration. Statistical analysis was done by two way analysis of variance (ANOVA) followed by post hoc test. **Results:** Gabapentin, topiramate and zonisamide treated groups showed a significant ($P < 0.0001$) increase hot-plate latency as compared to control group. Levetiracetam treated group however, did not show a significant increase in hot-plate latency. **Conclusion:** In vincristine induced neuropathic pain gabapentin, topiramate and zonisamide appear to be promising drugs although they act by different mechanisms.

Sprint Interval Training Better Than Traditional Aerobic Exercise For Improvement In Major Depression Inventory Score: A Randomized Controlled Trial

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Background: WHO ranks depression as the fourth leading cause of disability worldwide. Major depression is a serious, recurrent

disorder linked to diminished quality of life, medical morbidity, and mortality. The Study by Martinsen EW et al has indicated that antidepressive effects associated with exercise are not restricted to aerobic forms of training. Sprint Interval Training is coming up as a newer alternative form of exercise with increased compliance and adherence. **Purpose:** To compare Sprint Interval Training (SIT) & traditional aerobic exercise (AE) with respect to changes in Major Depression Inventory. **Hypothesis:** Sprint Interval Training (SIT) is better than traditional aerobic exercise (AE) with respect to changes in Major Depression Inventory Score in patients of Depression. **Study design:** Parallel assignment, Randomised controlled trial. **Method:** Sample size determined using openepi software. 44 males aged 20 - 35 years suffering from Depression as per DSM IV TR criteria were enrolled and randomly allocated to SIT & AE groups. SIT group exercised at high intensity for 10 minutes a day, 3 days a week. SIT group performed Sprint training in 1:1.5 ratio i.e one minute of all out sprint followed by one & half minute of cooling down, completing four such cycles per session. AE group exercised as per current guidelines i.e. daily 30 minutes of moderate intensity exercise for 5 days a week. The assessment of Depression patients based on Major Depression Inventory was done before intervention and 6 weeks after intervention. Paired t test was used to analyse the results. **Results & Conclusion:** Major Depression Inventory Score improved from 25.45 ± 2.12 to 21 ± 2.4 in traditional aerobic exercise group. The improvement was statistically significant with p value 0.0001. It improved from 26.23 ± 2.7 to 19.21 ± 1.56 in SIT group. The improvement was statistically significant with p value 0.0001. Thus, both aerobic exercise & SIT led to a significant improvement in Depression as per Major Depression Inventory Score. When difference in improvement was analysed between the groups, SIT led to an improvement of 7.02 ± 1.92 which was better than improvement of 4.45 ± 1.34 as seen with aerobic exercise. The difference in improvement from two protocols of exercise was statistically significant with p value of

0.001. SIT done for 30 minutes a week benefitted more than aerobic exercise done for 150 minutes as regards improvement in Major Depression Inventory Score. SIT can be suggested as a time efficient exercise protocol for improving MDI in Depression.

Key Words: Sprint Interval Training, Aerobic exercise, Major Depression Inventory.

Effect Of Body Mass Index On Menstrual Cycles In Women With Infertility

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Background: - The prevalence of overweight and obesity is increasing among the present generation due to dietary habits and lack of physical activities. Several studies have suggested that obesity impairs fertility in females by affecting ovulation through hormonal imbalance. **Aim:** - This study Aim to assess the association between BMI and menstrual irregularities in women with infertility. **Materials And Method:** - 100 Females of age 25 to 40 years attending infertility clinic at Coimbatore medical college hospital were selected by purposive sampling. Their anthropometric measurements were done using standardized instruments and BMI calculated using Quetlet's formula. They were grouped into three groups according to BMI as Normal (BMI < 22.9), Over weight (BMI 23 TO 24.9), and Obesity (>25). Their menstrual history was elicited using questionnaire and results were statistically analysed using SPSS for windows. Pearsons chi square test was done. **Result:** The association between overweight and obesity with menstrual irregularities like oligomenorrhea (cycles > 36 days) were found to be significant. (p < 0.05) **Conclusion:** - As obesity and overweight impair fertility by affecting ovulation, modification of dietary habits and physical activities play an important role in initial management of infertility.

Comparison Of Correlation Between Serum Uric Acid And Fasting Blood Glucose Levels In Offspring's Of Patients Of Type 2 Diabetes Mellitus With That Of Healthy Controls

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Background: Current evidence suggests a significant association between increased serum uric acid(SUA) levels and the risk of development of type 2 diabetes mellitus (DM). But the causal association between the two remains controversial. It still remains unclear whether SUA is merely a risk marker or an independent risk factor for developing type 2 DM. Family history of type 2 DM is an important risk factor for developing type 2 DM, in their offspring's along with other risk factors such as obesity, insulin resistance, hypertriglyceridemia, etc. Hence the present study was done to determine the association between SUA and the fasting blood glucose (FBS) levels in offspring's of patients with type 2 DM. **Aim and objectives:** 1) To evaluate the SUA levels and the FBS in offspring's of patients type 2 DM, and in age and sex matched healthy controls. 2) To compare and thereby to test the hypothesis that "a significant correlation is present between the SUA and the FBS levels in offspring's of patients of type 2 DM". **Methodology:** Thirty offspring's of type 2 DM patients and thirty age and sex matched healthy controls without history of type 2 DM in the family, were randomly selected for the study. Out of the thirty subjects in each group, ten were females and twenty were males in the age group of 17-25 years. SUA levels (Uricase-PAP method), blood urea (GLDH-Urease method), serum creatinine (Jaffe's method), triglycerides (GPO-Trinder method), total cholesterol (by CHOD-PAP method), FBS (Trinder's method), and blood pressure (palpatory and auscultatory method) were measured in both the groups along with the anthropometric measurements viz., height, weight, BMI, waist- hip ratio. Data was then tabulated and statistically analysed using SPSS software. **Results and Conclusion:** It was found

that both the groups were well matched with respect to age and sex. Body mass index and the waist circumference were significantly higher in offspring's of patients of type 2 DM in comparison to controls ($p < 0.001$, $p = 0.034$). Lipid parameters and renal parameters (except serum creatinine) did not differ much in both the groups and were within the normal range. FBS levels were within the normal range in both the groups, but were significantly higher in controls. Systolic blood pressure was significantly higher in offspring's of patients of type 2 DM in comparison to controls inspite of being within normal limits. Analysis further showed a significant positive correlation ($r = 0.339$, $p = 0.067$) between FBS and SUA levels, in offspring's of patients of type 2 DM unlike in controls ($r = 0.242$, $p = 0.198$). Hence it was concluded that a significant positive correlation is present between FBS and the SUA levels in offspring's of patients of type 2 DM.

Key words: Fasting blood glucose, Serum uric acid, Type 2 diabetes mellitus.

Perception Of Organ Donation Among General Public In Coimbatore Kanchana Bobby Sundarapandian

Background: Organ donation plays a vital role in saving many lives. organs and tissues from a single non-living donor can be used to benefit more than 50 people. living donors can donate a kidney and parts of their liver, lung, pancreas or intestine. at this juncture, it is necessary to know the ground reality on organ donation. **Aim:** To determine the knowledge and perception regarding organ donation among general public in Coimbatore. **Method:** Data of this cross sectional study was collected by self administered questionnaire from general public in Coimbatore from September 15th 2013- October 15th 2013. sample size of 1000 were selected by accidental sampling method using exclusion criteria (children and insane were excluded). descriptive research design was used to analyze the data. data was analyzed by SPSS and association was tested using pearsons chi-square test. **Results:** More than 80 percent of them (822/1000) are still unaware of organ donation. only 1.1 percent of them carried

donor card.54 percent of them are unwilling to register. 62 percent of them were not confident.84 percent did not feel well informed about registering.there is no association between educational qualification and level of awareness on organ donation at 0.05 % level of significance.p value =0.4893. **Conclusion:** There is a strong need to create awareness among general public on organ donation.high level of awareness creation at different levels need to be implemented through mass media,NGOS,health care providers,educational institutions at deep root level.

Peroneal Nerve Palsy In Farmers In Harvesting Season: A Report Of Twelve Cases

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Objective: Acute injury of peroneal nerve is a common phenomenon due to trauma at the level of fibular head. Rarely peroneal nerve injury occurs at the ankle level. This study shows twelve cases of such type of injury during the wheat harvesting season between February and April. **Materials and Method:** - Twelve cases with foot drop were referred from clinical department for nerve conduction studies. All the cases had similar history of foot drop because of long hours of continuous squatting for more than eight hours a day. NCV (Nerve conduction velocity) of peroneal was done by placing active and reference electrodes along the course of peroneal nerve. Electromyography of distal muscles of foot and ankle were done. **Results:** On conducting NCV (Nerve conduction velocity) of peroneal nerve it was observed that there was a conduction block at the level of ankle. EMG showed reduced recruitment and interference pattern in distal muscles of foot and ankle. **Inference:** Due to prolonged squatting on one limb (Right in right handed persons) with hyper dorsi-flexion of

foot there are chances of peroneal nerve injury at ankle level.

Risk Of Metabolic Syndrome In Non-Obese Rural Population

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Background: Metabolic Syndrome (MetS) is a combination of abdominal obesity, atherogenic dyslipidemia (hypertriglyceridemia and low HDL Cholesterol), elevated blood pressure and elevated plasma glucose. The characteristic features are abdominal obesity, insulin resistance and decreased glucose tolerance. People with MetS are at increased risk to develop cardiovascular disease and type 2 diabetes mellitus. With regard to MetS-related risks, obese persons have been the focus of attention and less attention has been paid to non-obese subjects, as if they were free from the risks. The present study was designed to find out if, “No-obesity means No-Metabolic Syndrome.” **Objective:** To determine the likelihood of MetS and deregulation of its components in normal weight (NW) and overweight (OW) individuals in a non-obese rural population. **Method:** MetS variables included in the study according to NCEP, ATP-III criteria are Body Mass Index (BMI), waist circumference, hip circumference, waist- hip ratio (W/H ratio), systolic and diastolic blood pressure, fasting glucose, fasting triglyceride and high density lipoprotein-Cholesterol (HDL-C). The biochemical parameters were assayed by conventional clinical laboratory Method with due external and internal quality assurance. **Result and Conclusion:** Of the total subjects selected in the study an unexpectedly high numbers of non-obese subjects from rural population were found prone to MetS, particularly in upper normal weight (NW) and overweight (OW) sub-groups. This suggests that non-obese individuals should also be screened properly for the risk of CV diseases and Type-II Diabetes Mellitus, because of their likelihood to develop Metabolic Syndrome.

Key Words : Metabolic syndrome, Obesity, Non-Obese rural population, ATP-III.

To Study The Effect Of Yoga (Yogasans, Pranayam, And Meditation) Training On Hypertension

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Background: Hypertension is the most common cardiovascular disease affecting more than one billion people worldwide. Yogic exercises (Asana, Pranayama and Meditation) have beneficial effects on hypertension. **Aim & Objectives:** The aim of present study was to evaluate the effects of yogasana, pranayama, and meditation as an adjunct to pharmacotherapeutic treatment in hypertension stage-1(Systolic Blood Pressure 140–159 mmHg and Diastolic Blood Pressure 90–99 mmHg) and Hypertension stage-2 (Systolic Blood Pressure ≥ 160 mmHg and Diastolic Blood Pressure ≥ 100 mmHg) patients. **Material & Method:** The study was conducted on 50 hypertensive patients aged 40-50 years, who were on salt reduction and antihypertensive drugs. They were randomized into two groups: control group (n=25; age 44.64 ± 3.69 years) and study group (n=25; age 45 ± 3.55 years). The study group practiced yoga for 45 min, 6 day/week for 3 months. The control group did not practice any type of yogic exercises or relaxation techniques. Systolic blood pressure (mmHg), diastolic blood pressure (mmHg), and pulse rate (beats per minutes) of all patients were assessed at day 1st and monthly for 3 months. The data were analyzed using paired and unpaired 't' test by SPSS software v 18. **Results:** In the present study, there were significant reduction in mean values of systolic blood pressure (121.12 ± 8.18), diastolic blood pressure (77.04 ± 3.35), and pulse rate (69.52 ± 2.84) after 12 weeks of yogic practices in yoga group as compared to control group in whom mean values of the systolic blood pressure (138.16 ± 12.98), diastolic blood pressure (94.24 ± 12.32), and pulse rate

(98 ± 3.13) was noted after 12 weeks. From the present study it was observed that a significant reduction in the systolic blood pressure, diastolic blood pressure and pulse rate occurs in subjects practicing yoga ($p < 0.001$). The results of present study indicate that yoga has beneficial effect on reduction of high blood pressure & dose of anti-hypertensive drug also.

Conclusion: Yoga and meditation should be recommended as an adjuvant therapy along with medication (anti-hypertensive drugs) to tilt the autonomic balance to parasympathetic dominance to get relieved from hypertensive symptoms.

Key Words: Yogic exercise; Hypertension; Blood pressure; Pulse rate.

A Comparison Of Cardiopulmonary Parameters Between Pranayama Practitioners With Age Matched Sedentary Controls

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Introduction-Pranayama is part of yogic practice. The word pranayama constitutes two separate terms 'prana', and 'ayama'. Prana is a concept of vibration, pulsation. 'Ayama' is the voluntary efforts to control and direct this prana. Respiration is the one vital function which we can partly control voluntarily. Pranayama is a science which makes use of voluntary regulation of breathing which in turn controls the mind with other vital parameters. Hence by controlling breathings in pranayama it can stabilize and control autonomous nervous system. Importance of pranayama is already mentioned in ancient Indian history. Pranayama can be effectively used for health promotion. Effects and benefits of yoga are already studied, but there are few studies on benefits solely of pranayama practice on cardiopulmonary parameters. This study is to compare the cardiopulmonary parameters between pranayama practitioners with age matched sedentary controls. **Method-**In this study participants were divided into two groups and written consent were obtained from them. Group 1 is of 30 (male and female) volunteers of age group 25-40 practicing pranayama for at least or more than 12 weeks. Group 2 is of 30

(male and female) age matched sedentary controls. Both groups were subjected to measurement of anthropometric data like age, sex, height, weight and BMI and they were compared. Both groups were also compared by unpaired t test for their cardiopulmonary parameters. Parameters compared were pulse rate, systolic blood pressure, diastolic blood pressure, respiratory rate, breath holding time, FVC, FEV1 and PEFR. **Result-** In both groups no significant differences in age, height were found. A significant reduction was found in group 1 for weight and BMI. There was significant reduction in pulse rate and systolic and diastolic blood pressure in group 1. There was significant decrease in RR while FVC, FEV1, PEFR and breath holding time were significantly increased in group 1. **Conclusion-** From present study it can be concluded that regular practice of pranayama improves cardiac and respiratory efficiency. Hence pranayama can be used as an adjunct in the prevention and also in the treatment of many cardiorespiratory diseases. **Key words-** Pranayama, cardiorespiratory parameters, sedentary lifestyle, FVC, FEV1, PEFR

Effect Of Duration Of Type 2 Diabetes Mellitus On Peripheral Nerve Conduction

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Introduction: Diabetes mellitus is one of the most common chronic diseases in nearly all countries affecting 8.3% of world's population. According to WHO estimates, India will have 80 million diabetics by the year 2030 making it the diabetes capital. Peripheral neuropathy is the most common and troublesome long term complication of diabetes mellitus, which can be diagnosed early by nerve conduction studies.

Objectives: This study was undertaken to assess peripheral nerve conduction in type 2 diabetes mellitus patients of varying duration and to compare it with age and gender matched healthy subjects. We also aimed to correlate peripheral nerve conduction parameters of diabetic patients with duration of diabetes.

Materials and Method: Nerve conduction parameters were recorded using the standard RMS ALERON 401 machine in diabetic male patients having diabetes for 0-5 years (Group B: n=30) and 5-10 years (Group C: n=30) with controlled blood glucose level (HbA1c < 7.0%) and 30 normal healthy control subjects (Group A). All selected patients were in the age group of 40 to 60 years. Parameters recorded were bilateral – sural sensory nerve conduction amplitude and velocity, ulnar sensory nerve conduction amplitude and velocity. Nerve conduction parameters of diabetic patients and controls were compared by applying ANOVA test. Correlation between nerve conduction parameters and duration of diabetes in diabetic patients was analyzed by applying Pearson's Coefficient. Percentage reduction in nerve conduction parameters in upper limb and in lower limb was analysed. **Results:** We found statistically significant decrease in sural ($p < 0.001$) and ulnar ($p < 0.05$) nerve conduction amplitude and velocity in diabetics having duration 0-5 years as well as 5-10 years as compared to controls. On multiple comparisons by post hoc Dunnett's t test, mean difference in amplitudes and velocities of both nerves in both, group B and group C was statistically significant as compared to group A; except in case of ulnar nerve conduction velocity where it was not significant in group B. We do not found statistically significant correlation of duration of diabetes with any of the nerve conduction parameter under consideration. We also found that percentage reduction in all nerve conduction parameters was greater in lower limbs as compared to upper limbs. **Conclusion:** This study shows that diabetic patients with longer duration of diabetes are at increased risk of diabetic neuropathy in spite of controlled blood glucose levels. Risk is greater in lower limbs as compared to upper limbs. This can lead to serious complications in future viz. diabetic foot. Therefore regular screening of peripheral nerve function should be done in type 2 DM patients so that prompt action can be taken to reduce the morbidity due to diabetic neuropathy thereby reducing the global burden of diabetic complications.

Key words: Type 2 diabetes mellitus, peripheral nerve conduction, duration of diabetes.

Antioxidant-Vitamin C Status In Obesity And Its Relation With Adipocytokine –Adiponectin

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Background: Antioxidants, such as ascorbic acid, play a role in scavenging free radicals to protect against oxidative damage. Few data on the concentration of vitamin status in obese subjects is available. This study was therefore designed to investigate the relationship of serum concentration of vitamin C with obesity and adiponectin, and impact of abdominal adiposity on its concentration. **Method:** Total 150 subjects (120 men and 30 women) aged 17-26 years without chronic illness and not taking multivitamin supplements were studied, in whom Body Mass Index and Waist-to-Hip Ratio were taken as a measure of generalized obesity and abdominal adiposity. The biochemical test had done including serum adiponectin and serum vitamin C. **Result:** The serum concentration of vitamin C decreased with increasing levels of Body Mass Index (as per the NIH classification) and was found to be significant in overweight ($p=0.025$), obese class-I ($p<0.001$) and obese class-II ($p<0.001$) subjects as compared to normal-weight subjects. Further, according to present study groups, obese subjects with (Group 1) ($p<0.001$) and without (Group 2) ($p=0.048$) abdominal adiposity had statistically significant lower concentration of serum vitamin C, when compared with normal-weight subjects, which was found to be more significant in obese subjects with abdominal adiposity. Even within the subset of obese subjects (Group 1 and Group 2) statistically significant ($p<0.001$) difference was observed, suggesting the role of abdominal adiposity. Karl Pearson coefficient of correlation revealed a statistically significant negative correlation of vitamin C with Body Mass Index ($r= -0.680$; $p<0.001$) while a positive correlation with adiponectin ($r=0.555$; $p<0.001$).

Conclusion: Obese subjects had a significantly lower serum concentration of vitamin C, and this decreased concentration of antioxidants is more prevalent in obese subjects with abdominal adiposity. Lower levels of antioxidant vitamins may reflect an increased utilization to combat oxidative stress as is evident in obese subjects. Moreover, serum vitamin C was positively related with serum concentration of adiponectin.

Key Words: - Obesity, abdominal adiposity, adiponectin and vitamin C

Performance In Hypertensive And Normotensive Individuals In The Age Group Of 30-40 Years.

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Background- Cognition impairment is a physiological consequence of ageing. After 65years of age, impairment of memory is common. The various factors for such decline are yet under evaluation. Hypertension, the most prevalent vascular disease in older adults is a reason for multiorgan damage .Does hypertension affects the intelligence and memory of a person?. Specific cognitive functions affected by consistently high blood pressure are not yet unequivocally determined . The following study is being planned to assess the cognitive status in hypertensive and normotensive individuals of same adult age group. We know that cognitive impairment is common in older age group in the studies done before; in our study we are searching such correlation in adult age group. The results might lead us to establish a co-relation between the blood pressure and cognitive levels, thus leading us to a potentially modifiable factor causing dementia which if controlled in adult age group could be beneficial to prevent further deterioration of the cognition. **Aim-** Assessment of cognitive performance in hypertensive and normotensive individuals in the age group of 30-40 yrs. **Method-** To establish the correlation between hypertension and cognition impairment in adult age group. Pretext instructions were given to the patients and their cognitive performance was assessed by using

Montreal Cognitive Assessment Scale. It is a 10 minutes 30 points scale used in assessing the cognitive abilities. The BP was measured by sphygmomanometer. **Result-** Statistical analysis of Moca score of all the hypertensives and normotensives with their BP levels was done by Chi-Square test, which showed a significant correlation with $P < 0.05$. **Conclusion-** From this study we conclude that hypertensives perform poorly than normotensives, so hypertension does affect the cognitive function of the adults.

Effect of oral contraceptive on Absolute Basophil counts during different phases of menstrual cycle

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Background and Objective: Different Methods are used to detect the time of ovulation. It is difficult to find out exact time of ovulation. Leucocytes have an active role in ovulation¹. In our previous studies² we have found that there is a significant change in Absolute basophil count in peripheral blood at the time of ovulation. Present study was done to find out effect of oral contraceptive on absolute basophil count in different phases of menstrual cycle and establish a correlation between basophil count and ovulation. **Method:** Absolute basophil count and ultra sonography was done in forty four female subjects aged 20-40 years. **Result:** A significant fall in absolute basophil count was seen on 14th day (calculated date of ovulation) as compared to 7th and 21st day of menstrual cycle with signs of ovulation by ultra sonography in subjects with spontaneous ovulation. But no significant change was seen in absolute basophil count and no signs of ovulation were seen in ultra sonography on 14th day of menstrual cycle as compared to 7th and 21st day of menstrual cycle. In subjects having an ovulatory cycle (confirmed by sonography) and an ovulatory cycle induced by oral contraceptives. The significant fall in basophil count in peripheral blood in subjects with spontaneous ovulation was probably due to migration of these cells from peripheral blood toward the maturing follicle in ovary. While this change was not seen in an ovulatory

and induced anovulatory subjects. **Conclusion:** There is a significant fall in basophil count at the time of ovulation. The absolute basophil count can be used as an indication of ovulation.

A Comparative Study Of Pulmonary Function Tests In Air Conditioners Users And Non Users

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Introduction: Air conditioners (AC) are now no longer a luxury but a necessity. In recent times a great increase in the use of AC has been observed in offices, residential places and vehicles. It causes air to become cold and dry. This can adversely affect the health of the AC users, particularly the respiratory system. The present study was selected to study the adverse effects of use of AC on respiratory health as measured by pulmonary function tests. **Aim & Objectives:** The study was aimed to assess the effect of using AC on pulmonary function tests as measured by spirometry and to compare spirometric parameters of AC users with those not using AC. The study was also aimed to compare spirometric parameters of AC users and non AC users after 1 year and to study the effect of duration of exposure to AC on various spirometric parameters. **Material & Method:** Hundred healthy, non-smoker adults of age 25 – 50 yrs. exposed to AC for minimum 6 hours a day since minimum 1 year were selected as study group. Controls were age and sex matched healthy, non-smoker 100 adults, who were not exposed to AC. Exclusion criteria were smoking, obesity ($BMI > 30$), present or past respiratory disorders, sportsmen & those doing pranayam or breathing exercises regularly. Spirometry was performed according to American Thoracic Society guidelines. Pulmonary function tests were recorded in both groups using NDD Easyware Spirometer (Switzerland). Parameters recorded were, FVC, $FEV_{1.5}$, $FEV_{1.5}/FVC$, $FEF_{25-75\%}$, $FEF_{25-75\%}/FVC$ and PEF. Again spirometry was done in both the groups after 1 year. Analysis will be done by applying appropriate statistical tests. Expected

Result: The cool and dehumidified air of AC can cause broncho-constriction and may bring changes in pulmonary function tests of AC users. In future, AC users can be advised for regular spirometry to prevent any further complications.

Key words : AC users , spirometry, FVC, FEV₁, FEV₁/FVC , FEF₂₅₋₇₅, FEF₂₅₋₇₅/FVC and PEFR.

Association of Age with Stress Relaxation in Premenstrual Syndrome cases : "A Randomized Controlled Trial with 61-Point Relaxation Technique

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Background: Premenstrual syndrome (PMS) is a psycho neuro endocrine disorder with biological, psychological components along with stress as a major cause. Relaxation technique can reduce stress. **Objective:** To determine association of age with stress relaxation in PMS. **Materials and Method:** An interventional study was conducted with 61 point relaxation technique on females with PMS and their aged matched controls. Effect of 61 - point relaxation technique on cold pressor test was observed in two different age groups i.e. 30 females suffering from pre menstrual syndrome <30 years and 30 females suffering from pre menstrual syndrome >30 years. Effect of relaxation technique was observed on systolic and diastolic blood pressure and heart rate. Association of age with effect of relaxation technique was observed by Chi-square test. **Result:** It was observed that there was highly significant(p<0.001) reduction in the systolic blood pressure ,diastolic blood pressure and heart rate(p value 0.0012, 0.0011, 0.0003 respectively)) in subgroup of >30 years in study group after one week training of 61- point relaxation training . While there was significant (p<0.05) reduction in the systolic blood pressure , diastolic blood pressure and heart rate p value (p value 0.043, 0.025, 0.032 respectively)in subgroup of >30 years in control

group after one week training of 61- point relaxation training . **Conclusion:** These results suggest increasing age itself is a risk factor for premenstrual syndrome. There is a reduction in sympathetic activity by 61- point relaxation training and it can be used as an effective relaxation tool during premenstrual stress.

Key words: 61- point relaxation training, premenstrual syndrome (PMS), Stress

Assessment Of Cognitive Age Related Changes In Cognitive Function In Thyroid Disorders.

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Aim and Objectives- Subclinical hypothyroidism is a condition of mild thyroid failure known to have higher prevalence with increasing age. Patients present with vague non specific symptoms. Recent studies have shown subtle cognitive deficit which can progress to marked cognitive impairment. In this study we evaluated cognitive function of middle age women diagnosed with subclinical hypothyroidism using event related potentials (P300). **Materials and Method-** 30 middle aged (30-50 years) women diagnosed with subclinical hypothyroidism (group1) were compared with 30 age and sex matched hypothyroid patients (group2) and euthyroid controls (group3). Cognitive functions were evaluated using three parameters Mini Mental Scale Examination, Event Related Potentials- P300 latency and amplitude, Audio & Visual Reaction time and compared according to age. **Result-** P300 latency in both subclinical hypothyroid group and hypothyroid group was delayed as compared to normal euthyroid controls with p value < 0.001. No significant difference was found in P300 amplitude in both study groups as compared to controls. In hypothyroid patients P300 latency at Fz, Pz was found positively correlated with age and P300 amplitude at Pz was negatively correlated with age. In euthyroid controls P300 latency at Fz, Cz and Pz showed positive correlation with age while P300 amplitude at Pz showed negative

correlation with age. No age related correlation was observed in subclinical hypothyroid patients. **Conclusion-** Age related cognitive decline, a feature of euthyroid controls and hypothyroid patients was not observed in subclinical hypothyroid patients.

Spirometric Studies In Woolen Factory Workers Of Ludhiana

Ritu Purohit*, Hemlata Badyal, Lily Walia, J.
Whig

Introduction : The burden due to occupational diseases is growing at an unprecedented rate. The nature of respiratory diseases caused by occupational dust is influenced by type of dust and duration of exposure. In India very few studies have been conducted to see the effect of wool dust on woolen factory workers. Hence, present study was designed to see the pulmonary function status of woolen factory workers. **Aim And Objective:** To record various pulmonary function parameters in woolen factory workers and compare them with healthy controls. **Materials And Method:** The study was conducted in 75 factory workers (18-60 yrs) of either gender in Ludhiana and compared with data obtained from 75 age and gender matched controls. Evaluation was done by measuring various pulmonary function parameters using computerized autspirometer following standard measures and precautions. Analysis was done using analysis of variance (ANOVA). ANOVA followed by Post hoc test, $P < 0.05$ was considered as statistically significant. **Conclusion:** The findings of this study revealed that there was decrease in FVC in factory workers as compared to controls and was found to be highly significant ($P < 0.05$). FEV_1 in factory workers was also found to be lower than group I. Various pulmonary flow rates in this study have been studied and it was observed that all the flow rates i.e. PEF, $FEF_{25\%}$, $FEF_{50\%}$, $FEF_{75\%}$, $FEF_{0.2-1.2}$ of exposed group were lower than that of group I but only $FEF_{25\%}$ was considered to be statistically significant. MVV in group II was significantly lower than group I in the present study. All the lung function parameters were correlated with duration of exposure to wool dust. A decline was observed

in all the parameters as duration of exposure increased from 1-5 years to 20 years. It was concluded that wool dust present in factory leads to decrease in lung function parameters of the workers working therein. There does occur harmful impact on pulmonary system functioning due to inhalation of these wool particles.

An insight about Transient Receptor Potential Vallinoid 1

Sadiqua Begum

Introduction: Transient Receptor Potential Vallinoid (TRPV1) is the most studied of the 20 members of the TRP (Transient Receptor Potential) family of ion channels. This is not because it was one the first to be cloned, but rather it has emerged as a target to control chronic & acute pain. **Structure:** TRPV1 is a calcium permeable channel. It has three well defined domains: the intracellular N- and C-termini & a transmembranal region. They are found throughout the body, in epithelial cells & peripheral & central nervous system. **Modulators:** It is regulated by heat, exogenous chemicals (eg. Spices) , voltage and endogenous compounds including acid, bases, ions, gases & lipids & their products. It is activated by different endogenous stimuli released during tissue damage & inflammatory processes. Endogenous molecules- PIP2 & DAG, lysophosphatidic acid, anandamide & N-acyl ethanolamines, N-acyl dopamines, arachidonic acid & lipoxygenase products, ATP, protons etc are positive modulators of TRPV1 & cholesterol, adenosine & resolvins are negative modulators. **Functions:** They exert variety of functions , ranging from inflammation, nociception and pain. Other putative functions include in sensing volume changes, obesity, itch & its role in respiratory & auditory system. TRPV1 channel is an important effector of cellular function under both physiological & pathological conditions. Its activation will depolarize neurons & produce action potentials that ultimately evoke the sensation of pain. **Conclusion:** Identifying natural & synthetic inhibitors of TRPV1 is a high priority field of research. Once identified it can play a vital role

in pain management. Further study of this molecule will give a clearer picture of molecular mechanisms underlying its functioning.

Effects Of Electromagnetic Waves Emitted From Mobile Phone On Auditory And Vestibular Functions

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Aim and Objectives: To study and compare the effects of electromagnetic waves emitted from mobile phone on auditory and vestibular functions in users of different duration before and after the use. **Materials and Method:** - 50 subjects were included in this study divided into two groups- **Group-I:** 25 subjects using mobile phone for <30 minutes/day for a period of <5 years. **Group-II:** 25 subjects using mobile phone for >30 minutes/day for a period of >5 years. BAEPs (for auditory function) were recorded using evoked potential recorder (RMS EMG EP MK2) in Faraday's cage and Modified Romberg's Test (for vestibular function) was performed before and after 10 minutes of mobile phone use. Results were compared before and after the exposure in each group separately as well as between two groups. **Result:** Most of the subjects have shown increase in latencies of different waves in BAEPs and positive Modified Romberg's Test after exposure, which were more evident in Group II. **Key Words:** Electromagnetic Waves, Mobile Phone, BAEPs, Modified Romberg's Test.

A Comparative Study Of Left Ventricular Diastolic Function In Young Pre-Hypertensives And Normotensives By Doppler Echocardiography

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Aim And Objectives: The structural and functional alteration of the heart caused by pre-hypertension is unclear. The present study was designed to compare the left ventricular

diastolic function in young normotensive and pre-hypertensive subjects between the age group of 18–35 years using transmitral Doppler echocardiography. **Subjects And Method:** Pulse wave transmitral Doppler echocardiographic data was assessed in 100 subjects. Of which, 50 were normotensives (systolic <120 mmHg and diastolic <80 mmHg) and 50 were pre-hypertensives (systolic = 120–139 mmHg and diastolic= 80–89 mmHg). Their early and late diastolic peak transmitral flow velocity ratio (E/A ratio) and deceleration time (E wave deceleration time) were measured. Un-paired student's t-test was used for statistical analysis. **Results:** When compared with normotensive, in the pre-hypertensive group the E/A ratio was significantly decreased ($p=0.05$) and the deceleration time (DT) was significantly prolonged ($p = 0.01$). **Conclusion:** This study concludes that diastolic relaxation abnormalities starts even in young prehypertensive individuals. The changes in the indices of diastolic function were only subtle in this age group of prehypertensives. Pre-hypertension is a predictor of established hypertension and diastolic dysfunction. **Key Words:** Pre-hypertension, E/A ratio, Deceleration time (DT)

Association of ABO blood groups with risk of breast cancer in Western Rajasthan women

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Background: Blood group is an important risk factor for some malignancies like pancreatic and stomach cancer. However, it is unclear whether the risk of breast cancer is higher in any specific ABO blood type. **Objective:** To find out the risk of breast cancer in relation to ABO blood groups. **Material and Method:** The study was conducted in the department of Physiology in collaboration with the department of Radiotherapy at Mathura Das Mathur Hospital

of Dr. S. N. Medical College, Jodhpur (Rajasthan), on 206 clinically diagnosed breast cancer patients, regardless of menopausal status, body mass index, oral contraceptive use or family cancer history. Study period was from September 2006 to March 2008. The standard agglutination test was used to determine the blood groups. Association of ABO blood groups and risk of breast cancers was found out with Odd Ratios (OR) with 95% confidence interval (CI). For significance P value equal to or less than 0.05 was considered significant. **Results:** Breast cancer was found minimum in blood group 'AB' and maximum in blood group 'A'. In reference of proportion of breast cancer in blood group AB [OR 1 with 95% CI 0.476 to 2.103], the breast carcinoma in blood group A [OR 7.444 with 95% CI 4.098 to 13.5222] was found at 7.4 times at higher risk than in blood group 'AB'. **Conclusion:** Blood group 'A' had higher risk of breast cancer than other blood group types.

Key Words: ABO blood, breast cancer, cancer and ABO blood group.

Antinociceptive Effect Of Sucrose Across Different Ages And Gender

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Background: Sucrose induced analgesia (SIA) is a well established phenomenon in both human infants and animals (Blass and Hoffmeyer 1991). In neonates and infants orally administered doses of sucrose reduces crying while performing routine investigative procedures (Stevens B, Tabbio A, Ohlsson A 1997). The mechanism underlying SIA is suggested to be mediated by the endogenous opioids system (Segatto et al 1997). This effect is produced by the sweet sensation rather than by the absorption of sucrose (Barr et al 1999). Very few studies in western countries have shown the analgesic effect of sweets like sucrose and glucose in adults (Mercer E.M, Holder MD 1997). An Indian study had shown sucrose induced analgesia in gender **Aim:** The aim of the study is to explore the gender and age difference in the analgesic effect of sucrose. **Method:** The study is a pilot study with

participants of age 16-60 years. Participants with a history of analgesic drug consumption and cyanosis are excluded. Pain is induced in the participants using cold stimuli, administered by immersing participants right hand up to the wrist. The cold water is maintained at 4°C while holding mouthful of plain water (control) and sucrose solution (30%) and the pain tolerance time (sec) of the participants is noted for each instance. The pain tolerance time in age 16-19 years (group1), age 20-40 years (group 2) and age 50-60 years (group3) are analysed for age difference. **Results:** The results, till now indicates an increase in pain tolerance time with sucrose solution in both male and female but the pain tolerance time in males is more than females. **Conclusion:** The study is ongoing and the data will be collected from the sample by next month.

Influence Of Age On Intra Ocular Pressure In Myopics

Sowjanya.M

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Aim: To study the influence of age on intra ocular pressure in myopics. **Introduction:** Intra ocular pressure (IOP) is the fluid pressure inside the eye. IOP is an essential entity in maintaining structural & functional integrity of the eye ball. Normal IOP varies between 10 to 20 mmHg. The average value is 15.5 mmHg with fluctuations of about 2.75 mmHg. During night IOP usually decreases. IOP is influenced by various factors like exercise, heart rate, respiration, fluid intake, systemic medications, topical drugs, alcohol, smoking etc. Myopia is a refractive error also called as near sightedness where the axial length of the eye ball is longer compared to the normal & the light rays coming from an object are focused in front of retina. IOP is an important aspect in evaluation of patients at risk for glaucoma. Control of IOP within normal physiological range is necessary to maintain the anatomical conditions necessary for optimal refraction & thus vision. **Objectives:** 1. To study the IOP in myopics in different age groups. 2. To study the influence of age on IOP in myopics. **Materials And Method:** This study was conducted in Ophthalmology Dept of Bidar

Institute Of Medical Sciences, Bidar. 100 myopic subjects attending ophthal opd were selected within the age group of 11to 60years and grouped into 5 groups. With the exclusion criteria –alcoholics, smokers, diabetics, hypertensives, vitamin A deficiency, patients on eye medications & previous eye surgeries. Subject’s refractive status was examined using refractive test & their IOP was measured using Schiottz tonometer. Results were analysed by ‘ANOVA’ test followed by unpaired ‘T’ test with p value less than 0.05 were considered significant. **Results:** The study showed IOP varies significantly in each age group with p value of 0.03. **Conclusion:** This study shows that age influences the IOP in myopics. The IOP in each age group shows significant differences.

Status of Autonomic Activity In Patients With Cervical Spondylosis

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The study was conducted in 60 subjects of age group 30to 60 years.The subjects were divided into two groups of 30 each (Group I-control and group II- cervical spondylosis patients) to compare the basal heart rate variability to assess autonomic function.The changes in heart rate variability(HRV) were studied through time domain and frequency domain analysis.The heart rate variability is one of the most non-invasive autonomic variable that reflects fluctuations in parasympathetic and sympathetic impulses and represents actual balance of autonomic activity in an attempt to achieve the optimum. Significant low values of time domain parameters (RMSSD, SDNN, NN50) and high value of low frequency domain (LF) and statistically high LF/HF ratio of basal HRV analysis in cervical spondylosis patients is suggestive of sympatho-vagal imbalance due to relatively more reduction in parasympathetic tone. The possible causes will be discussed.

Key Words: cervical spondylosis, heart rate variability, autonomic functions.

To Study the Effect of Noise Pollution On HEA

Sumitra Kumari

Background & Objectives- The noise pollution is defined as the unwanted sound which is released into the environment. Noise induced hearing loss in an increasingly prevalent disorder that result from exposure to high intensity sound, especially over a long period of time. **Material & Method-** The present study has been conducted in the Department of Physiology and E.N.T., J.L.N medical college and Hospital, Ajmer in a group of 60 subjects with 30 marble factory workers and 30 normal individuals and age group between 21-58 year. Noise level in marble factory was 110 dB. All subjects were submitted to audiometric measurements for air conduction at different frequencies and hearing loss was considered at > 25 dB. **Results-** The results of this study, the marble factory workers showed highly significant increase in mean monaural hearing thresholds compared to controls at frequencies 500,1000,1500 Hz. Audiometric values were consistently lower in normal than in marble factory workers. The differences were statistically significant among both sexes and that too for the parameters of right and left ear. In this study mild hearing loss was 20%, moderate hearing loss was 16.67%, moderately severe hearing loss was 36.67% and severe hearing loss 26.66%. **Conclusion-**This study also concludes that the presence of impact noise is more Hz to hearing irrespective of the duration of exposure but in workers exposed to continuous noise, the duration of exposure had a more prominent effect on the hearing loss. "The main focus in occupational health is on three different objectives: (i) the maintenance and promotion of workers’ health and working capacity; (ii) the improvement of working environment and work to become conducive to safety and health and (iii) development of work organizations and working cultures in a direction which supports health and safety at work and in doing so also promotes a positive social climate and smooth operation and may enhance productivity of the undertakings.

Key Words- NIHL, Pure tone audiometry.

The Assessment Of Autonomic Status And Hemodynamic Variables In Essential Hypertensive Patients

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Background & Objective: Hypertension is characterized by increased blood pressure associated with hemodynamic abnormalities. It is one of the major risk factors for cardiovascular mortality. Essential hypertension is most prevalent form of hypertension. Thus the present study was undertaken to assess the autonomic activity and hemodynamic variables in essential hypertensive patients. **Material & Method:** 30 essential hypertensive patients and 30 age matched normotensive subjects were examined. Autonomic activity was assessed by heart rate variability analysis. Hemodynamic variables were assessed on the principle of impedance plethysmography. **Results:** In the present study, no significant differences were observed in frequency domain measures of heart rate variability (Total power, amplitude of low frequency and high frequency power, low frequency and high frequency power in absolute units, low frequency and high frequency power in normalized units, Low frequency/High frequency ratio) in both groups. The mean blood pressure ($P<0.001$), cardiac output ($P<0.01$), stroke volume ($P<0.01$) were significantly increased and mean systemic vascular resistance ($P<0.05$) and blood flow index ($P<0.01$) were significantly reduced in essential hypertensive patients than normotensive subjects. **Interpretation & Conclusion:** This hemodynamic dysregulation obtained greater insight into the pathophysiology of essential hypertension. Therefore they may help to guide diagnostic, prognostic and therapeutic management decisions.

Keywords – Autonomic activity, hemodynamic variables, heart rate variability analysis, impedance plethysmography

Effect Of Type 1 Diabetes Mellitus On Brainstem Auditory Evoked Responses.

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Type 1 Diabetes is a chronic metabolic disorder characterized by hyperglycemia resulting from autoimmune destruction of the beta cells of the pancreas. Elevated blood glucose level can lead to dysfunction ,damage & failure of various organs especially eyes, kidneys, nerves, heart & blood vessels. One of the lesser known consequences of diabetes is auditory organ dysfunction. A study was conducted on 30 patients of type 1 diabetes mellitus aged below 45yrs & to have had diabetes for less than 10 yrs, attending Medicine Department at Rajindra Hospital,Patiala and 30 healthy age & sex matched controls below 45 yrs of age. It was found that in the diabetic group,the latency time of wave V and interval I-V duration was significantly longer compared to the control It was concluded that retrocochlear part of auditory pathway upto brainstem level are involved in patients of type 1 diabetes mellitus.

key words : diabetes, BAER.

Study Of Comparison Of Cognitive Functions In 1st Year Medical Students

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Introduction : Cognition refers to the mental activities involved in the acquisition, processing, organization and the use of knowledge. We examined the digit memory, processing speed, verbal fluency in male and female participants along with anxiety measure which may affect the cognitive functioning. **Aim & Objectives** : To compare the cognitive functions in male and female. **Material And Method** : 1st year healthy

medical students (22 male and 20 female) from government medical college, surat were selected for the study. Study protocol was explained to the participants and informed consent was taken from them in consent form. All the participants performed the following cognitive function tests : 1) **Digit memory test (digit forward and backward test)**, 2) **Digit symbol substitution test**, 3) **Verbal fluency test**. The participants were also asked to complete **State trait anxiety inventory (STAI)**, to access the anxiety level which may affect the cognitive functions. Mean and SD was calculated for all the cognitive tests and the observations of male and female participants were compared. The statistical analysis was performed with unpaired student's t-test. P value <0.05 was considered as the level of significance. **Results** : There was no statistically significant difference in age and anxiety status between male and female participants of the study. Female performed better in processing speed with mean and SD of 69.9 ± 6.3 as compared to male participants with mean and SD of 64.2 ± 8.8 ($p < 0.05$). In the tests for verbal fluency and digit memory test, the level of significance observed was $p > 0.05$. **Conclusion** : Physiological and neuroanatomical differences in male and female individuals contribute to such variations in cognitive functions.

Key Words : Anxiety, Cognition, Digit Memory, Processing speed, Verbal fluency

The Levels Of Zinc In Semen Of Infertile Human Male Subjects

Radhika P Kothari , Ajay R Choudhari

Background: Human semen contains high concentrations of zinc , a high degree of which originates from the prostate, plays an important role in sperm function. The presence of abnormal levels of zinc may affect spermatogenesis with regard to production , maturation , motility , and fertilizing capacity of the spermatozoa. The aim of this study is to evaluate the levels of Zn in seminal plasma in different groups of male infertility. **Aim:** To evaluate the seminal zinc levels in infertile male subjects with different fertility potential. **Materials and Method:** - : The semen samples

were obtained from 40 male partners of infertile couples who attended the Reproductive Biology Unit (Infertility Clinic) of the Department of Physiology, MGIMS, Sevagram, who were aged 20-42 years and were analyzed for the routine seminogram parameters by SQA II CP. All the subjects were categorized into two main groups, A. The subjects with abnormal ejaculates, which include i) Asthenoteratozoospermics (n=10) ii) Oligoasthenoteratozoospermics (n=05) and iii) Azoospermics (n=05) and B. The subjects with normal ejaculates (n=20). The levels of zinc were measured spectrophotometrically by using the kit (Coral Clinical systems). **Results:** The difference in the average Zn level in normal and abnormal cases is statistically significant ($p < 0.05$). **Conclusion:** A decreased zinc could have significant role in the aetiology of impaired sperm functions. So, zinc therapy may be used as specific treatment for infertile male subjects with abnormal ejaculate.

Effect Of Stress On Response Time In College Students

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Background & Objective: The measure of reaction time has been used to evaluate the processing and speed of central nervous system and co-ordination between sensory and motor system. As the reaction time is influenced by the different factors, the effects of stress on reaction time was investigated in the present study. The monitoring of stress levels of students is critically important around their examinations, to identify students with abnormally increased stress levels who are susceptible to complications of negative stress. In essence, the study was planned to evaluate the range of positive stress using examination stress as a model. **Materials and Method:** - A

reaction Time (visual and auditory) program for measuring sensori motor response was prepared indigenously in computer programming language. The stress level was determined by employing state and trait anxiety inventory. The effect of stress on response time in first year medical students had been studied in a sample of 50 healthy normal medical entrants (25 boys and 25 girls) in age group (19-21 years). The subjects served as their own controls. They were subjected in two different conditions: non-stress period and full of stress period, when they were expected to appear in the examination. These medical students were subjected to visual and auditory reaction time in these two conditions with different level of stress. The autonomic parameters of the subjects were recorded in supine position prior to the evaluation of Reaction Time. **Result & Conclusion:** No significant gender difference was observed in both visual and auditory reaction time. Visual Reaction Time (VRT) was greater than Auditory Reaction Time (ART). Results disclosed that stress within a limit, gives a positive feedback to CNS information processing resulting in a significant decrease reaction time. If stress level exceeds the capacity of the coping mechanism of an individual, it adversely affects the CNS information processing resulting in worsening of psychomotor performance.

Key words: Stress, Visual Reaction Time (VRT), Auditory Reaction Time (ART), State and Trait Anxiety Inventory (STAI), Central Nervous System (CNS).

Comparative Study of Auditory and Visual Reaction Time in Patients of Type 2 Diabetes Mellitus on Allopathic Treatment and in Healthy Controls

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Background : Diabetes affects peripheral nerves in the somatosensory and auditory system, slows psychomotor responses, and has cognitive effects on those individuals without

proper metabolic control, all of which may affect reaction times. Focussing on Type 2 diabetes a worldwide epidemic, we used visual and auditory reaction time as a tool to detect neuropathy a common complication of diabetes so that we could prevent further damage to nerves. **Aim :** to measure and compare visual and auditory reaction time between type -2 diabetics on oral medication and healthy volunteers. **Method:** Subjects and controls were enrolled based on detailed questionnaire and informed consent was obtained. The mean age of type 2 diabetic subjects was 49.8 years and that of control 44.8 years cases and controls were age matched. **Inclusion Criteria:** AGE 40-60 Years. Cases; Type 2 Diabetics under control. Control: Healthy subjects without Diabetes, Hypertension, no visual and auditory disturbance. **Exclusion Criteria:** Alcoholics, hypertension, subjects on insulin, diabetes with complication, subjects with auditory and visual disturbances

Human reaction time apparatus was used to measure auditory and visual reaction time. Unpaired 't' test of variance has been used for statistical analysis. **Results :** Auditory reaction time for both high frequency and low frequency sounds are more in type 2 diabetic patient as compared to normal. Visual reaction time for red and green colour are also more in type 2 diabetic patient as compared to normal control group. **Conclusion :** This study concludes that type 2 diabetes mellitus leads to neuronal changes which leads to delayed reaction time.

Visual Evoked Potential In Relation To Gender And Head Size In Age Group Of 18-25 Years

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Objective : 1) Evaluate P100 latency and amplitude in normal subjects of age group 18-25 years with different head size by Pattern reversal visual evoked potential. 2) Compare P100 latency and amplitude in relation to gender. **Method :** Pattern reversal visual evoked potential (VEP) was carried out in 60

normal healthy subjects of age group 18-25 years. Among these 30 were male & 30 were female. Age group was restricted in short range to eliminate age variance on VEP readings. Head circumference was measured. P100 latency & amplitude were measured and data was analysed. P100 latency & amplitude was evaluated in both sexes and different head circumferences. **Result:** Head sizes were larger in males as compared to females. P100 latency was comparatively prolonged in males and those having larger head circumference. There was positive correlation between P100 latency & head circumference. P100 amplitude was larger in females compared to males. There was negative correlation between P100 amplitude & head circumference. While no difference was found in P100 latency & amplitude in both sexes having head size measurement in same range. **Conclusion:** P100 latency & amplitude in pattern reversal VEP was significantly affected by head circumference. Gender variance was due to difference in head size

Key Words : Pattern reversal, P100 latency, P100 amplitude, Head circumference.

Study Of Chronic Exposure To Magnetic Field On Pain Status Of Fibromyalgia Patients

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Fibromyalgia (FM) is characterized by chronic pain, with fatigue, sleep disorders, anxiety, morning stiffness, depression, memory loss, dizziness, and generalized muscle tenderness irritable bowel syndrome. Recent literature indicates benefit in chronic pain by extremely-low-frequency transcranial magnetic stimulation (rTMS) at RDLPFC. Present study was undertaken to evaluate the effect of rTMS at RDLPFC on the symptoms of FM. The assessment parameters included all components of chronic pain syndrome, and pain modulation status before and after rTMS with 6 months follow-up. The assessment tools included visual analogue scale (VAS), McGill

pain questionnaire (MPQ), RIII reflex while STAI-SSF for anxiety, BDI-II for depression, questionnaire for pain belief and WHOQOL-BREF questionnaire for quality of life. Pain modulation status was assessed by cold pressor test and sucrose challenge test. Only primary FM patients were included. They had > 11 tender points, and exhibited chronic pain components. The patients were divided into FM and Control groups, FM with no rTMS (FM-Sham group) or rTMS (rTMS groups). Data revealed hyperalgesia, high anxiety levels, mild depression, in addition to better pain coping strategy vs. Controls. The quality of life was poor in the FM. Objective assessment of pain by RIII reflex supported hyperalgesia. Genetic polymorphism of 5HT2A and COMT gene was also noted. Beneficial effect of rTMS was seen on the quality and duration of sleep as early as day 2 while on chronic pain within 7 days. Chronic pain associated anxiety, depression, negative coping strategies and beliefs regarding cause of pain also improved during week 1 of rTMS treatment. The improvement was possibly because of strengthening of diffuse noxious inhibitory control and opioid mediated descending inhibition of pain. In totality, the quality of life of FM patients improved dramatically after extremely low frequency transcranial magnetic stimulation (rTMS).

Variation In Response To Experimental Pain During Different Phases Of Menstrual Cycle In Human Females

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Background: It is widely accepted that human males and females differ in their response to pain. One factor that could help to explain these findings is the female hormonal cycle, as hormone levels may affect pain sensitivity. **Aim and objective:** To study the variation in response to experimental pain on different days of menstrual cycle. **Materials and Method:** - Eighty one normally menstruating females (17-25 years) were subjected to experimental pain

of cold pressor task on days 1,7,14 and 21 of the menstrual cycle and pain threshold and pain tolerance were measured(in seconds) . Data were analyzed by one- way ANOVA with post-hoc Tukeys HSD test using appropriate software. **Result:** Mean pain threshold (seconds) were on day 1 (18.1±5.5), day 7(14.7±4.1), day 14(9.8±2.8), and day 21(16±4.1), respectively and mean pain tolerance (seconds) were on day 1 (108±35.9), day 7(87.1±26.2), day 14(65.1±13.4), and day21 (98.7±30.5) of menstrual cycle. It was observed that both pain threshold and pain tolerance vary across menstrual cycle and was found to be statistically significant ($p \leq 0.001$). **Conclusion:** Our findings suggest that pain sensations induced by cold pressor task significantly vary across the menstrual cycle.

Key Words: Experimental pain, Cold pressor task, Menstrual cycle.

Effect Of Magnetic Field Exposure On Ventromedial Hypothalamic Functions In Complete Spinal Cord Injured Rats

Sajeev Ambalayam

Introduction: Supra spinal changes associated with sensorimotor dysfunctions are documented after spinal cord injury (SCI). However, significant behavioral changes like alteration in feeding behavior and chronic pain are also seen post-SCI which are not totally accounted by the injury per se. Ventr-medial nucleus of hypothalamus (VMH) plays a pivotal role in these functions. Pulsed Magnetic field (MF) stimulation has been shown beneficial to SCI patients as well as animals for alleviation of chronic pain, osteoporosis, locomotor and bladder dysfunction. **Aim:** To know the status of VMH after spinal cord injury and the effect of MF stimulation on it. **Method:** Adult male Wistar rats were divided into Sham-SCI, SCI, SCI+MF, SCI+ VMHL and SCI+VMHL+MF groups. Laminectomy was performed (Sham group) followed by complete transection of spinal cord at T13 level (SCI group) while MF exposure (50Hz, 17.96 μ T, 2h/d) was given for 8 weeks after the surgery to SCI+MF group. Bilateral

electrolytic VMH lesion was performed for SCI+VMHL group after SCI while MF was given for SCI+VMHL+MF group. VMH functions like feeding behavior, pain, palatability and sucrose induced analgesia were assessed by daily food intake (FI)/water intake (WI), threshold of tail flick (TTF)/ Fore-paw lick latency (FPL), taste preference test to various taste solutions (sodium chloride, citric acid, sucrose, saccharin, quinine hydrochloride and water), FPL after sucrose ingestion, respectively at before and various time intervals after SCI. Hind limb locomotor function was assessed by BBB score. Results: Significant decrease in FI, WI, TTF and FPL were observed post-SCI. Palatability to sodium chloride and citric acid were increased while sucrose, saccharin and water were decreased after SCI. None of the rats in any of the group ingested quinine hydrochloride solution. Sham group of rats showed a biphasic pattern of pain response (initial analgesia followed by eualgesia and later hyperalgesia) after sucrose ingestion; however this pattern was altered after SCI. BBB score was significantly reduced after SCI. But MF exposure to SCI rats caused significant improvement and restoration in all of the above parameters. **Conclusion:** Our observations suggested a beneficial and protective effect of MF stimulation on significant alteration of VMH functions after SCI. **Ethical clearance:** The animals were procured from Institutional animal house and maintained as guided by the institutional animal ethical committee.

Assessment Of Peak Expiratory Flow Rate Among Secondary School Children From Low Socioeconomic Status: A Crossectional Pilot Study

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Background: Peak expiratory flow rate (PEFR) is an effective measure of effort dependent airflow. It is relatively a simple procedure and may be carried out in the field using portable instruments. Information on PEFR aspect of

spirometry in India is relatively lacking. Factors which have an adverse influence on PEFR are low socio-economic status, overcrowding of residence, and smoking. Overcrowding is in itself a reflection of low socio-economic status. **Aim:** This pilot study was done to assess the PEFR in secondary school children from low socioeconomic status in Aurangabad district of Maharashtra. **Material & Method:** Study Design: Cross-sectional study Site: Department of Physiology, Government Medical College, Aurangabad, Maharashtra Approval of Institutional Ethics Committee was taken prior to start of the study. Secondary school children (Standard VIII to X) from two of the schools of Aurangabad falling under low socioeconomic strata of society were included in the current pilot study. One was a boy's only school & the other was a girl's only school. 38 boys & 38 girls were selected by simple random sampling technique from Standard VIII to Standard X students. Body weight was measured on electronic weighing scale using standard procedure & height was done using stadiometer. PEFR values were calculated using Wright's peak flow meter. All the readings were taken in morning to avoid diurnal variation. For making the measurement, the subject was asked to breathe out maximally into the peak flow meter after having taken a maximum inspiration. Average of 3 readings was taken. **Results & Conclusion:** Mean age, height and weight of the female students was 13.4 ± 0.8 years, 150 ± 7.6 centimeters & 41.2 ± 9.2 kilograms respectively. PEFR in females was 235.3 ± 55.3 liters/minute. Mean age, height and weight of the male students was 13.9 ± 1.4 years, 152.7 ± 7.8 centimeters & 38.6 ± 8.1 kilograms respectively. PEFR in males was 227.4 ± 51.4 liters/minute. These PEFR values were found to be on the lower side of two standard deviations from the mean for their age and height. When compared to the data from published Indian literature for healthy children, PEFR adjusted for height was found to be significantly lower in the study group. Thus, there is a need to screen the children from lower socioeconomic status for early identification & treatment of respiratory abnormalities.

Key Words: Peak expiratory flow rate, pulmonary function, school children.

Effect Of Body Fat Distribution On Mep, Pefr And Blood Pressure In Obese Medical Students

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Aim & Objective: To assess & compare the difference in body fat distribution on MEP, PEFR and blood pressure among normal and obese young healthy medical students and to detect the correlation between Body fat percentage and Pulmonary Function Tests if any. **Materials & Method:** The present comparative and cross sectional study was conducted on obese ($n=30$, BMI >30) medical students aged 18-22 years and compared with age matched non obese ($n=30$, BMI 18.5–24.99) controls of Shri B.M. Medical College, Bijapur. Anthropometric parameters like height (cm), weight (Kg), Waist circumference (WC) and hip circumference (HC) were measured. BMI (Kg/m^2), WC/HC, WC/Ht were calculated. The percentage of body fat was estimated by measuring skin fold thickness at four sites (4SFT-biceps, triceps, subscapular and suprailiac) with the help of Harpenden's caliper. The pulmonary function tests like PEFR and MEP were recorded. Statistical analysis was done using Student's 't' test and correlation was done by using Pearson's correlation. **Results:** Nearly all obese medical students (BMI= 31.46 ± 2.29) had W/Ht >0.5 . However, 20% of non obese males and 10% non obese females (BMI= 21.17 ± 1.59) had W/Ht >0.5 . A significant increase in blood pressure (SBP, $p=0.00017$ and DBP, $p=0.00012$), body fat % ($p=0.0009$) and significant reduction in PEFR ($p=0.0003$), MEP ($p=0.02$) was observed among obese subjects compared to non obese. A significant negative correlation between BMI with PEFR ($r=-0.682$) and MEP ($r=-0.298$) and between body fat with PEFR ($r=-0.503$), MEP ($r=-0.528$) was observed. Also there was a significant negative correlation between WC/HC with MEP ($r=-0.286$), PEFR ($r=-0.621$) and

WC/Ht with MEP ($r = -0.513$), PEFR ($r = -0.621$). **Conclusion:** The present study demonstrates a decrease in MEP, PEFR with increase in body fat percentage and central fatness in obese medical students of Bijapur.

Key Words: Body Mass Index, Body Fat Percentage, Skin Fold Thickness, MEP, PEFR.

Impact Of Yoga On Diffusion Lung Capacity In Type 2 Diabetes Mellitus

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Aim: To study the effect of yoga on diffusion lung capacity in Type 2 Diabetes Mellitus (DM) patients. **Objectives:** To compare the anthropometry parameters and diffusion lung capacity in Type 2 DM patients (on routine conventional therapy) before and after 8-weeks of yogic training. **Materials and Method:** - The study involved 60 diagnosed Type 2 diabetic patients (age 30–60 years of 0-10 years duration) receiving conventional drug therapy along with diet modifications which were stratified equally into two groups: yoga ($n=30$) and control ($n=30$) group. Yoga group patients performed a defined yogic series consisting of 7 asanas and 3 pranayamas for 40 - 45 minutes daily for 8 weeks under the guidance of a yoga expert, while controls continued with only conventional therapy. Basal recordings of weight, body mass index (BMI) and diffusion lung capacity (TLCO) were recorded initially at the time of recruitment and reassessed after 8 weeks in both the groups. **Results:** In yoga group, there was a significant improvement as evident from reduced weight and hence, improved BMI. Diffusion capacity showed a highly significant increase with $p\text{-value} < 0.01$ after 8 weeks of yogic regimen. On the contrary, in control group BMI was slightly increased while diffusion capacity was deteriorated. **Conclusion:** Yogic regimen followed in this study would be beneficial to the patients of Type 2 DM and can be used as an adjunct to the conventional drug therapy, as it slows the progression of the disease and events leading to its complications.

Strain Imaging Based Assessment Of Regional Myocardial Systolic Function In Hypertensive Population With Normal LV Systolic Function

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Background: Hypertension is an important cause of systolic dysfunction. Thus early detection of systolic dysfunction is a valuable information for implementing interventions for prevention of progression of heart failure. The conventional 2 D guided M Mode derived Left ventricular ejection fraction(LVEF) may not be a sensitive index for detecting sub clinical left Ventricle (LV)systolic dysfunction. Although longitudinal systolic dysfunction with preserved ejection fraction has been reported in hypertensive hearts, radial and circumferential function has not been fully examined. The aim of this study was to investigate three-directional systolic function in hypertensive patients with normal LVEF using two-dimensional strain imaging. **Materials and Method:**It was a prospective hospital based observational study. 72 consecutive patients of newly diagnosed hypertension not on treatment and 57 normotensive healthy subjects were evaluated to record demographic and clinical characteristics . Anthropometrics and Blood Pressure were measured using standard criteria and guidelines. LV systolic function was assessed echocardiographically by calculating M Mode derived LVEF and by recording regional and global systolic strain in longitudinal, circumferential and radial plane using speckle tracking method. Diastolic function was evaluated by recording Doppler spectral derived indices across MV inflow [E wave velocity, E wave Deceleration time, A wave velocity ,E/A ratio and early diastolic motion of medial septal annular and lateral annular motion(E')] using tissue Doppler imaging. **Results:** The mean Global Longitudinal systolic Strain (GLS) was lower among hypertensive than in normotensive group but was statistically not significant (17.47 ± 3.66 Vs 18.29 ± 3.36 , $p=0.12$). Taking GLS value of 13.0

(<10th percentile in normotensive group) as cut off value for impaired GLS, 13(18.1%) patients from the hypertensive group had impaired GLS. The mean LS at Apex and Apico lateral segment of LV was significantly reduced in hypertensives than in normotensives (17.99± 5.21 Vs 19.77±4.17; p<0.021 and 14.78 ±5.69 Vs 17.40± 5.23; p<0.008) respectively. The mean Global Circumferential systolic Strain (GCS) in the hypertensive and the normotensive group was not significantly different (17.04±6.32 Vs 16.64±5.9, p=0.69). No significant difference in the regional radial strain at mid ventricular level was observed between the two groups. The indices of diastolic function were significantly impaired amongst hypertensive population than in normotensive population (A wave of 67.33±14.35 Vs 62.58±12.12 p<0.047, Medial mitral annular E' 7.59±2.22 Vs 8.43±2.01; p<0.027, Lateral mitral annular E' 10.90±3.54 Vs 12.42±3.01; p<0.011 and mean E/E' value of 9.68±2.33 Vs 8.67±1.79; p<0.007) . LV Mass was found to be significantly increased in the hypertensive group in comparison to the controls (142.85±32.01 Vs 127.08±27.46; P <0 .003). **Conclusion:** Hypertensive patients with normal EF have significantly reduced regional systolic function at apical and apico-lateral segment compared to normotensive subjects. The Global longitudinal strain appears to be reduced in about 18% of these subjects. As expected Diastolic function was significantly impaired among hypertensive patients with apparently normal E.

Blood Pressure Response To Cold Pressure Test In Normal Young Healthy Subjects: A Prediction Of Future Possibilities Of Hypertension

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Background Arterial blood pressure, an important physiological parameter has great etiological significance in epidemiology of cardiovascular disease. Cardiovascular reactivity to stress has been hypothesized to be a marker for subsequent neurogenic hypertension. Cold pressure test is simple, provocative, non-

invasive, reliable and cheap test to know autonomic status of body and potentially useful indicator of future hypertension. **Aim** To study effect of Cold pressure stimulus on Blood pressure, to find out vascular hyper reactor in study group and to demonstrate future risk of hypertension in hyper reactors. **Method** Subjects enrollment is based on detailed questionnaire and informed consent was obtained. **Inclusion Criteria:** Age, 17-20 years, non-alcoholics, non-smokers and without any medical and surgical illness. **Exclusion Criteria:** Subjects having any cardiorespiratory illness, diabetic, known hypertensive and on any medication which may influence blood pressure. In present study fully automated upper arm style blood pressure monitor was used to measure blood pressure. Blood pressure monitor was Omron Company. Accuracy of instrument was + 3 mm of Hg. For cold pressure test ice cold water is used as cold pressure stimulus. Mean + SD was taken by standard statistical method. Comparison of hemodynamic data was done by unpaired t test. **Results** In this study nearly half of the subjects were hyper reactor, in which systolic hyper reactor and both systolic and diastolic hyper reactor were less than diastolic hyper reactors. **Conclusion** The present study suggests that a state of hyper responsiveness may precede essential hypertension and that the cold pressure test could be useful as a predictor of future hypertension in a young study population. The cold pressure tests may thus identify a subgroup of individuals with an occult physiological abnormality that predisposes them to hypertension decades later.

A Study Of Correlation And Assessment Of The Various Qualitative And Quantitative Parameters Of Muscular Fitness And Nutritional Status In MBBS Students

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Objectives: Kraus-Weber test is a simple test to screen accurately and effectively the function of musculoskeletal system. The aim of present

study is to evaluate the efficacy of Kraus-Weber test as an indicator of muscular fitness and to study the correlation of muscular fitness with various qualitative and quantitative parameters (Hand muscles Strength, Mid-upper arm circumference, Head Circumference, Chest Circumference, Body Mass Index, Breath Holding Test, Maximum Expiratory Pressure, 40mm Endurance Test). **Materials and Method:** - The present study was conducted over a period of one year on 200 medical students. All the above mentioned parameters were measured by standard Method. All the six components of Kraus-Weber test were performed and failure in even one test item was taken as failure in the Kraus-Weber test. **Results:** The overall failure rate in Kraus-Weber test was 45%. Maximum failure percentage of 30 (60 subjects out of 200) was found in flexibility test. Values of breath holding test, hand muscle strength and 40mm endurance test have been found to be significantly higher in success of Kraus-Weber test as compared to failures (p value <0.01). **Conclusion:** Regular periodic administration of these tests to students can help to diagnose musculoskeletal disorders before they manifest themselves fully causing debilitating morbidity and irreversible damage.

The Study Of Effect Of Noise Pollution On Auditory Function Of Food Industry Workers

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Background: Excessive noise is a global occupational health hazard with considerable social and physiological impacts, including noise-induced hearing loss (NIHL) at higher frequencies. This paper describes the morbidity of occupational NIHL in the food industry. **Aim & Objective:** To evaluate and compare the Auditory functions in subjects exposed to noise with unexposed once (control groups) and to find out the correlation between duration of exposure with observed audiometry parameters. **Materials and Method:** The

present study was conducted in McCain food industry with the help of pure tone audiometer. A total of 100 individuals, 50 food industry workers and 50 controls were included in this study. **Results:** The average hearing loss in food industry workers was 8.92 ± 5.98 in right ear and 9.04 ± 4.59 in left ear, which was significantly higher ($p < .0001$) as compared to unexposed subjects 1.40 ± 4.05 in right ear and 0.80 ± 2.74 . When the degree of hearing loss was studied in correlation with duration of exposure, it was observed that the increased hearing loss showed a significant ($p < 0.01$) positive correlation with exposure time. **Conclusion:** In our study an attempt was made to compare auditory function between unexposed controls and exposed food industry workers. We must focus on health conditions of the human involving in the manufacturing process and environmental conditions.

Key Words: Pure Tone Audiometry, Noise Induced Hearing Loss, Occupational Health.

Will Eating Dark Chocolates Improve Cognition In Older Adults ?

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Objective: Chocolate contains numerous substances among which there are a quite large percentage of antioxidant molecules, mainly flavonoids, most abundantly found in the form of epicatechin. Epicatechin improves various aspects of cognition and flavonoids have been found to preserve cognitive abilities during ageing in rats. Old age is associated with cognitive decline. Since the P300 component of event-related potentials provides valuable information concerning cognition, we studied the effect of chocolates on auditory P300 cognitive potential in elderly individuals. **Method:** 30 healthy elderly individuals of age group 67 to 73 yrs were taken as subjects. P300 cognitive potential was recorded by standard auditory 'oddball paradigm' on computerized evoked potential recorder (RMS EMG MK-2) using 10/20 system. Active electrode (Ag/AgCl electrodes) was placed at Cz with reference electrodes on the mastoid at A1 and A2 and the ground at Fz. A total of 300 click stimuli of

intensity 70dB included two types of tones, 1000 Hz (non-target tone) and 2000 Hz (target tone), were delivered binaurally through earphones at a rate of 1.1/s and subjects were supposed to count target tone. Subjects were made to eat one bar of dark chocolate every day for one month and P300 was recorded again. Statistical Analysis was done by paired "t" test. **Results** : There was a significant decrease in latency ($P < 0.05$) of P300 potential and statistically insignificant change in amplitude of P300 potential after one month of chocolate eating in elderly individuals indicating there was improvement cognition especially relative timing of the stimulus evaluation process. **Conclusion**: Eating dark chocolates has beneficial effects on cognition in elderly people. The improvement in the stimulus classification speed which reflects the allocation of attentional resources for memory can be explained by enhanced neurovascular coupling due to cocoa and maybe due to changes in neuron morphology, mainly in regions involved in learning and memory.

Key Words: Chocolates , P300 , cognition , elderly individuals

A Study Of Electrocardiographic Changes In Sugarcane Factory Workers Of North Karnataka.

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Aim & Objective: To assess the electrocardiographic changes in asymptomatic sugarcane factory workers. **Materials & Method**: Study was conducted among sugarcane factory male workers ($n=60$) exposed to sugarcane dust (with minimum duration of exposure 5years) and compared with age matched controls selected from the same factory but not exposed to dust (office workers, $n=60$) having sedentary life style. The electrocardiographic recording was done using conventional 12 lead Electrocardiogram. Anthropometric parameters like height (cm), weight (Kg), BMI (Kg/m^2) recorded. Statistical analysis was done using Student's 't'

test. **Results**: A significant reduction in PP interval ($p=0.013$) and a significant increase in PR interval ($p=0.0015$) and ST segment ($p=0.00019$) was observed in cases compared to controls. An insignificant reduction in heart rate ($p=0.12$) was observed among cases compared to controls. **Conclusion**: It may be concluded that the ECG changes are suggestive of slow atrial depolarization which may be due to cardiac efficiency of sugarcane factory workers. Such cardiac efficiency also reflect a healthy life style and humanization of work environment exposed to, among sugarcane factory workers of North Karnataka.

Key Words: Sugarcane factory workers, PP interval, PR interval, ST segment.

Impact Of Chronic Work Stress On Autonomic Cardiovascular Regulation In Nursing Staff

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The present study was planned to identify nurses perception of work place stress in nurses and to find out that whether before any apparent sign of disease, occupational stress is accompanied by alterations of cardiorespiratory regulation suggesting ANS dysregulation. 150 nurses (30-50 years) volunteered for the study, who were not suffering from neuromuscular and/or cardiorespiratory disorder, that may limit their work efficiency . 30 age matched (43.2 ± 5.2 years) non working healthy women not suffering from any neuromuscular ,cardiovascular ,endocrine and autonomic disorder served as control. After obtaining written consent all the participants were subjected to detailed clinical examination , relevant biochemical investigations, ECG recording and autonomic function testing . Based on inclusion criterias 90 nurses (43.93 ± 5.2 years) were selected and divided in three groups of 30 each. In group 1 nurses who were not suffering from any cardiovascular, endocrine, autonomic disorder were included. In group II, nurses suffering from type 2

diabetes mellitus (ADA 2011). Group III comprised of nondiabetic nurses identified as hypertensives (as per JNC VII criteria). Work stress was measured by using modified occupational stress inventory (A. K. Shrivastava & A. P. Singh 1981). Autonomic cardiovascular regulation was assessed by autonomic response to sympathetic excitation produced by sustained handgrip and heart rate response to Valsalva maneuver (Ewing et al 1973). None of the subjects included in the study showed any abnormality in electrocardiographic recordings. Main stressors reported by study group were unfavourable working condition (>90%), increased workload (88%), poor peer relationship (77%), unprofitability (69%), intrinsic impoverishment (59%). The mean occupational stress score (OSS) of group I, II and III was 166.9 ± 22.07 ; 196.17 ± 15.9 ; 191.3 ± 19.08 respectively. The appraisal of stress was moderate (OSS 120-180) in 37% subjects and was high (>180) in 63% subject. Increase in diastolic blood pressure in response to sustained hand grip was found borderline abnormal (11-15 mm Hg) in 27% of the nurses suffering from T2DM and 7% suffering from hypertension. No sympathetic abnormality was found in nurses of group I. Borderline abnormal parasympathetic reactivity (VR=1.11-1.20) was found in 67%, 40% and 56% in the nurses of group I, II and III respectively. 37% of the group II and 7% of group III showed abnormal parasympathetic reactivity (VR<1.10). Noticeable reduction in parasympathetic reactivity was observed in nursing staff of group I and III. Nurses suffering from Type II diabetes mellitus, who had high occupational stress score showed autonomic dysregulation. Association of Type II diabetes mellitus and hypertension with occupational stress might make them more vulnerable to future cardiovascular morbidity and mortality. It is concluded that chronic stress reduces vagal tone. Subjects with low vagal tone showed increased cardiosympathetic drive during stressful work situation which may be attributed to occupational stress. It is suggested that stress management may be implemented at the work place to reduce stress level and stress related autonomic dysfunction.

Key Words: Occupational stress, Autonomic function, Cardiovascular disease risk

Cognitive Status In Hypothyroid Patients Before And After Attainment Of Euthyroid State

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Introduction: Thyroid hormones play an important role in human brain function. Overt hypothyroidism is associated with deficits in general intelligence, memory, attention, psychomotor speed, visuoperceptual and constructional skills. Hypothyroidism has been known to cause cognitive impairment and improvement in associated neuropsychological symptoms have been reported following adequate treatment of the thyroid disorder. Attention is a basic cognitive mechanism by which a person can focus on relevant objects and ignore the irrelevant ones. Attention or vigilance can be assessed by paper pencil tasks like Trail making test (TMT). It is a popular neuropsychological test for assessing visual search, scanning, speed of processing, mental flexibility and executive functions. The TMT consists of two parts. TMT-A requires an individual to draw lines sequentially connecting 25 encircled numbers distributed on a sheet of paper. Task requirements are similar for TMT-B except the person must alternate between numbers and letters (e.g., 1, A, 2, B, 3, C, etc.). The score on each part represents the amount of time required to complete the task. In the present study we evaluated the effect of hypothyroidism on cognitive functions of the patient by neuropsychological test and compared the same test after attainment of euthyroid state. **Aim and Objectives-** To compare the cognitive status of patients before and after treatment with age and sex matched controls. To evaluate the changes in cognitive status of hypothyroid patients before and after attainment of euthyroid status. To find the correlation between cognition and hypothyroid

state. **Material and Method**-Thirty newly diagnosed hypothyroid patients of age group 18-50 years (M=31.67, SD= \pm 8.405) were recruited from the thyroid clinic, GTB hospital, Delhi. Thirty age and sex matched controls were also recruited for the study after taking written consent. Patients attained euthyroid status usually after three months of treatment as evident by changes in the levels of hormones. The cases and controls were called a day before the actual testing to familiarize them with the tests. They were made to abstain from nicotine and caffeine for at least 12 hours before testing. Trail Making Test was performed on both groups following a restful overnight sleep, at the start and after three months of study. **Result:** In this study response time of Trail Making Test A & B was increased in hypothyroid cases in comparison to euthyroid controls in pretreatment state. Attainment of euthyroid state led to a significant improvement in case group. We also found a positive correlation of impairment of cognitive status with hypothyroidism. **Conclusion:** There was impaired cognitive status in hypothyroid patients and improved after the attainment of euthyroid state. Thus we conclude that the early diagnosis and treatment does have significant effect on restoration of cognitive functions.

Ocular Perfusion Pressure (Opp) Changes After Moderate Isotonic Exercise In Young Adults

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Aim: To study the short-term effect of moderate isotonic exercise on OPP in young adults. **Objective Of The Study:** To compare OPP before and after isotonic exercise. **Materials And Method:** Study was conducted on 40 healthy young adults of age 18-21 yrs who were selected among MBBS students of JSS medical college. Intra-ocular pressure (IOP) & Blood pressure (BP) were recorded at rest and immediately after isotonic exercise. OPP was calculated. $OPP = [(MAP-IOP) \frac{2}{3}]$ Statistical analysis was done using paired t test. **Results:**

There was a significant increase in SBP(118.5 \pm 5.5 to 148 \pm 7.3) & a decrease in DBP(77.35 \pm 7.1 to 75 \pm 3.1) which was non-significant. There was a significant decrease in IOP (16.20 \pm 1.6 to 11.58 \pm 2.8) after isotonic exercise. Hence there was significant increase in OPP (49.91 \pm 2.2 to 55.51 \pm 4.7) after isotonic exercise. **Conclusion:** Isotonic exercise induces increased BP & decreased IOP, thus increases OPP which was significant. Hence isotonic exercise proves to be beneficial in treatment of glaucoma.

Key Words: Ocular perfusion pressure, Isotonic exercise, Glaucoma.

A Comparative Study Of Heart Rate Variability In Obese And Healthy Young Adults (18 – 25 Years)

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Introduction : The heart rate variability (HRV) represents fluctuations in the heart rate under the influence of autonomic nervous system. The assessment of heart rate variability proves to be the most sensitive, specific and valuable tool, which is a noninvasive index reflecting the sympathetic and parasympathetic components of the autonomic nervous system on the sinus rhythm. The High frequency (HF) and Low frequency (LF) components are the markers of vagal and sympathetic modulation. The LF/ HF ratio reflects sympathovagal balance. This study is an attempt to determine HRV in young obese subjects, as early establishment of autonomic dysfunctions helps in preventing future obesity related cardiac disturbances. **Aim And Objectives :** To assess and compare the Heart Rate Variability in obese and (age and sex matched) healthy young adults (18 – 25 years). **Method :** The Study group comprised of 35 obese young adults males in the age group of 18-25 years and the control group comprised age and sex matched 35 healthy young adults. Evaluation was done by recording the 5 min resting ECG in supine position. The analogue signal was converted to digital signal by using National Instrument software version 8.0 and

HRV analysis was done with HRV software version 1.1. The difference in the mean and proportion was inferred with the use of unpaired 't' test and Chi – square test. **Result** : The Findings of this study reveals that LF and LF/ HF ratio is significantly higher in obese group as compared to healthy control group ($P < 0.05$). **Conclusion** : It is concluded that LF & LF/ HF ratio is significantly higher in obese young adults. The study shows that there is deranged cardiac autonomic functions in the obese individuals as reflected by reduced HRV. The obese group showed a significant reduction of parasympathetic activity. There was a shift of sympathovagal balance towards sympathetic predominance among obese males in contrast to healthy males.

Key Words : Heart Rate Variability, ECG, LF, HF, LF/ HF.

Pulmonary Function Test Among Swimmer And Yogic - A Comparative Study

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Background- Pulmonary benefits of swimming and yoga training have been reported by earlier investigators but the reports were scanty .Regular swimming and yoga produces a positive effect on the lung by increasing pulmonary parameters and thereby increasing the lung functioning. Studies are still insufficient to establish that out of these two modalities of exercise which one is producing more beneficial effect on lung function parameter and to what extent especially in Rajasthan. The present study was conducted to find out and confirm the benefits of swimming and yogan on pulmonary function test among young healthy volunteers and also to determine the differential effects of such training among volunteers. **Aim** -To find out the benefits of yoga and swimming on pulmonary function tests and to compare the benefits among swimmers & yogis with sedentary individual. **Material and method** - In this study 200 subjects aged between 17-23 years from both

sex were taken. The subjects were divided into three groups; group A -75 subject doing swimming from 3 months , group B-75 subject doing yoga from 3 month; group C -50 subject [control] sedentary individual. The subjects were assessed by studying their pulmonary function parameter [FVC, FEV1, PEFR, FEV1/FVC] after 3 month training period. Computerized Polygraph (spiroexcel) was used to find out the pulmonary function tests. **Result** -The pulmonary function parameters [FVC, FEV1, PEFR, FEV1/FVC] were statistically analyzed by using Student “t” test. All parameters showed highly significant improvement in both the groups [after yoga and swimming] except FEV1/FVC which showed only slight improvement [p -value < 0.01]. There was a significant difference in mean and standard deviation of pulmonary parameter with the p - value < 0.0001 in swimmer and yogi which shows a highly significant improvement. **Conclusion** - Our result showed a slight edge of swimming over yoga in maintaining respiratory health and improving pulmonary function test but still the beneficial effect of yoga cannot be undermined. Therefore both of exercises (swimming +yoga) can be prescribed on regular basis for maintaining pulmonary health. However, it is suggested that further studies need to be taken up on persons practicing in swimming and yoga on various other physiological parameter in order to scientifically document the holistic influence on the body physiology. Finding of the present study emphasize the benefits of swimming and yoga on respiratory parameters.

Key Words – Pulmonary function test , Swimmer , Yoga

Isometric Hand Grip Strength In Healthy Male And Female Subjects

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Introduction- Hand grip strength is important as an index of general health and as a screening test for the integrity of both the upper motor neurons and function of the motor unit. It is widely used in adults as an indication of strength in fitness testing and has also been

used for assessing hand function and general weakness in patients with joint disorders like rheumatoid arthritis. **Objective:** The present study was done to determine the grip strength values in healthy normal medical students of both sexes. **Material & Method:** The study comprised of 30 female and 30 male students of Govt Medical College, Patiala in the age group of 17- 22 years. The handgrip strength was tested in these subjects by using electronic handgrip dynamometer. The grip strength was checked in both the hands with 30 seconds rest. The data collected was statistically analyzed. **Results :** The mean handgrip strength in females was 18.30 ± 4.44 and 16.23 ± 3.57 in right and left hand respectively, while in males the mean was 43.07 ± 15.04 and 35.20 ± 13.87 respectively. The analysis showed that the grip strength correlated significantly with the weight of the subject in both females and males.

Noise Removal: An Effective Approach To Enhance A Medical Image

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Low-contrast images in medical imaging would be acquired commonly, which may interfere with the regular diagnosis. Improvement with enhancement is one of the key tools in medical image analysis. The enhancement during the preprocessing stage includes contrast improvement, brightness and noise removal or to provide better input for other automated image processing techniques. Noise can be defined as any undesired artifact that contaminates an image. The presence of noise in an image can be due to several sources like camera sensors, analog-to-digital conversion, communication channels etc. Enhancement of the acquired image focus on removing noise that is the product of low-level data errors. Therefore, it is vital to remove noise to improve the quality of the acquired image and to facilitate the further processing such as edge detection, segmentation and analysis etc. Filtering an image to attenuate noise while keeping the image details preserved is one of

the most important issues. Consequently, there is a need for noise removal technique that removes different types of noise.

Key-Words: Low-contrast images, noise removal, processing, filtering

Rheumatoid Arthritis Affects Brainstem Auditory Evoked Potential

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Introduction Rheumatoid arthritis (RA) is a chronic multisystem disease of unknown etiology characterized by persistent inflammatory synovitis, usually involving peripheral joints in a symmetric distribution. It affects many organ systems, including the auditory system. **Material And Method** Control (group 1) comprised of 25 healthy female subjects of age 30 to 50 years while study group (group 2) comprised of 25 female patients with RA of more than 5 years. Proven cases of RA (as per 1987 ACR criteria) underwent brainstem auditory evoked potentials. The recording was carried out by using RMS EMG EPMK2. Ear discharge, deafness, history of intake of ototoxic drugs, chronic hepatic, renal and respiratory diseases were excluded. **Result** In left ear, the difference in absolute peak latency of wave IV of group 1 and 2 and the difference of wave V of group 1 and 2 were significant ($p < 0.05$) while for rest of the waves it was insignificant ($p > 0.05$). The differences in interpeak latencies (I-III, III-V, I-V) were insignificant ($p > 0.05$). The difference in amplitude of I-Ia between group 1 and 2 was significant ($p < 0.05$) but difference in amplitude of I-Va was insignificant ($p > 0.05$). In right ear, difference in absolute peak latency of wave III of group 1 and 2 was significant ($p < 0.05$) while for rest of the waves it was insignificant ($p > 0.05$). The differences in interpeak latencies and amplitude were insignificant ($p > 0.05$). **Conclusion** Differences of absolute peak latency of wave IV and V in left ear and III in right ear were significant ($p < 0.05$) when compared with control. The difference in amplitude of I-Ia was significant ($p < 0.05$) in left ear when compared with control. Thus

rheumatoid arthritis affects brainstem auditory evoked potential.

To Study The Pulmonary Function In Diabetes Patients

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Objectives: To study the changes in pulmonary functions of individuals with diabetes mellitus by performing computerized spirometry. Comparison of pulmonary functions of diabetics with non-diabetic control group. To correlate the abnormalities of pulmonary functions with duration of diabetes mellitus.

Introduction Diabetes mellitus and its complications have become the challenging health problem as it affects virtually all the systems in our body. Microvascular angiopathy and Non-enzymatic glycosylation of connective tissues especially collagen are responsible for diabetic nephropathy neuropathy, retinopathy and other manifestations. Some reports of histopathological changes in lungs in diabetic patients show basal lamina thickening and fibrosis. The effects of diabetes mellitus on respiratory system are less documented and researched. It became necessary to study the effect of diabetes on pulmonary function.

Materials And Method A cross section study descriptive study of lung function of diabetics compared with age and sex-matched non-diabetic controls. 100 patients in OPD of D.Y Patil medical college hospital will be included in the study. **Inclusion Criteria:** Type II diabetes Diabetics age group >40 years Diabetes mellitus of minimum 6 month duration

Exclusion Criteria : Diabetics having H/O Smoking Present and past history of respiratory diseases History of occupational exposure to any substance that could affect lung function

Method Of Data Collection Details of the test protocol will explained & informed written consent will be undertaken from the patients : Selected patients will be grouped into two categories depending on the duration of DM 6 month to 5 year 5 to 10 year The cases will be subjected to clinical examination 1. general examination 2. Systemic examination Pulmonary

function tests will be performed using computerized spirometer RMS Helios 702 Test performed will be forced vital capacity forced expired volume in one sec (FEV1) FEV1 / FVC ratio peak expiratory flow rate (PEFR) MVV Test performed will be analyzed statistically.

Discussion This study was undertaken to assess the ventilatory function of type 2 diabetes mellitus patients, and to compare it with those of non-diabetic healthy subjects. Few studies have focused on the relationship between pulmonary function and diabetes. Most such studies have been conducted on subjects with type 2 diabetes. In this study, there was a larger number of females than males (66.2% vs 33.8%). The probable cause for this female preponderance was the fact that many males were excluded on account of their smoking history, while female diabetics were mostly eligible on account of their being non-smokers. When duration of diseases was compared with all parameters the following was observed: 1. There was a tendency for all parameters to fall with longer duration of diabetes. Poor diabetic control was associated with poorer lung function. FEV1 fall in values was more pronounced among females than among diabetic males. **Conclusion** 1. Spirometric values were consistently lower in subjects with Type 2 diabetes mellitus than in non-diabetics. The differences reached statistical significance only for the forced vital capacity, but the trend was seen across all parameters. 2. Males with diabetes tended to be affected more than females, attaining lower levels of their percentage of predicted values. 3. The effect on the FVC was even more pronounced in diabetics who had duration of disease longer than 5 years, and the effect was not explained by the difference in age alone. 5. Subjects with poorer diabetic control have worse spirometric function. 6. Non-enzymatic glycosylation of connective tissue, especially the collagen, may be responsible for reduced lung functions. 6. Non-enzymatic glycosylation of connective tissue, especially the collagen, may be responsible for reduced lung functions. There is scope for further intensive work in the same area, extending the study to a larger group, and

including diffusion studies as part of the protocol.

Effect Of Proloned Exposure Of Noise On Reaction Time Of Textile Industry Workers

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Performance of workers is a complex phenomenon which is affected by various factors in the industry and it leads to decrease in performance of workers. Some of the significant factors which affect the performance of textile workers is, prolonged exposure to noise, temperature, vibration, etc. Present study was aimed at recording reaction time (auditory and visual reaction time) in textile workers (subjects) and age and sex matched controls, and to compare the Reaction time (ART and VRT) between subjects and controls. The reaction time was recorded using reaction time apparatus designed by Anand Agencies Pune. We found that Reaction Time (ART and VRT) was prolonged in subjects as compared to controls. Continuous and prolonged exposure to industrial noise leads to an increase in Reaction Time (ART and VRT). Reaction Time is one of the important parameters for performance. This can be indicator of impaired performance in the exposed textile workers to maintain their attention during the work period, which may be due to chronic exposure to industrial noise

Key Words: Auditory Reaction Time, Visual Reaction Time, Noise, Textile Industry Workers

Maternal Anthropometry and Feeding Behaviour Toward Preschool Children In Relation With Childhood Body Mass Index

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Background: A better understanding of the link between eating behaviour and maternal feeding practices with childhood and maternal

weight status is of great interest. **Objective:** To assess the association between childhood anthropometric measures with mother's Body Mass Index (BMI) and their feeding practices toward preschool children. **Method:** 50 preschool children and their mothers were selected. Mother's BMI, children's BMI and weight-to-height ratios were registered. Maternal feeding practices towards their children's nutritional habits were measured using an adapted version of the Child Feeding Questionnaire (CFQ). **Results:** We found a direct correlation ($p < 0.001$) between children's BMI z-score and their mother's BMI, both in boys and girls. Analysis of the combined categories of childhood obesity and/or maternal obesity showed an important influence of child's weight status on CFQ scores. **Conclusion:** Mother's BMI and children's BMI z-scores are highly correlated. We also found significant associations between mother's behaviour subscales and children's BMI z-score. **Key Words** – Mother's BMI, children's BMI z-score, Child feeding Questionnaire.

Comparative Study Of VO₂max In Obese And Non Obese Young Indian Population

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Background: Incidence of obesity in young age is increasing due to lack of physical activity and faulty food habits. People are prone to develop cardiovascular diseases and other chronic diseases at young age of their life because of early life obesity. The journey from early life obesity to cardiovascular disease will be evident by slow regression of their cardio-respiratory efficiency. VO₂max is the maximum capacity to transport and utilize oxygen during incremental exercise. It is also known as aerobic capacity, which reflects physical fitness of a person. As VO₂max is an accepted measure of cardio-respiratory efficiency it is used in this study to estimate the same. **Objective:** To study the effect of obesity on cardio-respiratory fitness of young individuals. **Materials and Method:** The study was conducted on 30 obese (male=15 &

female=15) and 30 non obese (male=15 & female=15) students of age group 20 to 25 yrs selected from JSS medical college Mysore. The sample size was estimated to be enough to detect a clinically relevant difference of 10% in parameters under study at 5% level of significance with 80% power. The subjects were categorized in to obese and non obese depending on the BMI cutoff for Indian population. VO_2max was estimated by using predicted equations for Standard Bruce Treadmill test protocol. Unpaired t-test was used to test the significance of difference between mean values of VO_2max in obese and non obese group. **Results:** VO_2max /kg body weight was significantly lower in obese group compared to non obese group. (40.33 ± 1.61 vs 44.07 ± 4.76). There was significant difference in VO_2max between obese and non obese male subjects (40.91 ± 1.50 vs 48.35 ± 1.75). There was no significant difference in VO_2max between obese and non obese female subjects (39.80 ± 1.50 vs 39.05 ± 2.15). **Conclusion:** This study showed that the aerobic capacity of obese individuals was less in compared to non obese. Therefore therapeutic exercise programmes should be designed to obese individuals in order to reduce their body fat and improve VO_2max to have good aerobic fitness and to reduce the risk cardiovascular disorders. **Key words:** cardio-respiratory fitness, VO_2max , Obesity

A Cross Sectional Study Of Audiovisual Reaction Time On Basketball Players

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The reaction time is the time interval between the stimulus application and the proper response. Sports in which movement of a participant are conditioned by the signals like movement of opponents or motion of the ball, reaction time is of great importance. Regular training involved in basketball players may lead to an improvement in audiovisual reaction times. **Aim:** To compare the audiovisual reaction

time in normal healthy individuals with that of basket ball players. **Materials and Method Design:** Cross-sectional Study. Inclusion criteria Group 1: 30 Normal healthy male volunteers in age group of 18-35 years. Group 2: 30 Healthy male basketball players in age group of 18-35 years, doing regular practice for minimum 2 hours per day since more than 2 yrs. Exclusion criteria 1) History of smoking, alcoholism. 2) Those having any sports injury to limbs. 3) Having any cardiovascular, respiratory diseases. 4) Subjects having psychiatric disorder. The reaction time was measured with the help of Audio Visual Reaction Time Apparatus in these two groups, at Department of Physiology, GMC, Aurangabad. Statistical analysis: Using Unpaired T-test. **Result & Conclusion:** The values of auditory and visual reaction time are significantly less in basketball players than the healthy controls. Thus basketball players showed an improved reaction time as compared to healthy volunteers. **Key Words:** reaction time, auditory, visual, basketball players.

The Relationship Between Oxidative Stress And High Sensitive C-Reactive Protein In Preeclampsia

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Background: Preeclampsia is the most common medical complication of pregnancy. It is well documented in several reports that about 10% women in the first pregnancy and 20-25% chronic hypertensive women suffer from pregnancy induced hypertension, need in-gest early diagnosis and intervention. **Aim & Objective:** To measure and correlate serum malondialdehyde acid (MDA) level (an index of oxidative stress) with High sensitive C-reactive protein (HS-CRP) level (an inflammatory marker) in preeclampsia. **Materials and Method:** The present study involves 200 subjects in the age group of 20 to 35 years

(devoid of diabetes, urinary tract infections, renal or liver disorders), all in their third trimester singleton pregnancy, recruited from preeclampsia ward and OPD of Mahila chikitsalaya, Sanganeri gate, Jaipur. Out of total 200 subjects, 100 were preeclamptic women and 100 were normotensive pregnant women. Data were statistically analyzed by “z” test for comparison of mean and Karl Pearson coefficient of correlation to quantify the association between the variables. **Results:** The mean gestational age (wks) of preeclamptics and normotensives was (28.42±3.14 and 27.76±3.09) respectively. The levels of serum MDA (nmol/ml) and HS-CRP (mg/l) were significantly elevated ($p \leq 0.05$) in preeclamptics (4.97±1.00 and 1.18±0.43) when compared to normotensives (2.43±0.51 and 0.66±0.31), respectively. Moreover, in preeclamptics a significant positive correlation ($r=0.073$, $p \leq 0.05$) between serum MDA and HS-CRP was observed. **Conclusion:** Elevated maternal serum MDA and HS-CRP in preeclamptic women compared with normal pregnant women suggest that oxidative stress in preeclampsia associated with increased inflammatory responses.

Key-Words: Preeclampsia; oxidative stress; Serum malondialdehyde acid (MDA); Serum HS-CRP; Normotension.

Correlation Of Glycemic Status With Indicators Of Myocardial Oxygen Usage

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Study aimed to investigate the relation of degree of overt hyperglycemia as determined by estimation of fasting plasma glucose (FPG) and blood glycosylated haemoglobin (A1c) estimation with indirect indicators of myocardial oxygen demand, i.e, resting heart rate (RHR), systolic blood pressure (SBP) and resting rate pressure product (RPP). It is a case control study. Taking prevalence of T2DM patients as 2.9% in Madhya Pradesh (WHO 2012), the sample size of 43 was calculated by Daniel (2004) formulae of biostatistics. Resting heart rate, systolic blood pressure and resting

rate pressure product were recorded in 50 normoglycemics normotensives (group I), 50 prediabetic subjects (group II) and 50 newly diagnosed Type 2 diabetes mellitus patients (group III) diagnosed clinically as per ADA (2011) criteria. Fasting plasma glucose was measured by glucose oxidase peroxidase method (GOD-POD) using autoanalyser (MERCK 300) and kits used were supplied by AGGAPPE diagnostics, Kerala. A1c was measured by microcolumn method at recommended temperature (AGGAPPE) and is quantified by direct photometric reading at 415 nm by photocalorimeter. The A1c level of >7% was taken as criteria of poor glycemic control. ANOVA was done for comparison between groups. Taking BMI as gold standard (WHO 2010) prediabetics and majority of T2DM patients were classified as overweight. The SBP (mm Hg) values were in prehypertensive range in prediabetics and T2DM patients (125.52±4.05, 130.68±5.29; $p < 0.001$). The resting heart rate (bpm) was significantly higher in patients with T2DM patients (91.06±4.72; $p < 0.001$) as compared to controls and pre diabetics. The rate pressure product (mm Hg.bpm) was estimated to be significantly higher in T2DM patients (11922.96±1091.29) as compared to prediabetics (10197.60±806.10) and controls (8186.80±635.35). The observations revealed significant differences in the FPG (mg/dl) and A1c (%) in the three groups (84.18±8.30, 112.46±7.01, 149.16±12.30; 4.90±0.57, 5.66±0.47, 7.76±0.01). Positive correlation was found between resting heart rate ($r=0.97$, 0.98) and rate pressure product ($r=0.98$, 0.98) with fasting plasma glucose level. Similar correlation was established between resting HR ($r=0.96$, 0.95) and RPP ($r=0.97$, 0.95) with A1c values. The study concluded that in T2DM patients the resting HR, SBP and RPP were higher as compared to non diabetic subjects. This suggests increased myocardial oxygen demand in these patients. Similar observations were found in subjects with FPG and A1c levels in prediabetic range. The heightened myocardial oxygen demand in these subjects render them vulnerable to future diabetic risk and adverse cardiovascular outcome.

Key Words-Resting heart rate (HR), Rate pressure product (RPP), Systolic blood pressure

A Study of Correlation of FEV1/FVC Ratio With Body Fat Percentage In Young Individuals

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Background: For diagnosing pulmonary disease lung function tests are most important. The purpose of this study was to find out the association of body fat percentage and its distribution on pulmonary function FEV1/FVC.**Objectives:** To measure & compare the difference in Pulmonary Function FEV1/FVC ratio among normal and overweight young healthy adults and to detect the correlation between FEV1/FVC and Body fat percentage and its distribution, if any.**Method:** The study underwent in one forty eight young healthy individuals (74 male & 74 female) of 18-25 years and categorized into 4groups: Normal weight (37 males and 37 females) and over weight (37males and 37 females) on the basis of BMI. Body fat percentage was calculated by Durnin and Womersley method. Body fat distribution was also estimated by measuring waist hip ratio and then pulmonary function tests were recorded in all groups.**Results:** Analysis done by using SPSS window. Parameters were compared by unpaired 't' test. Mean values of FEV1/FVC ratio among all four groups were calculated. P value was >0.05 NS, among both genders. Pearson's Coefficient of correlation (r) used. Non Significant correlation (r) of FEV1/FVC ratio with body fat% and WHR in overweight males and females was noted . **Conclusion:** This study shows that with increase in body fat percentage itself and the way of fat distribution have no significant effect on FEV1/FVC ratio.

Key Words:Body fat percentage, FEV1/FVC ratio, pulmonary function.

Effect Of Deep Breathing On Electrical Axis Of Heart In Young Healthy Volunteers As Determined By Formula And Einthoven Triangle

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Aim: 1. To study the effect of deep breathing on electrical axis of heart 2. To compare the electrical axis of heart obtained by formula and Einthoven triangle.**Objectives:** To test the accuracy of formula in calculating electrical axis of heart.**Method:** 45 healthy subjects (20-30 y) were recruited based on inclusion and exclusion criteria.After 10 min of supine rest, leads I & aVF were recorded during eupnea, after full inspiration & full expiration. The electrical axis of heart was calculated by dropping perpendiculars on the Einthoven triangle and also by using formula: $EA = \pm 90 - \theta$ where $\theta = \tan^{-1} (I / aVF)$ where I and aVF denote mean QRS amplitude in leads I and aVF respectively. If aVF is positive, then $EA = 90 - \theta$, if aVF is negative, then $EA = -90 - \theta$.**Result:** As compared to full inspiration produced a significant ($p < 0.001$) increase while full expiration produced an insignificant ($p = 0.06$) decrease in electrical axis of the heart.**Conclusion:** In conclusion, full inspiration results in a significant increase in electrical axis of heart. Further, the values obtained by formula are similar to those obtained by Einthoven triangle.

Key Words: electrical axis of heart, deep breathing, formula, Einthoven triangle

Changing Sleep Patterns Among Children And Teenagers

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Introduction: Sleep is a vital and essential process for physical and psychological restoration. It plays an important role for promoting efficient performance and thinking. Sleep duration and patterns change through the

lifespan. Newborn sleeps for 18-20hrs, an infant for 14-15 hours, child for 9-13 hours, a teenager needs 8-10 hours and adults need 7-8 hours of sleep. **Objective:** This study was done among five hundred and one school going children of age 11-15yrs with the objective to evaluate the changes in the sleep patterns of Indian children (11-12yrs) and teenagers (13-15yrs) and to determine its effect on their mood, performance and attention. **Material & Method:** It was a cross sectional study which included 501 students of age 11-15yrs. Based on the questionnaire, they were evaluated for their mood along with their sleep patterns, sleep duration, napping and quality of sleep separately on weekdays & weekends. Daytime sleepiness was scored using the Epworth Sleepiness Scale & performance, from their percentages in respective subjects during the academic session. **Result:** Analysis of variance of sleep routines of age groups 11-15yrs reveals no difference between 11yrs and 12yrs aged children as well as between 13 to 15yrs aged teenagers. However, significant differences were found between sleep routines of children (11-12yrs) and teenagers (13yrs-15yrs). Higher the age, the later was the bedtime leading to reduced sleep duration and increased daytime sleepiness on school days. Sleep schedule varied significantly on weekdays and weekend among both the groups. Bedtime was delayed by about 30min; wake-up time by more than 2hrs and total sleep duration increased by about 1hr30min ($p < 0.001$) on weekends. Teenagers had significantly higher ($p = 0.038$) sleepiness scores and mood disturbances. They also had significantly poor performance in Mathematics ($p = 0.003$) and English ($p = 0.0001$) as compared to children. **Conclusion:** Sleep needs of the children and teenagers shows a change along with many other physiological changes occurring during this crucial period. Delayed sleep schedule along with early compulsory awakening for schools causes sleep deprivation and increases sleepiness among students which has a bad impact on their mood and performance. This study was a small step to create awareness among educationalists, parents and physicians who can play a major role in propagating, incorporating and

maintaining good sleep hygiene among all for a healthy society.

Serum Lipid Profile In Sickle Cell Disease Patient In Raipur District, Chhattisgarh

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This study was done to determine the serum lipid profile in sickle cell disease patients. Thirty sickle cell anemia (HbSS) patients aged 15-35 years were used for study. A total of thirty one healthy, symptoless normal persons with HbAA genotype aged 15 -35 years were taken as control. The total cholesterol in males (162.52 ± 16.65 mg/dl) and females (169.73 ± 13.24 mg/dl) of sickle cell disease was insignificant when compared with the control males (165.59 ± 21.27 mg/dl) and females (174.57 ± 20.99 mg/dl) respectively. Also the plasma high density lipoprotein cholesterol of males and females (33.35 ± 4.43 and 32.64 ± 4.82 mg/dl) and low density lipoprotein cholesterol of males and females in sickle cell anemia (103.83 ± 15.45 and 112.55 ± 13.41 mg/dl) were also insignificantly decreased on comparison with the control male and female HDL (34.47 ± 3.24 and 37.00 ± 3.37 mg/dl) and LDL (107.53 ± 19.36 and 114.57 ± 19.75 mg/dl) respectively. Whereas insignificantly increased level of triglyceride of male (125.61 ± 34.30 mg/dl) and female (123.55 ± 19.49 mg/dl) of sickle cell anemia on comparison with control males (117.29 ± 30.39 mg/dl) and females (121.07 ± 18.69 mg/dl) was observed. Very low density lipoprotein was also increased insignificantly in sickle cell disease cases males (25.35 ± 6.75 mg/dl) and females (24.64 ± 3.88 mg/dl) when compared with HbAA males (23.47 ± 6.06 mg/dl) and females (24.21 ± 3.77 mg/dl). It is hypothesized that due to decrease in levels of TC and LDL there may be a reduced chance of concurrent existence of CVD but there is also associated decrease in HDL and increase in TG levels which again poses an uncertain threat for development of CVD.

Key words : Sickle cell disease, Cholesterol, Hypcholesterolemia

Progressive Muscle Relaxation Therapy In Anxiety:

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Background: Anxiety is a normal reaction to stress and represent a common human emotion. But when anxiety becomes an excessive, irrational dread of everyday situations, it becomes a disabling disorder. A reaction opposite to stress is relaxation. Relaxation techniques include behaviouraltherapeutic approaches that differ widely in philosophy, methodology, and practice. **Objective:** To study the EEG changes associated with Modified JPMRT in stressmanagement,tocorrelate the hemodynamic changes with relaxation and to validate the effectiveness of Modified JPMRT. **Material and Method:** 35 (thirty-five) patients diagnosed with Generalised Anxiety Disorder (GAD) as defined by the Standardised diagnostic criteria of DSM-IV-TR of American Psychiatric Association was recruited. They were subjected to Modified Jacobson Progressive Muscle Relaxation Therapy (JPMRT) for a total of 10 (ten) sessions everyday by an experienced Clinical Psychologist. EEG, PR and BP were recorded before the beginning of therapy and at the end. Subjective Hamilton rating scale for anxiety (HRSA) was taken before the beginning and at the end of therapy. Statistical analysiswasdone using ANOVA-singlefactor.**Result:** Significant reduction in EEG frequency ($35.86\text{Hz} \pm 2.43$ to $31.2\text{Hz} \pm 2.22$), PR ($80.57\text{min}^{-1} \pm 6.43$ to $73.14\text{min}^{-1} \pm 3.73$) and SBP ($130.69\text{mmHg} \pm 8.58$ to $124.17\text{mmHg} \pm 8.36$) was found at theend of session. Subjective HRSA was also significantly reduced (9.54 ± 1.87 to 6.54 ± 1.09).Nosignificantreduction in DBP was seen. **Conclusion:** The present study confirms and extends the finding of efficacy of Modified Jacobson Progressive Muscle Relaxation Therapy (JPMRT) on GAD. It could prove as a valid treatment option for anxiety and depression related disorders.

Key Words: Anxiety, JPMRT, EEG, PR, SBP, DBP, HRSA.

Blood Pressure And Body Composition In Offspring (18-20 Years) Of Hypertensive Parents

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Background: Parental history of hypertension enhances the risk of future development of the disease in the offspring. Hence possibility of alterations in blood pressure along with body composition may be an early predictor. **Objectives:** To detect the possibility of pre-hypertension or hypertension with concomitant changes in body composition at a young age (18-20 years) in offspring of hypertensive parents **Method:** The study group consisted of 40 apparently healthy medical students aged 18-20 years with parental history of hypertension (O_{Hyp}). The control group ($n=30$) consisted age and gender matched medical students without parental history of hypertension (O_{Norm}). Anthropometric parameters like height, weight, waist circumference, hip circumference were recorded and Body surface area, Body mass index, waist-hip ratio, waist-height ratio were calculated. Skin fold thickness was measured at four sites - biceps, triceps, subscapular and suprailiac using Harpenden's caliper. The percentage of body fat was calculated by Durnin and Wormsley equation. Physiological parameters like pulse rate, systolic and diastolic blood pressure were recorded. The results were analyzed using SPSS (version 9.0). **Results:** BMI in O_{Hyp} is greater (Male $O_{\text{Hyp}} = 25.28 \pm 4.33$, Female $O_{\text{Hyp}} = 25.52 \pm 5.13$) than their respective normal reference values (Male $O_{\text{Norm}} = 20.90 \pm 2.44$, Female $O_{\text{Norm}} = 21.41 \pm 4.16$) and also found to be significantly higher when compared to their corresponding control groups O_{Norm} (Male $p=0.003$, Female $p=0.007$). WHR was in the normal range in both male (0.89 ± 0.06) and female (0.81 ± 0.07) offspring, but significantly higher when compared to their respective controls. Body fat percent was more than the normal range in both male (23.64 ± 3.58) and female (34.08 ± 3.67) offspring and significantly higher in comparison to their respective controls. Systolic blood pressure in

female offspring (116.0±8.64) was within the normal range whereas in male offspring (121.41±6.31) it was slightly found to be higher than the expected value. However as compared to the control group systolic blood pressure was significantly higher in both male and female offspring. Diastolic blood pressure was in the normal range and no significant differences were observed between cases and controls.

Conclusion: O_{Hyp} are slightly overweight and have higher body fat % may be noted with a bit seriousness as these offsprings are genetically predisposed with hypertensive factors inherited through their parents. It should be further noted down of the fact that the systolic blood pressure of male offspring were within the normal range but it is suspiciously at the terminal end of normal range. This observation clearly indicates a possibility of development of an early hypertension of the male offspring. Early identification of individuals at risk of future development of hypertension and counseling about preventive measures like diet management and exercise programs to increase calorie expenditure may prevent or delay the onset of hypertension.

Key words: Parental history of hypertension, Skin fold thickness, Body Fat Percentage.(Registration no for the conference ICON/2/0/215)

Heart Rate, Blood Pressure And ECG Changes In Head Down Position

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Introduction:The cardiovascular system is dependent on gravity. There are a number of studies regarding human adaptations to microgravity exposure, to long-term bed rest, and to 6° Head Down Test (HDT) in healthy volunteers. However, there is limited data concerning the results of short-term exposure to HDT greater than 6°. Accordingly, this study examines the effect of short term Head Down Position at 60°. **Aim:**To compare heart rate, blood pressure, ECG changes in supine and head down position. **Method:** Fifty healthy male volunteers in the age group of 17-20 years were

involved in this study which was done at the Department of Physiology, Coimbatore Medical College. Heart rate, BP and ECG were assessed in supine position and at head down position of 60°, within 5 minutes of changing the position. **Result:** The data obtained was analysed using paired t-test. From supine to head down position, there was significant decrease in heart rate, increase in systolic BP and decrease in diastolic BP and hence an increase in pulse pressure and a decrease in the mean arterial pressure (p<0.05). There were no significant changes (p>0.05) in the ECG parameters (P-wave duration and amplitude, PR interval, QRS complex, QT & QTc using Bazett formula, R wave amplitude and ST elevation) **Conclusion:** There are adaptations by the cardiovascular system due to short term head down test in the form of changes in heart rate and BP but no significant change is reflected in ECG. Head down position, hence, does not hinder monitoring of ECG (as in the case of certain surgeries).

Nerve Conduction Velocity In Upper Extremity Among The Computer Users

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Background:The Information Technology Revolution has changed the way of working by invention of computers because of faster communication, work completion, data analysis & interpretation. The number of computer users has risen dramatically in last few decades. Intensive computer use puts excessive stress and strain on muscles and joints, particularly of the upper extremities, as it involves continuous and repetitive movements and awkward postures. Hence, musculoskeletal disorders have become common problems with computer users and work related musculoskeletal disorders (WRMSD) have become an area of research interest. **Objective:** To determine whether the nerve conduction velocity in the median and ulnar nerves of upper extremities (Both sides) in computer users is affected when

compared to the nerve conduction velocities in same nerves in non – computer users. **Materials and Method:** - The study was done in Neurophysiology Laboratory of Physiology Department PCMS Bhopal by using NeuroPerfact Plus NCV machine .Nerve conduction velocity test was performed in 40 subjects worked under PCMS group. Group I consisted of 20 computer users who work on computer using the keyboard and mouse for at least 6 hour/day for more than 6 months. Group II comprised of 20 height weight matched non – computer users in the same age group (21to40 yr.).**Results:** The motor and sensory conduction velocities in median and ulnar nerves in Group I were decreased as compared to those in Group II . These differences may be due to extra stress and strain that the computer users are subjected to while being engaged in keyboard work. There was no significant differences observed in conduction velocity of both Right and Left hand for the same nerves in Group I. **Conclusion:** The lowering of motor and sensory conduction velocities in the median and ulnar nerves in computer users is suggestive of peripheral neuropathy. Thus, the computer users involved with repetitive nature of keyboard work are at risk of developing carpal tunnel syndrome. Further studies with large sample size can be initiated to explore the role of nerve conduction studies in predicting the development of carpal tunnel syndrome

Key Words: computer user, keyboard work, nerve conduction velocities.

Comparative Study Of Visual Event Related Potential (P300 Wave Amplitude & Latency) With Novel And Repeat Stimulus In Young Healthy Adult Males

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Event Related Potential (ERP) is a time locked measure of electrical activity of the cerebral surface representing a distinct phase of cortical processing. It provides information about neuro physiological processes related to a range of cognitive tasks.ERP is used to evaluate the

characteristics of information processing in the Central Nervous Systemelicited by a task known as oddball paradigm. The latency and amplitude of P300 can be used as an index for the assessment of neural processing time and the neural activity.**Aim and Objectives:** To find out and compare the Visual Event Related Potential(VERP), amplitude and latency of P300 wave with novel and repeat stimulus in young healthy adult males. **Material and Method:** 32 Right handed healthy males (18-23years) with normal visual acuity were randomly selected for the study. After explaining the procedure for recording of Visual Event Related Potential (VERP), written informed consent was obtained. Subjects were seated in a sound attenuated, dimly lighted room. Computer screen was kept at 100cm. from the subject. VERP recording was done using odd ball paradigm. Each stimulus was presented for 2 seconds followed by next stimulus with 2 seconds inter stimulus interval. They were asked to count the novel stimuli whenever it appears on the screen.EEG electrodes were positioned on scalp as per the International 10-20 system. VERP recording was done on Brain Electro Scan System, Version 4.0. Scalp impedance was kept at 20k Ω . VERP recording was done with sampling rate of 250Hz. The vertex sensor was used as reference electrode. Centro Parietal sensors Cz & Pz electrodes were used as active recording electrodes. Online band pass filter of frequency 0.01-100Hz was used. After completion of procedure, the data was analysed offline & mean P300 wave amplitude and latency was calculated by using suitable software. Paired ‘t’ test was used to find out the significance of difference in P300 Wave amplitude and latency with novel & repeat stimulus in study.**Results & Conclusion:** P300 wave amplitude and latency is found to be significantly higher with novel stimulus as compared to repeat stimulus in odd ball paradigm. Hence it is concluded that novelty influences the P300 waveamplitude and latency.

Key Words- Event Related Potential, Visual Event Related Potential, Odd ball Paradigm, P300 wave.

Efficacy Of Simple Bed Side Method In Diagnosing Peripheral Neuropathy In Diabetic Patients In Comparison With Vibration Perception Threshold

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Diabetic neuropathy is among the most common disorders of the peripheral nerves, also among one of the least treatable. Screening and early diagnosis of neuropathy helps the patients with diabetes to actively have glycaemic control before the onset of complications. The present study was aimed to evaluate the usefulness of simple bed side Method like Diabetic Neuropathy Symptom (DNS) score, 10-g Semmes-Weinstein monofilament testing, vibration testing by 128 Hz tuning fork and ankle reflex testing in diagnosing neuropathy in diabetic patients in comparison with measuring vibration perception threshold (VPT) with a biothesiometer. The study was carried out at the medicine outpatient department of Punjab institute of medical sciences hospital and medical college Jalandhar. A total number of 106 T2DM patients aged above 30yr were taken. The study included information about socio-demographic characteristics and other parameters like height, weight, BMI, waist circumference, BP, fasting blood sugar, lipid profile and physical activity. The prevalence of peripheral neuropathy was 36.79 per cent with VPT. When compared with VPT, DNS score was most sensitive (53.6%) and specific (55.17%). The tuning fork, monofilament and ankle reflex tests had lower sensitivity (51.14%, 48% and 47.18%). There was significant correlation between the VPT score and the DNS score ($r = 0.84$, $P < 0.01$), tuning fork testing ($r = 0.94$; $P < 0.01$), monofilament testing ($r = 0.9$; $P < 0.01$) and ankle reflex ($r = 0.76$, $P < 0.01$). Therefore it can be concluded that these simple bed side tests are useful in clinical practice.

Key Words: diabetes, VPT, peripheral neuropathy,

Estimation Of Gall Bladder Volume In Sikkimese Population

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Aim: The study was conducted to determine the gall bladder volume (GBV) and determine its correlation with age, sex and body mass index in Sikkimese population attending Central Referral Hospital. **Objective:** The objective of the study was to establish baseline indices for the study population and evaluate the correlation between the variables and determine the statistical correlation. **Patients and Method:** The study was designed as a descriptive study with an aim of including 50 consecutive patients who fulfilled the selection criteria for the study population. The first 50 patients undergoing ultrasound scan of the abdomen in the department of Radiodiagnosis, who fulfilled the selection criteria, and willingly gave written consent were included in the study. A fact sheet containing information regarding age, sex, height, weight, body mass index (BMI), gall bladder volume (GBV) from ultrasonographic evaluation and history for any co-existing diseases were recorded for subsequent analysis. The gall bladder volume was calculated by the ellipsoid formula ($V = \pi \times L \times W \times H / 6$) by a single, experienced observer with the help of inbuilt software of the ultrasonography machine. The data collected was tabulated and analyzed by SPSS (statistical package for social sciences) software version 20.0 for windows as well as Microsoft excel 2010 with inbuilt statistical analysis tool. Different statistical aggregates like mean (average), median and mode were used to analyze numerical (scale) variables. Frequency distribution was used in case of non-numerical variables (nominal and ordinal) variables. Appropriate statistical Method were used to determine the significance of differences between various comparisons. **Results:** A total of 50 patients were included in the study, 25 of who were males and 25 females with a male to female ratio of 1:1. The mean age of the study population was 36.26 years with a range of 13

years to 72 years. The average BMI of the study population was 24.3 ± 3.8 , with a minimum of 17.3 and maximum of 33.06. The mean BMI in males was 23.9 whereas the same in the females was 24.7 and were within normal limits. However 11 females had a BMI within the range 25-30 and 3 within the range 30-35 thereby being overweight and mildly obese in contrast to 8 and 1 in the males, respectively. The mean GBV in the present study was 15.47 ± 7.9 ml with 17.2 ± 8.9 ml and 13.74 ± 6.4 ml being the average volumes in the males and females respectively, which gives the baseline indices for the Sikkimese population. Mean GBV in participants with normal BMI was 14.84 ± 6.9 ml, in overweight was 15.97 ± 6.2 ml and in moderately obese was 21.80 ± 7.99 ml which shows a positive correlation with the increasing BMI as proved by the Spearman correlation test, however it was not significant statistically. **Conclusion:** 1. Ultrasonography is an effective method of evaluating gall bladder volume. 2. Sikkimese males have a larger fasting gall bladder volume. 3. Fasting gall bladder volume has a weakly positive correlation with advancing age. 4. Fasting gall bladder volume is directly correlated with higher BMI

Key Words: Sikkimese, gallbladder, volume, ultrasonography.

Effect Of Body Mass Index On Parameters Of Nerve Conduction Studies In Median Nerve

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Introduction -Nerve conduction study is important in the diagnosis of focal or diffuse peripheral neuropathies. As shown by previous studies Body mass index (BMI) can affect nerve conduction. The purpose of this study is to analyze the effect of body fat (Body mass index, BMI) on Median Nerve conduction latency, amplitude and velocity. **Aim and objectives** – To study the effect of BMI on nerve conduction parameters like latency, amplitude and velocity on median nerve in healthy people. **Materials and Method** –The study was conducted on 100

healthy volunteers in the age group of 18 – 30yrs. BMI was calculated as weight (kg) divided by height (m) squared. The study group was divided into 3 groups depending upon BMI (BMI<18, 18-25, >25). The amplitude, latency and conduction velocity were measured in motor and sensory component of median nerve prospectively using Neuro MEP machine. **Result** –Data was statistically analyzed using appropriate tests after adjusting for age and sex. No correlation was noted between BMI and nerve conduction velocity and latency. Motor and sensory nerve conduction amplitudes correlated significantly ($P < \text{or} = 0.05$) with BMI. This study demonstrated that parameters of nerve conduction study can be affected by BMI. The correlation between increased BMI and motor and sensory nerve amplitudes should be considered while calculating nerve conduction parameters.

Keywords – Nerve conduction Velocity, Body mass index, Median nerve

Lung Volumes And Flow Rates In Wasted And Stunted Children

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Background & objective - Lung functions in healthy normal children are closely related to growth and development. The purpose of our study was to explore the effects of malnutrition on lung functions and to assess and compare the differences in PFTs among normal & malnourished children of Jammu city. To the best of my knowledge not much work has been done on PFT's in malnourished children in northern part of the country. **Method** – Two hundred and eight randomly selected school children in the age group of 7-14 years of both the sexes were included. There were 110 wasted & stunted children according to Waterlow classification considering height for age and weight for height. The height (cm) body weight (kg) were measured by standard

techniques & BMI was calculated. Lung volume and flow rates were measured with a computerized spirometer (Medspiror). **Results**--The data was analysed with the help of computer software SPSS 12.0 for window & epi-info version 6.1. Among 208 children 98 were normal (Group I) & 110 were wasted & stunted children (Group II). Wasted & stunted children showed a lower value of height & weight from normal children (Group I). Lung volumes and flow rates were significantly lower in group II when compared with group I. **Interpretation & conclusion** ---Our study show that reduction in lung volume and flow rates is probably due to ventilatory muscle wasting and diminished skeletal growth **Keywords** – Wasted and stunted, Flow rates, Lung volumes.

Effect Of Kundalini Meditation On Some Physiological Variables Indicating Relaxed State And Parasympathetic Dominance

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Background & objectives: Meditation is now recognized as a different physiological state scientifically as relaxed & calm mind with parasympathetic dominance. This study is performed on two expert meditators of sahaj yoga kundalini meditation. Objectives of this study is to find out whether regular meditation practice could lead to rapid “stress reduction” & control over autonomic nervous system. **Method:** .Various physiological variables like heart rate, respiratory rate , galvanic skin response are measured before, during & after meditation & electroencephalography is performed during meditation. The following physiological parameters were assessed respiratory rate , heart rate & GSR by physio-pac instrument & electroencephalography by neuropage plus before, during & after meditation. **Results :** Heart rate , respiratory rate are reduced during meditation session & GSR is increased suggesting parasympathetic dominance .EEG findings suggest relaxed state. **Conclusion & interpretation :** This study

shows a relaxed & calm state of mind during meditation with parasympathetic dominance.

Key words: EEG: electroencephalography, sahaj yoga: a kundalini meditation

Evaluation Of Peak Expiratory Flow Rates (PEFR) In Tea Garden Factory Workers In Dibrugarh District Of Assam

Rumi Konwar

Aim: Evaluation of Peak Expiratory Flow Rates (PEFR) in Tea Garden factory workers in Dibrugarh District of Assam **Objectives:** 1. To assess the PEFR values in tea garden factory workers 2. To study the effect of duration of exposure to pollutants in them. **Method:** 210 healthy male tea garden factory workers (cases) and 70 healthy male field workers (control group) were selected. Duration of exposure to dust in the factory workers was noted and divided into three groups-Group 1(<1 year), Group 2(1-2 yrs) and Group 3(>2 yrs upto 10 yrs). Each group including control group had 70 participants. PEFR values were assessed using Mini Wright Peak Flowmeter. **Results:** The mean PEFR(L/min) values of the groups were the following: Group 1- 460+_{39.07} Group 2- 458+_{18.37} Group 3- 405+_{18.60} Control- 466+_{14.02} On comparing with control group, the decline in PEFR values in Group 3 was highly significant (p<0.01). Also when the 3 groups were compared amongst themselves, the decline in PEFR values from Group 1 to 3 (Group 1 **Conclusion:** The study highlights the fact that with increased duration of exposure to dust within the factory, there was a decline in PEFR values of the garden factory workers **Key Words:** Peak expiratory flow rates (PEFR), tea garden factory workers, dust.

Association Of Blood Group, Gender And Age With Cholelithiasis

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Aim – To find out any association of blood group, gender and age with cholelithiasis. **Material And Method** – 60

cholelithiasis patients diagnosed by ultrasonography and blood investigation were screened. Test was carried out using SPSS software and the significant was seen as the P value stood to be < 0.05 out of the total number of the patients approximately 45% were of blood group A. The disease mainly aimed female gender as approximately 90% of the patients were female. Our study also proposed that patients who were more than 40 years old showed preponderance as approximately 53.3% of them were more than 40 year old. **Result And Conclusion** -Blood group A is more at risk as 27 out of 60 patients were belongs to this blood group Female are at higher risk as 54 out of 60 patients were female. Age more than 40 showed preponderance, as 53.3% were more than 40. To conclude our study shows that cholelithiasis is more common in female of more than 40 years belonging to blood group A.

Changing Trends In Medical Education For Effective Teaching Learning

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Background: 'Change is the only constant thing in this world'. With the advent of newer technology and new windows for seeking information for students as well as faculty, there is a great need for change in Method of medical education for medical students. Current Method of teaching in medical education, alone, cannot fulfill the need of imparting relevant education to students. Hence, a need has arisen to introduce other tools for medical education in addition to current modes of teaching. Proper teaching Method can lead to successful medical students, not in terms of quantity but in terms of quality of medical graduates. Many tools of medical education can be introduced at basic science level which can motivate the students and help them learn effectively. We have experimented with some Method of medical teaching with encouraging results. **Aim And Objectives:** To introduce newer active Method of teaching and learning

in physiology I MBBS and to study their effectiveness among I MBBS students in physiology. **Method:** Before introducing these Method, we took feedback from students about the current teaching Method. One most common opinion of students was, that the traditional current teaching Method were not giving them enough platform for them to learn actively. Based on feedback, we tried to focus on experiential learning and carved certain newer Method of teaching medical students. We prepared teaching learning modules as following: 1) Peer teaching 2) Buzz groups 3) Problem based learning 4) One minute preceptor model 5) Role play 6) Integrated teaching 7) Web based learning **Observation And Conclusion:** Students feedback was taken after adopting the newer Method. Analysis of students feedback was encouraging. 99% students were in favour of newer Method of teaching as they put the students in active mode of learning. Hence, these modes of teaching should be introduced in I MBBS for selective topics in addition to traditional Method of teaching.

Key words: change, medical education, new Method

Comparison Of Correlation Between Serum Uric Acid And Blood Pressure In Offspring's Of Patients With Essential Hypertension And In Healthy Controls

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Background: Data have revealed that there is a close association between elevated serum uric acid and the onset of essential hypertension in adolescents. Studies have also suggested a tight linear correlation between the serum uric acid levels and systolic and diastolic blood pressures in children with prehypertension. Many factors, including family history, genetics, insulin resistance and body mass index, play a role in the development of essential hypertension. The family history is an important risk factor for essential hypertension in children. Hence the present study was undertaken to investigate

the relationship between serum uric acid levels and blood pressure in offspring's of patients with essential hypertension. **Aim And Objectives:** 1) To assess the serum uric acid levels, blood pressure in offspring's of patients with essential hypertension, and in age and sex matched healthy controls. 2) To compare and thereby to test the hypothesis that a "significant correlation is present between the serum uric acid levels and the blood pressure". **Methodology:** Thirty offspring's of patients with essential hypertension and thirty age and sex matched healthy controls without history of essential hypertension in the family, were randomly selected for the study. Out of the thirty subjects in each group, ten were females and twenty were males in the age group of 17-25 years. Serum uric acid levels (Uricase- PAP method), blood urea (GLDH – Urease method), serum creatinine (Jaffe's method), triglycerides (GPO–Trinder method), total cholesterol (by CHOD-PAP method), fasting blood glucose (Trinder's method) and blood pressure (palpatory and auscultatory method) were measured in both the groups along with the anthropometric measurements viz., height, weight, body mass index, waist- hip ratio. Data was then tabulated and statistically analysed using SPSS software. **Results And Conclusion:** It was found on subsequent testing that both offspring's of patients of essential hypertension and the controls were well matched with respect to age, sex, BMI, and waist-hip ratio. Both the groups also did not differ much in their lipid parameters, renal parameters (except serum creatinine) and were within normal limits. But there was significant difference between the two groups in their fasting blood glucose levels (and were within normal limits). The blood pressure (both systolic and diastolic, $p < 0.001$, $p = 0.075$) was significantly higher in offspring's of patients of essential hypertension in comparison to controls and was within the normal range. Further analysis revealed a significant positive correlation between serum uric acid and systolic blood pressure in controls ($r = 0.431$, $p = 0.017$) unlike in offspring's of patients of essential hypertension ($r = -0.265$, $p = 0.157$). So it was concluded that a significant positive

correlation exists between serum uric acid levels and systolic blood pressure; but the same correlation has been distorted in offspring's of patients with essential hypertension due to some confounding factors like age, etc.

Key Words: Blood pressure, Essential hypertension, Serum uric acid.

Heart Rate Variability: A Comparative Study Between Males And Females Of Age Group 18-24 Years

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Aim Of The Study: To analyze heart rate variability in a sample of young active subjects (18 to 24 years old), and to find out gender related differences. The study was carried out in 30 male and 30 female subjects. The mean age of subjects was 21 ± 3 years. Electrocardiographic recording (ECG) of each subject was obtained for 5 minutes, in supine position, using physiopac hardware, by Medicaid. Heart rate variability of each subject was analysed. The test results depicted significant difference in mean R-R interval (sec) between males (0.79 ± 0.08) and females (0.69 ± 0.08). A significant difference was also found in mean heart rate (per minute) between males (77.14 ± 7.66) and females (88.36 ± 9.92). No significant effect of height and weight of subjects was observed on heart rate variability. Also no difference was observed in other parameters of heart rate variability (RMSSD, NN50, pNN50) between males and females. [RMSSD : the square root of the mean squared difference of successive NNs; NN50 : the number of pairs of successive NNs that differ by more than 50 ms; pNN50 : the proportion of NN50 divided by total number of NNs]. **Conclusion:** No significant differences between males and females in HRV parameters, except for mean RR interval and mean heart rate.

Key words: HRV, gender.

To Study The Effect Of Iron Deficiency Anaemia On Pure Tone Audiometry In Young Children

Shweta Arora

Objective: To study the effect of iron deficiency Anaemia on pure tone audiometry in young children. **Method:** 50 Anaemic children having Hb<12gm/dl were taken as cases and 30 healthy children were taken as controls. Anaemics were further divided in mild, moderate and severe anaemics. Recording was done by RMS Audiometry Platform version 1.0.0.390. The statistical significance of difference between groups was evaluated using unpaired student's t test. **Results:** The hearing threshold values were more in all anaemic groups as compared to controls for both air and bone conduction but values were not statistically significant except at some higher frequencies. In left ear, significant change ($P<0.05$) was observed in air conduction values at 500 and 4k Hz while in right ear, significant changes were observed in air conduction value at 2k Hz and bone conduction value at 4k Hz while in right ear, significant changes were observed in air conduction value at 2k Hz and bone conduction value at 4k Hz. **Conclusion:** The results of the present study didn't support any significant hearing loss due to iron deficiency Anaemia.

Bacterial Isolates Associated With Semen Of Primary Infertile Patients

Shubhangi.D, Baig, S.T Khan

Introduction: Male Urogenital Tract Infections is one of the most important causes of male infertility, accounting to 8-35% of male infertility cases. Several studies suggest that one or more infectious agents in the genito-urinary tract may be associated with male infertility. Microbiology investigation in infertile couple can be useful to detect the male urogenital tract infection. Presence of pathogenic microorganisms in semen may be related to a breach in the integrity of the blood-testes barrier, may give early warning signals of impairment of male fertility. This study was aimed at investigating and determining the

influence of microorganisms in male infertility as well as to determine the qualitative and the quantitative features of the seminal fluid of man. **Aim & Objectives:** To study seminal parameter and bacteriological isolates in primary infertile patients. **Material And Method:** Seminal fluid specimens were collected from males attending the fertility clinic at the Reproductive Biology unit, Department of Physiology, Government Medical College, and Hospital Aurangabad. n= 50 patients of primary infertility between the ages of 25- 45 years were enrolled for the study. The patients with unknown cause of secondary infertility were excluded from study. Culture of seminal fluid samples (50) was done in aseptic condition. **Result And Observation** Out of 50 samples, culture was positive in 19 cases (38%) most common organisms found were E. Faecalis, followed by E. coli. **Conclusion:** The presence and profound influence of microorganisms in semen is evidence that microorganisms played significant role in male - infertility.

Key Words: bacterial isolates, semen and primary infertility.

Effect Of Music On P300 Event Related Potential

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Background: Music is a complex auditory stimulus which is made meaningful by the perceptual and cognitive systems P300 Event related potential represents basic characteristics of neurocognitive functioning of brain. Identification of effect of music on P300 Event related potential may provide information about the way in which music is processed by the individual. **Objectives :** To study and compare the effect of music of different types on auditory P300 in subjects exposed to Indian classical slow music (Group I) & in subjects exposed to Western fast rock music of (Group II) with that of controls. **Materials & Method :** ERP responses elicited by a auditory oddball task were measured at the mid-parietal site. Auditory P300 amplitude and

latency were recorded and analysed in 50 Group I and 50 Group II male individuals in age group of 25 to 35 years before and after music exposure. Same music was also presented in repetition for 10 mins three times and P300 was evaluated each time after exposure. 30 age and sex matched subjects were taken as controls who were not exposed to any music. Study was done after controlling for potential confounding factors like alcohol intake, smoking, drug abuse, psychopathology, diabetes, Hypertension, Neurological diseases, pulmonary disease or any other conditions which were likely to affect ERP (P300) were excluded from study. **Results** : Group I showed P300 of increased amplitude and shorter latency ($p < 0.001$) after exposure to music of classical type compared to group II who were exposed to rock music. Both Group I and Group II showed reduction in latency and increased amplitude of P300 after exposure to music compared to before exposure and controls. Repetitive presentation of music showed no improvement in P300 in Group II compared to Group I. **Conclusion**: Music causes improvement in cognitive function of brain and elevates mood. The effect of classical music showed significant improvement in P300 than rock music type. No improvement in P300 ERP with repetitive presentation in rock music listeners may be due to early habituation phenomena compared to classical music. These results led us to the conclusion that listening to classical music type has got more beneficial effect on cognitive function of brain.

Key Words : Auditory ERP; P300; Music; Cognition.

Comparison Of Blood Flow Index Of Upper And Lower Extremities In Young Healthy Males Using Impedance Plethysmography

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Background- Impedance plethysmography (IPG) is the recording of instantaneous volume by measurement of electrical impedance. It is an indirect assessment of blood volume changes in any part of the body segment from changes in the electrical impedance of that segment. **Aim-**

To compare the blood flow index (BFI) of upper and lower extremities in young healthy males.

Method -The study was carried out in different segments of upper and lower extremities of 30 healthy young males (aged 30-40 years) by Nivomon (L&T) in the employees of SMS Medical college Jaipur. Subjects were screened after measuring Height, weight and risk factors contributing to peripheral vascular diseases like smoking, DM, dyslipidemia, hypertension, obesity etc. Hemodynamic parameters measured using IPG were Basal impedance (ZO) and Blood flow index (BFI). **Result & Conclusion**: BFI was found to be significantly high in upper extremities than in lower extremities. However the difference of blood flow index was insignificant when compared between arm and forearm also when compared between thigh and calf. Impedance plethysmography may become an important clinical tool to study of peripheral blood flow it is simple, inexpensive and noninvasive hemodynamic test for screening peripheral vascular diseases at a certain age provided that one has predetermined normal data of blood flow index.

Key Words: Blood flow index (BFI), Impedance plethysmography (IPG), Peripheral vascular diseases (PVD).

Effect Of Physical Activity On Variables Of Spirometry

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Background : Physical activity is known to improve physical fitness and to reduce mortality and morbidity from numerous clinical conditions. There is positive relation seen between physical activity and variables of spirometry (FEV1, EV1/FVC, PEFR, EF25-75, FEV.05 and MVV.) **Aim And Objective**: The major purpose of this analytic type of observational study is to explore the role of physical activity on respiratory fitness in healthy people. **Materials And Method** : Number of subjects - 90 subjects of age group 18-25 years divided into three groups. Each group is having 30 subjects. Subjects were divided into three groups according to leisure time physical activity assessed by metabolic equivalent

minutes/week. Group 1-low MET score <1500 MET min /week. This is lowest level of physical activity. Group 2- Moderate 1500-3000 MET min /week. 3 or more days of vigorous intensity activity of at least 20 minutes per day OR 5 or more days of moderate intensity activity and/or walking at least 30 minutes per day. OR 5 or more days of any combination of walking, moderate intensity or vigorous intensity activities achieving a minimum total physical activity of at least 600 MET-minutes /week. Group 3 ->3000 METmin /week OR 7 or more days of any combination of walking, moderate intensity or vigorous intensity activities achieving a minimum total physical activity of at least 3000 MET-minutes/week. Respiratory functions were tested by spirometry. Variables of spirometry recorded were FEV1, EV1/FVC, PEFR, EF25-75, FEV.05 and MVV. **Results:** In present study the results were analysed for significant differences between groups and within groups by one way ANOVA followed by posthoc Tukey test. P value <0.05 were considered significant. FVC, PEFR, EF₂₅₋₇₅ increased significantly with increase in physical activity (P<0.05). **Discussion:** Results from the present study strongly suggest that the intensity or severity of the sports determines the extent of strengthening of the respiratory muscles with a resultant increase in the lung volumes.

Key Words: spirometry, physical activity, MET

A Study To Compare The ECG Changes Between Smokers And Non Smokers

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Background: Cigarette smoking is a major public health problem leading to worst health outcomes like heart attacks, COPD, cancers, peripheral vascular disease, hypertension, diabetes and many more. About 34.6% of adults smoke in India. The components in smoking like nicotine and carbon monoxide induce profound changes in the heart, which can be assessed by doing an ECG. **Objective:** To compare the

changes in ECG between smokers and non smokers. **Materials and Method:** The study is a cross sectional comparative study. A total of sixty healthy male persons in the age group 40 to 50 years who reported to the NCD clinics at primary healthcare settings were included in the study. Thirty of the study subjects included were smokers who gave history of smoking for the past five years or more while the other thirty persons were non smokers. A 12 lead ECG was recorded in the resting supine position. The heart rate, P wave, PR interval, QRS complex were assessed and the QTc (corrected QT interval) was calculated using Bazet's formula. The values in smokers and non smokers were analyzed by using students T test. **Results:** The mean heart rate per minute is higher in smokers (76.6) as compared to Non smokers (72.2), and P wave amplitude in mm was also increased in smokers (2.16 Vs 1.88), and both parameters were statistically significant at P<0.05. The PR interval, QRS Complex, and QTc values however showed no statistically significant difference between the smokers and Non smokers.

Body Mass Index Assessment Among Secondary School Female Children From Low Socioeconomic Status In Aurangabad Maharashtra: A Crossectional Pilot Study

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Background & Aim: Today there is a widespread awareness regarding obesity especially among females. Although it is becoming more prevalent among high & middle income population, still there is a significant prevalence of under nutrition among low income families. This pilot study was done to estimate the status of Body Mass Index in female secondary school children from low socioeconomic status in Aurangabad district of Maharashtra. **Material & Method:** Study Design: Cross-sectional study Site: Department of

Physiology, Government Medical College, Aurangabad, Maharashtra Approval of Institutional Ethics Committee was taken prior to start of the study. Secondary school children (Standard VIII to X) from one of the schools of Aurangabad falling under low socioeconomic strata of society were included in the current pilot study. It was a girl's only school. 38 girls were selected by simple random sampling technique from Standard VIII to Standard X students. Body weight was measured on electronic weighing scale using standard procedure & height was done using stadiometer. BMI for age was assessed using the WHO reference scale for classification of normal weight, underweight & overweight children. **Results:** Only two girls were overweight. Twenty eight girls fell under normal BMI for age category as per WHO nomogram data. However 8 students had BMI less than normal for age. The percentage of underweight girls was 21.05% with 95% Confidence Interval of $21.05\% \pm 12.96\%$. So, the range for the true population proportion for underweight students among secondary school girls from low socioeconomic status in Aurangabad is 8.09% to 34.01%. **Conclusion:** A high proportion of female students among secondary school children from low socioeconomic status in Aurangabad are underweight. There is an urgent need to address this issue.

Key Words: Body Mass Index, schoolgirls, underweight

Comparative Study Of Mechanical Lung Function Measurements In Copd Patients: A Pilot Study

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Aim & Objective : (a) Comparison of Airway Resistance by Spirometry and Maximal Inspiratory Pressures (MIP), Maximal Expiratory Pressures (MEP). (b) Assessment of Respiratory Muscle Strength using MIP and MEP. (c) Assessment of Airway obstruction using Forced Oscillation technique (FOT).

Method: Equal number of COPD patients and healthy individuals of age group 50 ± 20 are taken as subjects for this study. Subjects undergone spirometry test using a computerised machine MASTER SCREEN PFT by JAEGER. Vital Capacity (VC), Forced Vital Capacity (FVC), Forced Expiratory Volume at the end of 1 second of Expiration (FEV_1) and FEV_1 /FVC ratio are assessed and compared. MIP, MEP and FOT tests are carried out with a computerised machine SPIRO AIR by MEDISOFT. Maximal Inspiratory Pressures (MIP) reflects the strength of the diaphragm and other inspiratory muscles while the Maximal Expiratory Pressures (MEP) reflects the strength of abdominal muscles and other expiratory muscles. The increment in airway obstruction in COPD patients may cause an increase in total resistance, which is obtained by FOT. This project is currently underway. **Result:** FEV_1 and FEV_1 /FVC ratio are used to assess the severity of disease. As expected, the FEV_1 values are lower in all patients as compared to controls. MIP and MEP are lower in patients with COPD as compared to the healthy subjects and the increment in airway obstruction caused an increase in resistance at lower frequencies. **Conclusion:** The measurement of Maximal Inspiratory Pressures (MIP) and Maximal Expiratory Pressures (MEP) indicates state of respiratory muscles. The ability of FOT to measure respiratory impedance during spontaneous breathing could be useful for monitoring of airway obstruction, resulting in great benefits to patients with COPD.

Key Words: COPD, FEV_1 , MIP, MEP, FOT technique

Clinicoradiological And Electrophysiological Correlation In Patients Of Lumbosacral Prolapse Intervertebral Disc (PIVD)

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The study was conducted on thirty patients with lumbar intervertebral prolapsed disc (PIVD) at

the levels of L4-5 & L5-S1 diagnosed by Magnetic Resonance Imaging (MRI). All patients were clinically evaluated by their signs and symptoms and physical examination. Motor nerve conduction velocity of bilateral lower limb nerves (tibial and peroneal nerve) and sensory nerve conduction velocity of sural nerve were assessed. Electromyography of bilateral four lower limb muscles (vastus medialis, vastus lateralis, tibialis anterior and extensor hallucis longus) and paraspinal muscles were performed. Results of electrodiagnostic tests, clinical evaluation and MRI were compared and correlated. Electrodiagnostic study accurately identified radiculopathy and provided valuable information and minimizes other invasive and expensive diagnostic and therapeutic procedures. Results will be discussed.

Key Words – Electrophysiology, PIVD, Nerve conduction velocity, Electromyography, MRI.

Evaluation Of The Effect Of Smoking On Select Cytomorphometric Indices Of Buccal Mucosal Cell In Middle Aged Individuals

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Background: Tobacco, an exotic substance that holds a fancy for all has its own drawbacks and can induce a number of degenerative changes including malignancies afflicting the physiology of practically all organ systems physiology. Oral exfoliative cytology is a simple, non-invasive and painless method that involves microscopic analysis of cells collected from the surface of the oral mucosa and is seemingly a potential tool to evaluate the malignant changes in the mucosal cells, if any at an early stage. The aim of the present study was to evaluate the effect of smoking on select cytomorphometric indices of buccal mucosal cell in middle aged individuals. **Materials and Method:** - 60 smokers and an equal number of age and sex matched control in the age range of 40 - 50 years were recruited in the present study. On

exfoliative buccal mucosal cytology average nuclear area (NA), nuclear perimeter (NP), minimal nuclear diameter (Dmin) and maximal nuclear diameter (Dmax) values of cell nuclei were observed and assayed through light microscopy making use of digital image processing software TS view version 7.3.1.7. **Results:** Statistically significant increased cytomorphometric mean values of nuclear i.e. measurements ND_{max} (μm) ($P=0.000$), ND_{min} (μm) ($P=0.000$), NA (μm^2) ($P=0.000$), and NP (μm) ($P=0.004$) in smokers as compared to that seen in non-smokers. **Conclusion:** In the present study, statistically significant increase in the cytomorphometric nuclear parameters, namely minimum nuclear diameter (ND_{min}), maximum nuclear diameter (ND_{max}), nuclear area (NA) and nuclear perimeter (NP), could be appreciated in smokers as compared to that observed in non-smokers, underscoring the relevance of exfoliative cytology as a potential screening assay for the diagnosis of dysplastic changes in the oral mucosal cells.

Key word: Oral exfoliative cytology, Light microscopy, Smokers and Non Smokers.

Effect Of Abdominal Adiposity On Pulmonary Function Test In Young Adult Males

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Objective: Obesity is a modern day epidemic which can be quantified by Body Mass Index (BMI). It affects various body systems which are being well documented. There is a high likelihood that obesity can also affect lung function due to various reasons. (BMI) may not be an ideal index of obesity in prediction of pulmonary dysfunction. The purpose of the present study is to deduct the effect of other markers of abdominal adiposity i.e. waist circumference (WC) and waist hip ratio (WHR) on lung function tests. **Material & Method:** The study was conducted in 120 young healthy male

individuals in the age group of 30-45 years (60 normal, BMI 18.5-22.9 kg/m² and 60 obese, BMI ≥25 kg/m²) based on their anthropometric profile. Both the groups were assessed for their parameters of obesity (BMI, waist circumference (WC), waist hip ratio (WHR) and pulmonary functions force expiratory volume in 1 second (FEV1) and force vital capacity (FVC) and FEV1/FVC ratio. **Result:** The measured pulmonary functions were impaired in the obese group when compared to non obese group. Statistical analysis revealed that the two groups differ significantly with obese people having lower FEV1 ($p < 0.05$) and FVC ($p < 0.05$). The results showed a negative correlation (r) of FEV1 (-0.408, -0.301, -0.326) and FVC (-0.514, -0.304, -0.393) with BMI, WC and WHR respectively. **Conclusion:** These results suggest that abdominal adiposity effects pulmonary functions (FEV1) and (FVC) by both restricting and obstructing the lung parenchyma and conducting airways.

Comparative Study Of Pulmonary Function In End Stage Renal Disease Patients Before And After Hemodialysis

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Aim: To study the acute effect of hemodialysis on pulmonary functions in end stage renal disease patients. **Objective Of The Study:** To compare Forced Vital Capacity (FVC), Forced Expiratory Volume (FEV1) and FEV1/FVC ratio before and after dialysis. **Materials And Method:** Study was conducted on 30 end stage renal disease male patients of different etiologies undergoing hemodialysis for more than three months. Pulmonary function parameters (FVC, FEV1 & FEV1/ FVC ratio) were recorded in the pre dialysis session (12 noon) and post dialysis session (4pm) with the help of Medspiror Helios 702. Statistical analysis was done using paired t test. **Results:** There was a significant increase in FVC [(2.10±0.63)L to (2.33±0.56)L], in FEV1 [(1.98± 0.57) L to (2.19±0.50)L] , FEV1/FVC ratio (91.29±5.07 to 94.41±4.07) from pre dialysis session to post

dialysis. **Conclusion:** Hemodialysis has a positive impact on the obstructive pulmonary changes in end stage renal disease patients. Hence proper respiratory care needs more integration in management and follow up of end stage renal disease patients.

Key Words: End stage renal disease, Hemodialysis, Forced Vital Capacity (FVC), Forced Expiratory Volume (FEV1) and FEV1/FVC ratio.

A Study Of Prevalence And Association Of Risk Factors For Diabetic Vasculopathy In An Urban Area Of Gujarat, India

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Background: Peripheral Artery Disease (PAD) is an aftermath of type II Diabetes posing a significant health problem in developing countries. Its silent progression warrants presymptomatic screening by Ankle Brachial Index (ABI) which cannot be applied to the whole population. We tried to measure burden of PAD in Diabetics of this region correlating various risk factors for it quantitatively and qualitatively. **Materials and Method:** 110 known under treatment type II diabetics were recruited from various OPDs. They underwent thorough assessment for general, symptomatic, medical history and risk factor screening that included 11 well known risk factors. ABI was measured by VersaDop instrument using standard protocol with ABI < 0.9 being considered as abnormal. **Results:** There was a high prevalence of asymptomatism, hypertension, positive family history and age <52 years in the study group. Relative risk was highest for asymptomatism followed by high BMI, hyperlipidaemia, CVD and smoking but less significant for age, gender, fasting sugar level, family history. More adverse ABI profile was noticed with increase in number of 5 modifiable risk factors cumulatively. **Conclusion:** There was high prevalence of low ABI in our region that is an evidence of PAD mainly affected by risk factors many of which were modifiable.

Defining those who are at risk to develop PAD in Diabetes, one can use ABI better in early screening and prompt treatment of this complication to stop its further progression and primary prevention can be served as felt need for health care effectively.

Key Words: Ankle brachial index, peripheral artery disease, prevalence, risk factor, type II diabetes .

Effect Of Occupational Exposure To Rice Husk Dust On MVV And PEFR

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Background: Paddy is grown in almost all parts of India. Few decades ago, these food grains were processed at family level before cooking. Today, due to industrialization and global competitive market trend, it has emerged as a major industrial activity in small medium scale sector to cater to the needs of increasing population. There are large number of mills engaged in processing/milling of rice, and are spread over in almost all states across the country. Due to increasing trend especially in urban areas to buy branded products, such as rice flour and rice, it is estimated that the number of units under this category of industries will continue to increase throughout the country. Keeping in view the large and increasing number of these industries countrywide and the gravity of environmental pollution caused by these industrial sectors the study has been taken.**Objective Of The Study:** To study the effect of rice husk dust on MVV and PEFR.**Materials And Method:**The study was conducted on 30 male rice mill workers and 30 healthy adult individuals of age group 20 to 40 yrs selected from JSS medical college Mysore. Unpaired t-test was used to test the significance of difference between mean values of subject and control.**Results:**MVV and PEFR was significantly lower in male rice mill workers compared to healthy individuals males. (MVV: 65.28 ± 10.77 vs 83.40 ± 15.73 , PEFR: 5.27 ± 1.33 vs 8.23 ± 1.11 $P < 0.0001$)**Conclusion:**This study shows, rice

husk dust significantly affects lung functions and measures have to be taken to prevent irreversible pulmonary pathology.

Key Words: Pulmonary functions, rice mill workers, maximum voluntary ventilation, peak expiratory flowrate.

The Isometric Handgrip Exercise As A Tool For Screening Hypertension In Offsprings Of Hypertensive Patients

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Introduction: . A familial history of hypertension increases the risk of hypertension in the offsprings. In recent years physical exercise has gained prime importance in public life for its enormous health benefits. Exercise in a form of stress leading to circulatory and respiratory adjustment in the body. These adjustments depend upon the specific type of exercises, isometric or isotonic. Isometric exercise involves sustained contraction of skeletal muscles against fixed resistance ,without external work, without movement of joints or axial skeleton and regular performance of which does not increase endurance. **Aim And Objectives:** The present study was undertaken to assess the underlying hypertension by using the Isometric Handgrip (IHG) exercise test in the offsprings of hypertensive parents and to compare it with age-matched controls of normotensive parents. **Materials And Method:** - The study is carried out on 40 healthy adults. Out of them 20 ,with family history of hypertension and 20 without family history of hypertension. The isometric handgrip test was performed with hand grip dynamometer in the study and control groups. The resting blood pressure was recorded before exercise and afterwards the subjects were asked to perform the isometric handgrip exercise with the dominant hand for 3 minutes. Then the blood pressure was recorded in the sitting position every 30 secs until resting blood pressure was attained and time was noted. **Statistical Analysis:** The analysis of the results was done by student t test with SPSS, and were found to

be significant. $p < 0.05$ **Results And Discussion:** The results showed that the Systolic (SBP), Diastolic (DBP) Blood Pressures and pulse pressure after completing the exercise were higher ($p < 0.001$) in the off springs of the hypertensive parents as compared to those of normotensive parents. Time taken to return to baseline after exercise was (308 ± 21) sec in off springs of the hypertensive parents as compared to (238 ± 24)sec in off springs of normotensive parents. It has been shown that a common familial disturbance which could possibly predispose to the development of essential hypertension, was an imbalance between the cardiovascular noradrenaline responsiveness and the circulating noradrenaline. The increased response to norepinephrine in the normotensive siblings of hypertensive parents was due to a reduced threshold to norepinephrine. **Conclusion:** An early and a regular screening of the children of hypertensive parents is necessary to prevent any future cardiovascular complications.

Key Words: familial hypertension, isometric hangrip test, resting blood pressure

A Comparative Study Between Young And Elderly Indian Male On Audio-Visual Reaction Time

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Introduction: Reaction time is the time taken by an individual to react to stimulus. It is an indirect index of the processing ability of Central Nervous System and simple means of determining sensory motor association and performance of an individual. Reaction time has physiological significance and is a simple and non invasive test for peripheral as well as central neural structures. Hence present study was undertaken to compare the effect of age on Audio- Visual reaction time. **Aim and Objectives:** To compare the effect of age on the Audio-Visual reaction time in young males adults of 18-28 yrs & late middle male age group of 45-55 yrs. **Method:** The Study group comprised of healthy male adults in age group of 18-28 years and 45-55 years

respectively. 50 males in each group were evaluated for Auditory and Visual reaction time with the help of reaction time apparatus, supplied by Medisystems. Analysis was done using Student's 't' test. **Result:** The findings of this study revealed that Auditory and Visual reaction time were higher in elderly age group (18-28) as compared to younger age group (45-55) and was found to be highly significant ($P=0.000$). **Conclusion :** It was concluded that as the age advances Audio –visual reaction time increases which may be due to effect of ageing on the myelination of neurones. Senile changes in peripheral processes like decelerated muscular response and impulse transduction through sensory nerves can account for reaction time lengthening which was found in our study. Other possible reasons for this delay in response could be due to Axonal degeneration and axonal shrinkage occurring with advancing age or loss of co-ordination with advancing age due to inability to maintain fine balance between agonists and antagonists muscles especially during rapid movements. So it was concluded that elderly group should be more cautious while performing the daily routine activities due to lengthening of Audio –Visual reaction time so as to prevent any type of injury in any form which may be harmful to the individual for his health.

Key word- Auditory Reaction Time, Age, Visual Reaction Time.

To Study the Effect of Duration of Smoking in Patients of COPD and the Development of Peripheral Neuropathy

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Introduction: Worldwide cigarette smoking is the most commonly encountered risk factor for Chronic Obstructive Pulmonary Disease (COPD), and is known to cause COPD by its noxious particles and or gases, thus making it the most important risk factor for the development of COPD and making it a leading cause of mortality and morbidity in the developing

countries. **Aim:** To study the effect of duration of Smoking in patients of COPD and the development of Peripheral neuropathy **Objective:** To find out the nerve conduction velocity (NCV) of the ulnar and median nerves of both the upper extremities in different groups of patients of COPD, and to study effect of duration of the smoking leading to the occurrence of peripheral neuropathy. **Materials And Method:** - The COPD patients and healthy volunteers recruited from AVBRH, Department of Chest and TB were assessed for anthropometric measurements, history regarding smoking in pack years, the pulmonary function tests, percentage O₂ saturation levels and were then subjected for nerve conduction tests. **Results:** It was observed that as the smoking history in pack years increases, there was the severity of the COPD disease. The various groups formed in patients of COPD was statistically significant in relation to smoking history in pack years and the FEV₁% at p value <0.001. Consequently, decrease in the values of NCV of the nerves tested was found, which was statistically significant at p<0.001 in the COPD patients. **Conclusion:** As duration of smoking in pack years increased, there was deterioration in nerve conduction velocity and it was statistically significant. As smoking and COPD are themselves closely related, the smoking and neuropathy association reflects a more complex interaction between cigarette neurotoxins and metabolic changes secondary to pulmonary disease.

Key Words: duration of smoking history, chronic obstructive pulmonary disease, peripheral neuropathy

Comparative Study Of Senile Dementia In people doing exercise and Sedentary Life Style Above 60 Yrs Of Age

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Aim: To compare the Senile Dementia in people doing exercise & sedentary life style above 60 years of age. **Background:** Dementia is

syndrome of symptoms such as memory loss & decrease in ability to handle the daily functions of life. Normal aging can cause some minor changes in memory or learning, but not in a way that affects functioning. This study is to find out the prevalence of senile dementia in sedentary an exercise groups. **Objectives:** To find out difference in senile dementia between exercise doing and sedentary life style geriatrics age groups. **Materials And Method :** In this study, 300 old age persons among these 150 sedentary & 150 doing exercise were invited to participate voluntarily. They were given MMSE & Clock Drawing Test. **Results :** Among 300 persons; 150 in sedentary as well as exercise doing persons. Mean age, 72.3 years of age. Based on MMSE score among sedentary group 72% were positive & Clock Drawing Test score 74.66% were positive for dementia. Based on MMSE score among exercise group 45.34% were positive & Clock Drawing Test score 42.66% were positive for dementia. **Conclusion :** In present study, there was high prevalence of dementia in sedentary life style persons than persons doing exercise. Results add further weight to the idea that regular exercise can help keep the mind alert and lower the risk of cognitive problems like senile dementia as compared to sedentary group.

Effects Of Air Pollution On Lung Function Tests

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The World Health Organization (WHO) estimates that every year 800,000 people die prematurely from lung cancer, cardiovascular and respiratory diseases caused by outdoor air pollution. The air contains several toxic pollutants: sulphur oxides, nitrogen oxides, dust with a diameter of less than 10 um (particular matter PM10). Adverse effects of air pollution on respiratory health: air flow limitation increases the prevalence of bronchial hyperactivity increase the prevalence of airways infections. **Objectives:** To undertake a retrospective analysis of urban air quality interventions and trends for four major cities of Punjab (India) and to strengthen, within the limits of the available data and analytical

Method, the understanding of factors influencing ambient air quality in different cities so as to assist in the process of formulating future city-level strategies and action plans for addressing urban air pollution.

Materials And Method: - The present study has been conducted on 1000 people of different age groups in different cities with different levels of air pollution to assess various ventilatory norms like- FVC, FEV0.5, FEV1, FEV3, PEFR, FEF25-75%, FEF0.2-1.2%, FEF25%, FEF50%, FEF75%, FEV0.5/ FVC%, FEV1/ FVC%, FEV3/ FVC% and MVV.

Results: The people living in the areas with higher air pollution levels showed significant decline in the spirometric parameters, indicating higher lung function loss in comparison to the people living in the areas with lesser air pollution. **Conclusion:** A multistep and coordinated approach is required for Air Quality Management.

Assessment of hearing in infants at risk by Auditory Evoked Potential

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Objective: Incidence of severe hearing loss among survivors of neonatal intensive care who are exposed to multiple risk factors ranges from 1% to 28%. To prevent this & to initiate rehabilitative procedure as early in life as possible a screening method to detect auditory disabilities in newborns is of great importance. So the present study is done to know the incidence of hearing loss in infants at risk & to evaluate the effect of risk factors on hearing. **Method:** 128 Infants at risk who were exposed to multiple risk factors viz; prematurity, birth asphyxia, LBW (<1500 gm), hyperbilirubinemia, neonatal seizures were evaluated using RMS EMG. EP MARK -II machine **Results:** On multiple logistic regression analysis however only hyperbilirubinemia was found to be significantly correlated (p-value <0.05) with hearing impairment in the affected infants & infants without neonatal seizures showed protection from deafness signifying that it is a risk factor for deafness. **Conclusion:**

Since most of infants admitted to NICU have one or more risk factors, their hearing screening by BERA at the earliest will help in their rehabilitation & normal developmental milestones.

Key Words: infants; prematurity; EMG. EP MARK-II

Comparative Study Of MMSE (Mini Mental State Examination) In Pre And Postmenopausal Women

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Introduction: Endogenous and Exogenous estrogen hormone has a widespread influence on the various brain functions. Through the various possible mechanisms of action of estrogen, it can overcome almost all causes of cognitive decline, thereby bringing an improvement in cognition. Since estrogens are considered to be protective for cognitive function, therefore, menopause which is a state marked by physiological decline in estrogen levels must be associated with cognitive decline. **Aim:** To compare the MMSE Scores amongst regularly menstruating (pre menopausal) and postmenopausal women in North Indian Population and to correlate it with the serum estrogen levels of women in the two respective groups. **Materials And Method:** This study was conducted in the departments of Physiology, Biochemistry and Psychiatry, Christian Medical College, Ludhiana. The study enrolled 150 participants, including 50 regularly menstruating females and 100 menopausal females. All the participants were subjected to MMSE, which is an objective assessment of global cognitive functions, including orientation to time and place, registration, recall, calculation and language. Also serum estrogen levels of all the females were assessed using the fully automated chemiluminescence Elecsys 2010 analyser. Finally the results obtained were statistically analysed using the relevant tests of statistical significance. **Results:** The study observed that the MMSE scores were significantly lower (p<0.001) in the menopausal

women when compared with that of the regularly menstruating females. Another observation of importance to us was that the serum estrogen levels were also significantly lower ($p < 0.001$) in the menopausal women in contrast to the regularly menstruating ones, which abides by the physiological decline in serum estrogen levels following menopause. When the various components of MMSE were analysed amongst the two groups, interestingly, orientation to time, presented a significant fall ($p = 0.043$) following menopause, registration showed no significant difference amongst the two groups, while orientation to place, recall, calculation and language showed a highly significant ($p < 0.001$) decline following menopause. **Conclusion:** The present study observed that the MMSE scores and hence the cognitive functions decline following menopause, whereby the serum estrogen levels also show a declining trend, meaning thereby that cognition declines following menopause. In other words, it proves that estrogen exerts a protective effect on cognitive functions and hence this knowledge throws open the gates for the treatment of various disorders pertaining to cognition.

Study Of Powerloom Workers With Special Reference To Hearing Function In Ichalkaranji, Maharashtra

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Background : Continuous noise exposure converts noise induced temporary threshold shift (NITTS) of hearing into a permanent one (NIPTS) by damaging outer hair cells (OHC) in organ of Corti resulting in hearing loss of varying degrees. **Aim & Objectives:** To correlate the effect of duration of high intensity sound exposure and observed impairment of hearing function in powerloom workers; to find its correlation with type of job and to find a pattern & range in involvement of different

frequencies of sound. **Method:** In this cross sectional ,observational study, hearing thresholds of 178 otologically normal subjects [age group 18 -50 years] was estimated using conventional pure tone audiometry [ELKON EDA -3 NS MILLE model]. Subjects were divided into three groups according to the duration of exposure as: Group I < 5 years , group II 5-10 years & group III > 10 years. **Results:** The mean noise levels in the powerloom units was 95.33 dBA , which was above the safety limits. Hearing loss was observed in group I -33.84 % (PTA 26 - 40 dB) which went on increasing to group III - 99 % (PTA 41 – 55 dB) [P value < 0.001]. Highest mean threshold levels were observed at 4000 Hz frequency in all three groups [P value < 0.001] . Jobbers (90%) were the most affected workers [P value < 0.001] . **Interpretation:** Strong association exists between duration of exposure & type of job with the degree of hearing loss. Hearing loss develops within first 10 years & thereafter progresses slowly. Initial hearing loss was observed at 4000 Hz frequency in group I and then included lower & higher frequencies in groups II & III. Change of working stations, periodical audiometry and use of personal protective devices can prevent hearing loss & its progress .

Key Words:audiometry, hearingloss, noise, powerloom

Impact Of Cyclic Meditation On Examination Stress Induced Psycho-Biochemical Changes Amongst Medical Students Of Ajmer

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Background&Objective: In today's competitive world, examination has become the major cause of stress amongst the students. Due to vigorous academic nature of medical studies, medical students are more prone to stress, which can be manifested as biochemical and psychological changes. It is scientifically proved that meditation can reduce stress. Cyclic meditation differs from meditation; it is combination of gentle stretch and guided relaxation cyclically. It seeks invigorate the mind

and body through yogasans; these are interspersed with rhythmic breathing and relaxations. The study was undertaken to assess impact of cyclic meditation on medical students under examination stress. **Method:** 50 students of 1st MBBS who voluntarily agreed to participate were included in this study, after obtaining approval from institutional ethical committee. The questionnaire contained a list of symptoms that was given to students to check the level of stress. Biochemical parameters (Blood sugar, lipid profile) were measured with a standard protocol. Students were randomly divided into 2 groups of 25 each. One group practiced cyclic meditation for two months and other group served as control. After two months, on the day of examination (practical and viva voce) same parameters were measured in both groups. **Result:** The result showed a significant reduction in number of symptoms in practicing group as compared to control. There is significant increase in blood sugar, Serum cholesterol and triglycerides level in control group as compared to practicing group. **Interpretation and Conclusion:** Finding of our study revealed that cyclic meditation is simple and effective technique for relieving stress. So it is suggested to incorporate this technique as a regular feature for medical students to keep them mentally and physically fit.

Key Words –Biochemical changes, Cyclic meditation, Examination stress, psychological changes.

Timing And Depth Of Breathing During Normal Human Pregnancy

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Timing and depth component of breathing at rest were studied in 184 apparently healthy non-smoking pregnant women aged between 18-35 years. Forty two females (Mean age 23.03 ± 2.45 yrs), 65 females (Mean age 22.31 ± 2.5 yrs) and 77 females (Mean age 22.23 ± 2.64 yrs) were studied during I, II and III trimester of pregnancy respectively. Sixty seven

non-smoking nonpregnant women matched with age and socioeconomic status were studied as control group. Normal respiration was recorded during rest with the help of digital spirometer (Spirowin+, Made in India). Timing and depth components of respiration obtained. Data were represented as Mean \pm SD. Students unpaired t-test was used for pregnant and nonpregnant comparison. Three trimesters of pregnancy were compared by ANOVA. Alpha error was set at 5% level. Ventilation V_E increase initially when compare to control (Control 10.73 ± 3.37 L vs I Tm 13.54 ± 4.8 L, $P > 0.05$), but after that the increase will remain constant throughout the pregnancy. This increment in V_E during pregnancy was due to increase in Tidal volume V_T (Control 0.491 ± 0.14 L vs I Tm 0.672 ± 0.25 L, $P > 0.05$), because respiratory frequency R_f was unaltered throughout the pregnancy. Duty cycle (T_i/T_{tot}) was increase in second trimester and maintained throughout the pregnancy. Inspiratory time (T_i) increases during pregnancy but mean inspiratory flow (T_v/T_i) was unaltered. All above results evident that normal respiration particularly V_E , TV and duty cycle was increased during pregnancy significantly suggest the role of progesterone on respiratory drive stimulation. May be progesterone is not effective locally at the level of respiratory apparatus because our earlier study in same population suggest no changes in FVC manoeuvre.

Key Words: Resting respiration, Duty cycle, V_E , Timing and depth of respiration

Correlation Between Glycemic State And Lung Functions In Type-2 Diabetes

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Background & Objective: The purpose of this study was to evaluate pulmonary functions in patients with type 2 diabetes mellitus and to determine their correlations with duration of diabetes & glycemic control. **Material & Method:** 40 type2 diabetic patients, aged 30-60 years, with diabetic duration of 1-20 years, were included in the study. Type2 diabetic patients were taken from Diabetic clinic of

B.L.D.E.A.'s Shri B. M. Patil Medical College, Hospital and Research Centre, Bijapur. FVC, FEV1, FEV1%, PEFr and MEP were recorded. And the results were compared with age and sex matched control (non diabetic) subjects. Results were analyzed by calculating Mean±SD, using Student's t test, and Pearson correlation. **Results:** All the respiratory parameters are reduced in type2 diabetic patients compared to control of which FEV1, FEV1%, & MEP show highly significant reduction ($p=5.953E-06$, $4.19E-07$, $1.206E-06$ respectively for FEV1, FEV1%, & MEP). Lung functions are negatively correlated with glycemic status & duration of diabetes. ($r=-0.390$, -0.324) **Interpretation & Conclusion:** The present study shows reduced dynamic lung function parameters in type2 diabetes mellitus. Lung function parameters are negatively correlated to glycemic status & duration of diabetes. As MEP is significantly reduced in study group we attribute this reduction in lung function tests to respiratory muscle weakness. Breathing exercises to strengthen the respiratory muscle may improve the lung function tests.

Key Words: Type2 diabetes; FVC- Forced vital capacity ; FEV1- Forced expiratory volume in 1 second ; FEV1%; PEFr- Peak expiratory flow rate ; MEP- Maximum expiratory pressure ; Lung function tests.

Evaluation Of Oxidative Stress And Antioxidant Status During Normal Menstrual Cycle

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Background & Objectives: Oxidative stress has been investigated to explain various physiological as well as pathological basis of many medical conditions. But very few data concerning the oxidative stress during normal menstrual cycle of eumenorrhic women are available. Thus, the purpose of study was to examine the physiological role of oxidative stress during normal menstrual cycle. **Method:** 120 young healthy female subjects of

reproductive age group (17-27 yrs), having regular menstrual cycle, were examined. Serum malondialdehyde (MDA), an oxidative stress biomarker and serum ascorbic acid (vitamin-C), an antioxidant vitamin were assessed in the follicular phase (on 7th day) and in the luteal phase (on 21st day) of normal menstrual cycle.

Results: In the present study, significant higher ($p<0.0001$) levels of MDA and lower but non-significant ($p>0.05$) levels of ascorbic acid were observed in the luteal phase when compared to the follicular phase. Non-significant negative correlations were also observed between MDA and ascorbic acid in both the phases of normal menstrual cycle. Significant increase in serum MDA level coincided with the increased progesterone and estrogen levels during the luteal phase. High levels of estrogen may be the initiator of lipid peroxidation process which eventually ends up with cellular injury during the luteal phase. **Interpretation & Conclusion:** Oxidative stress has an important role to play in physiological phenomenon of the menstruation.

Key Words: Antioxidants, ascorbic acid, malondialdehyde (MDA), menstrual cycle, oxidative stress.

Influence Of Obesity On Cardiovascular Parameters

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Introduction-Increased blood pressure, heart rate and rate pressure product (double pressure) can affect the cardiovascular system in numerous ways. They can determine MVO₂ and are thought to act as risk factors for cardiovascular diseases. On the other hand obesity is gaining importance as global epidemic and the incidence is rising. Obesity also increases the risk of future cardiovascular diseases. With this background we wanted to study the impact of obesity on blood pressure, heart rate and double pressure and compare with that of the controls in young obese individuals free from overt cardiovascular diseases. **Materials And Method-**In this comparative cross-sectional study, 50 obese

males (BMI \geq 23) and 50 non-obese males (BMI \leq 22.9) in the age group of 18-28 years were selected from the general population of Dibrugarh randomly. The obese individuals were again divided into two groups: 1. obese-I BMI between 23-29.9 kg/m², 2. obese-II BMI \geq 30 kg/m². Anthropometric parameters like height (in cm), weight (in Kg) were recorded and body mass index (BMI) was derived by Quetelet's index - weight (kg)/height (m²). After 20 mins of rest in supine position ECG and blood pressure (measured with mercury sphygmomanometer using the appropriate sized cuff) were recorded. Heart rate (HR) was calculated from ECG by using the formula 1500/R-R. The rate pressure product was calculated as = Systolic BP X HR. Rate pressure product is an index of myocardial oxygen consumption.

Results And Observations- There was a statistically highly significant increase in systolic blood pressure (SBP), diastolic blood pressure (DBP), heart rate and rate pressure product in obese as compared to normal and all the parameter showed a positive correlation with increase in BMI. **Conclusion-** Obesity is an important risk factor for cardiovascular morbidities like increase blood pressure, increase heart rate, and increase rate pressure product. rate pressure product is a correlate of myocardial oxygen consumption, and hence of work load of the heart. It is considered a determinant of cardiovascular risk, since its increase precedes ischemic events. Rate pressure product being an indirect measure and good indicator of MVO₂ could be used for early detection of cardiac dysfunction.

A Comparative Study Serum Lipid Profile In Smokers And Smokers With Tobacco Chewers

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Introduction: Tobacco use in form of smoking or smokeless is a major preventable cause of disease and premature death, currently leading to over 5 million deaths each year worldwide, which is expected to rise to over 8 million deaths yearly by 2030. Majority of cardiovascular diseases, cancers and chronic

obstructive lung disease are directly attributed to tobacco consumption. **Objective:** To compare serum lipid profile in smoker and smoker with tobacco chewers and II. To study the additive effect of tobacco chewing on lipid profile among smokers. **Materials And Method:** - Serum lipid profile was studied in 30 control (non smoker and non tobacco chewer); 30 smokers and 30 smoker with tobacco chewer; without other illnesses and with socio-culture background, were assessed. Standard Method were adopted to measure the lipid profile. The data were analysed statistically. **Results ;** High density lipoprotein-cholesterol was lower both in smokers (p<0.01) and smokers with tobacco chewers (p<0.001) than controls. Smokers had higher values of total cholesterol, very low density lipoprotein cholesterol and triglycerides. Smokers with tobacco chewers had highly significant (p<0.001) raised triglycerides, LDL-cholesterol and VLDL cholesterol as compared to smokers. **Conclusion:** Though different mode of addictions, tobacco chewing had an addictive effect on lipid profile among smokers.

“Small Airways Of Petrol Pump Workers - Bearing The Burden Of Air-Pollution

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Introduction- The disease burden of air pollution is increasing at an alarming rate with rapid urbanization and increase in automobiles. Occupational environment plays a major role on the health of those exposed to pollutants. Petrol pump workers by their virtue of work are being exposed to petrol and diesel fumes, and vehicular air pollution at high concentration for longer duration. The petrol and diesel fumes along with vehicular air pollution may worsen the lung functions. So, the present study was done to assess the FEF_{25-75%} of petrol pump workers in and around Dibrugarh town. **Materials And Method-** 120 petrol pump workers of age group 20-40 years working in and around Dibrugarh town were taken as cases and 120 healthy male individuals of same age were taken as

controls. Intragroup categorization of Petrol pump workers were done depending on the duration of the exposure. Anthropometric parameters like height, weight, BMI were recorded and FEF_{25-75%} was assessed using computerized spirometer (Medspiror). Appropriate statistical tests (Independent sample 't'-test, one way ANOVA and Pearson's correlation) were done for analysis. **Results**-On analysis of the observations made, the values of FEF_{25-75%} in the petrol-pump workers (3.66 ± 0.57 L/sec) showed a statistically significant decline compared to controls (4.29 ± 0.39 L/sec) and a negative correlation ($r = -0.756$, $p < 0.001$) with the duration of work at petrol pumps. **Conclusion**-Airways with internal diameters of less than 2 mm are known as small airways. FEF_{25-75%} indicates flow rates in small airways. The present study concludes that by virtue of their occupation the petrol pump workers were at the risk petrol and diesel vapour inhalation and also inhalation of automobile exhaust for a longer period of time. Exposure to fuel vapour and automobile exhaust impairs lung function in a time dependent manner. So, the gaseous pollutants may alter the properties and concentration of surfactant and contribute to the early closure of small airways. Most individuals may remain asymptomatic till significant pulmonary damage results. So, a regular monitoring of the lung function is desirable.

A Study To Assess Prevalence of ABO and Rh Blood Groups in First Year Medical Students of G.R. Medical College Gwalior, M.P.

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The ABO and Rh blood groups were discovered and identified in 1900 and 1940 respectively. They are the most important blood groups despite the long list of several other blood groups discovered so far. The presence or absence of antigens A, B and Rh on RBC

membrane determines the Blood group of the individual. The frequency of ABO and Rh Blood groups in different populations has been extensively studied. The present study was done to assess the prevalence of ABO and Rh Blood groups in first year medical students of G.R. Medical College Gwalior, M.P. **Method** – A cross sectional study was carried out on 119 first year medical students of both sexes from October to December 2012. The capillary blood was used to determine the Blood group of each student by adding a drop of monoclonal anti A and anti B sera on clean glass slide and mixed it well with blood drop. Result of agglutination were recorded immediately. **Results** - The study comprised of 79 (66.38%) males and 40 (33.61%) females. Among males frequency of blood groups B and O were same i.e. 24 (30.37%) followed by A 21 (26.58%) and AB 10 (12.65%) while in females the frequency of blood groups A and O were same i.e. 13 (32.5%) followed by B 12 (30%) and AB 2 (5%). The Rh positive and negative males were 74 (93.67%) and 5 (6.32%) and females were 36 (90%) and 4 (10%) respectively. **Conclusion** – The Blood group O (31.09%) was the most prevalent and AB was the least prevalent Blood group. The Rh positive and Rh negative were 92.43% and 7.56% respectively.

Azoospermia – A Critical Medical Review

(A Cross- Sectional Cohort Study Of 300 Cases From Southern Rajasthan)

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Background-When a newly married couple comes to know that male partner is spermless, then it is an unexpected and terrible shock for them. Same time the treating clinician remains confused and cannot decide the treatment options in time. Here we evaluated such cases with their proper placements. **Aim**- To locate anatomical site, find out management options and underlying

medical disorders causing azoospermia.

Methodology- 300 cases of azoospermia presented to our center since Jan 2009 to June 2013 were included. Their history, clinical examination, semen analysis, endocrine profile with additional investigations, ex. testicular biopsy, karyotyping etc. performed.

Observation – We found, S.FSH is highly variable and related with testicular volume and other parameters. Anatomically categorize cases as- (A) Pre testicular (FSH < normal) -4% of total with endocrinal abnormalities from hypothalamus to testis, under-androgenized hypogonadotrophic hypogonadism. (B) Post testicular (FSH =normal) -. 68% of total azoospermia with obstruction from testis to outlet, normal testicular volume with evidence of spermatogenesis. (C) Testicular- 28% with intrinsic damage to testis and hypergonadotrophism, (C1) FSH < double of normal, small testes usually with haploid precursors, contribute 17%. (C2) FSH >double, primary failure with low testosterone, are 11%.

Conclusion :FSH plays master role in timely decision taking which is vital for infertile couples. As per literature- Cat.A- andrologist can induce spermatogenesis with gonadotrophins. Cat. B- microurologist can restore sperm flow, many of Cat. C1 will be benefited by testicular sperm retrieval with ART. Cat.C2 are untreatable and need counseling for gamete/ embryo donation or adoption. We recommend testosterone replacement for hypogonadic and genetic study for Cat. C.

Key Words- ART, SMR, Kallman syndrome, Klinefelter syndrome, hypogonadism.

Study Of F-Wave In Chronic Traumatic Brachial Plexus Injuries

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Aim & Objective: To study the pattern of F wave in chronic traumatic brachial plexus injuries and correlate clinically the pattern of F wave in traumatic brachial plexus injury. **Introduction:** The F wave is a response of motor neurons activated by stimulation of a peripheral nerve. It is a late response resulting

from antidromic activation of motor neurons involving conduction to and from spinal cord and occurs at the interface between the peripheral and central nervous system. Because F-waves traverse the entire length of a peripheral nerve between the spinal cord and muscle, F-waves provide a means of examining transmission between stimulation sites in the arm and the leg and the related motoneurons (MNs) in the cervical and lumbosacral cord. Traumatic brachial plexus injury is a potentially severe debilitating injury, commonly affecting individuals in the prime of their life. Complete or partial loss of the use of one's limb results in significant impairment with devastating consequences. Non penetrating trauma is the leading cause of brachial plexus injuries especially motorcycle misadventure and is mainly prevalent in young males. **Method:** Twelve clinically and radiologically confirmed patients of either sex with traumatic injury of >3months to the brachial plexus were selected. F wave was recorded with Ag/AgCl surface recording electrode for ulnar and median nerves on RMS EMG EP Mark II machine manufactured by Recorders and Medicare Systems, Chandigarh, India in an isolated room with controlled environmental conditions. For ulnar nerve Abductor digiti minimi and for median nerve Abductor pollicis brevis muscle was selected. Conventional supramaximal stimulation (25% above maximal) at a rate of not more than 0.5 Hz was used. Recording electrode was placed in a belly tendon montage similar to motor nerve conduction study. For analysis 10 F waves were recorded. The same procedure was done on the non affected limb as control. **Result:** The F wave showed consistent change in all cases in affected limb as compared to non affected limb. The F wave response was invariably reduced or even absent in affected limb as compared to non affected limb. **Conclusion:** The study has so far shown the affirmative result in characterizing the recovery and prognosis of chronic brachial plexus injury but as the number of cases and data obtained is very small so, further work is required.

Effect of Fluoxetine on Blood Glucose Levels and Diabetic Neuropathy (Measurable) in Experimental Rats: A Randomized Control Interventional Study

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Introduction: Diabetes mellitus is a chronic disease resulting from defects in insulin secretion, insulin action, or both. Diabetic neuropathy is a peripheral nerve disorder which is a microvascular complication of diabetes mellitus. The main risk factor for Diabetic neuropathy is hyperglycemia. Diabetes has also been reported to at least double the risk of comorbid depression. A significant association has been demonstrated in studies designed to assess the effect of glycemic control on mood. SSRI and tricyclic antidepressants have been used in the management of Diabetic neuropathy. **Materials And Method:** Double blind randomized interventional study performed after clearance from Institutional Ethics Committee at Experimental Pharmacology Laboratory at SMS Medical College, Jaipur from July to September 2013. It included 24 rats divided into four groups viz, vehicle control, diabetic control, test group and standard group. Diabetes was induced by a single injection of streptozotocin (70 mg/kg I.V.). Diabetic neuropathy was evaluated by the grip strength and tail flick method. All rats included in the study were observed for 9 weeks. Test group was given Fluoxetine (20 mg/kg, p.o.) whereas standard group received Glibenclamide (0.5 mg/kg p.o.). Unpaired t test and ANOVA test were used to infer the difference in means. **Results And Discussion:** In diabetes there is loss of pain perception and it is thought due to nerve damage and induction of peripheral neuropathy. Painful diabetic neuropathy significantly affects the quality of life; so far no ideal drug has been available for its management. Results of chronic treatments with fluoxetine demonstrated to more

significant ($P < 0.01$) decreases in the blood glucose level at 60th day that is comparable to that of standard therapy of Glibenclamide. In addition, Fluoxetine showed to raise the grip strength and decrease the tail flick time in diabetic rats significantly ($P < 0.05$). Thus the present study demonstrated good glycemic control & protective effect of chronic fluoxetine therapy on diabetic neuropathy. **Conclusion:** From the results it is indicative that chronic treatment of fluoxetine reduced the blood glucose level as well as increased pain perception and grip strength in streptozotocin induced diabetic rats. Fluoxetine also has a well established role in alleviating depression which can be a co morbid condition in diabetes. So it can be concluded that fluoxetine could offer an alternative role in curative therapy for diabetes with co morbid conditions.

Effect of mobile phone radiation on autonomic response of the human body by using parameter Heart Rate Variability and Galvanic Skin Response

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Introduction: In the present age of the rapid development, technology has gifted us many a gadgets like mobile phone, computer, ipod etc. Out of which mobile phone is one of the revolutionary products working through electromagnetic waves. This new technology despite their acknowledged benefits has one common matter of concern is increasing exposure to the electromagnetic fields generated during the use of this wireless communication. **Aim:** The present study was designed to study the effect of mobile phone radiation of 1800 MHz on heart rate variability and galvanic skin response in normal male subjects of 18-40 years. **Material And Method:** 100 subjects were selected and were divided into 2 groups of 50 each, Group I not using the mobile phone and Group II using mobile phones at least 4 hours a day. Both the groups were given the mobile phone exposure for 30 minutes. The pre exposure and the post exposure recordings were taken and compared

statistically. **Result:** The effect of acute exposure though do not show any difference in the heart rate but the time domain variables of HRV show a significant increase in all the components like SDNN, RMSSD, NN50, and PNN50. The acute exposure does not cause a change in GSR but in chronically exposed people there is significant decrease of GSR. **Conclusion:** Hence this can be concluded from the whole study that the acute exposure of mobile phone shows increase in time domain variables of HRV and decrease in GSR demonstrating some modulation of autonomic tone.

Effects Of Yoga On Blood Glucose , Insulin And C-Peptide Levels In Patients Of Diabetes Mellitus

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Background And Objectives: India has 63 million people with diabetes according to International diabetes federation, 2012. Diabetes is characterized by hyperglycemia, peripheral insulin resistance, impaired insulin secretion and obesity which has become a significant global health problem. Diabetes is, first and foremost, a lifestyle disease. It therefore follows that lifestyle modifications have a central role to play in the management of this disorder. **Method:** Thirty patients of Diabetes mellitus (without any major systemic disorder), in the age group of 30-60 years were selected (all of them had type 2 diabetes) from yoga samsthana, Raipur. They were on 45 days yoga regime under the supervision of a yoga expert. Thirteen specific yoga asanas and pranayamas done by these patients include Bhastrika, Anulom-Vilom, Udgat om uccharan, Surya namaskar, Trikonasana, Tadasana, Pashimottanasana, Ardhamatsyendrasana, Pawanmuktasana, Bhujangasana, Vajrasana, Dhanurasana and shavasana are beneficial for diabetes mellitus. Their blood glucose levels (Fasting and Postprandial), Fasting serum insulin and c-peptide levels were measured before and after 45 days of yoga asanas in the department of physiology and biochemistry. Their anthropometric parameters were also recorded

before and after yoga. Insulin resistance in type 2 diabetes mellitus leads to high levels of insulin and c-peptide. C-Peptide is formed along-with insulin from proinsulin and is a good marker of endogenous insulin secretion. Insulin resistance leads to hyperglycemia. **Results:** The results of this study indicated that there was significant decrease in fasting glucose levels from basal 122.43 ± 47.73 to 99.9 ± 34.86 (mg/dl) ($p < 0.001$) and two hour postprandial blood glucose levels from 204.46 ± 29.66 to 189.63 ± 27.37 (mg/dl) ($p < 0.001$). Serum insulin levels were also reduced significantly from 15.81 ± 6.65 to 7.59 ± 6.58 ($\mu\text{U/ml}$) ($p < 0.001$) and serum c-peptide levels also reduced significantly from 2.87 ± 1.22 to 1.20 ± 1.02 (ng/ml) ($p < 0.001$). A significant decrease in weight (kg), BMI (kg/m^2), and waist circumference (cm) were also observed ($p < 0.001$), suggesting a positive effect of yoga on glucose, insulin and c-peptide levels and fat distribution of body. **Conclusion and interpretation:** The beneficial effect on insulin kinetics may be by improving the insulinsensitivity of the target tissues thus decreasing insulin resistance and consequently increasing peripheral utilization of glucose. The reduction in c-peptide levels is a good support to improved insulin resistance. Yoga asanas may be used as an adjunct with diet and drugs in the management of type 2 diabetes.

Key Words- Diabetes Mellitus, Yoga, Blood Glucose, Insulin, C-Peptide

Blood Antigenicity And Personality

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Effect of blood group antigen was studied in 150 volunteers in Department of Physiology of R D Gardi Medical College. The personality assessment was done with the help of personality inventory. Blood group was determined with slide method. It was observed that blood group 'O' individuals were 48.75 % efficient, 49.09% social, 52.15 % emotional, 51.94 % challenge acceptor, 48.63% workaholic. Blood group 'A' individuals were 45.6 % efficient, 52 % social, 52.9 % emotional, 48 % challenge acceptor, 50.3 % workaholic. Blood group 'B' individuals were 47.82 % efficient, 50.53% social, 51.3 % emotional, 51.7 % challenge acceptor, 48.94 % workaholic. Blood group 'AB' individuals were 51.43 % efficient, 50 % social, 53.06 % emotional, 46.94 % challenge acceptor, 44.5 % workaholic. The results were statistically significant.

Melanin pigment: Scope of research

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Cutaneous melanin pigment plays a role not only in coloration of skin but also in social communication and protection against harmful effect of solar radiation. Melanogenesis is controlled by multiple factors interacting through different pathways like endocrine, autocrine, paracrine or intracrine for its activation and inhibition. Evolutionary changes in human skin leads to hairlessness and less pigmentation in female. These evolutionary changes have advantages like more Vitamin D formation in skin, which helps in more Ca⁺⁺ ion utilization by female required in different physiological conditions. Less pigmentation may lead to abnormal thermoregulation and carcinogenesis. Because of its multitude nature, pigmentation disorders are usually associated with syndrome or diseases as seen in Addison's disease or Nelsons syndrome. In keeping with these multiple roles, melanogenesis is controlled by a highly structured system, active since early embryogenesis and capable of super selective functional regulation that may reach down to the cellular level represented by melanocytes. The significance of melanogenesis extends beyond the mere assignment of a colour trait making it an important tool in diagnosis.

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Ergonomical Evaluation of Occupational Problems of Women Workers in Agricultural Tasks

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Abstract: Background: In the present investigation efforts have been made to assess the occupational problems including musculoskeletal disorders (MSD) and other job related problems in relation to different rice cultivation tasks. Method: About 375 women workers are selected at random from the different districts in West Bengal state (India). MSD and other problems of the agricultural workers are evaluated by the basis of Nordic questionnaire method. Results: The results of the MSD in agricultural workers reveal that the shoulder problem is highly prevalent (97.6%) among the rice cultivation workers. This is followed by the problems in low back (95.2%), in thigh (91.6%) and in neck (88.4%). It has been noted that MSD is related to the inappropriate working postures, duration of jobs and repetitive movement of the body parts. The results of the other health hazards reveal that digestive disorders (66.8%) are also prevalent among the women agricultural workers. About 56% of female agricultural workers have different types of menstrual problems. Conclusion: The MSD is more prevalent in uprooting and transplantation jobs than in other rice cultivation jobs. It can be concluded that job related problems may be reduced by modifying work Method, work rest cycle and by providing some hand tools for different rice cultivation jobs.

Key words: Agricultural workers, Low back pain, menstrual problems, MSD.

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Introduction: Rice is the major crop in West Bengal State of India. Women workers are involved in different phases of rice cultivation, such as, sowing of seeds, uprooting, transplantation, weeding, reaping, binding of straw, carrying of straw bundles, threshing and collection of crops and straw bundles. Investigations of male subjects predominated, although it is actually women that comprise the majority of subsistence farmers in developing countries¹. According to the census report² it has been found that in West Bengal 45.84% of female population are involved in agriculture. They have to face many job related problems during work. They are exposed to postural stress due to adopting different inappropriate postures during performing different agricultural jobs. They may suffer from pain in their limbs as well as in other parts of body. Women are engaged in repetitive tasks with high postural load in different steps of paddy cultivation, which may be strain full to the musculoskeletal structure of the workers.

The musculoskeletal load in the hand and wrist (exposure of applicable soft tissues) during manual tasks related to a number of chronic muscle strain, tenosynovitis and carpal tunnel syndrome or cumulative trauma disorder^{3,4}. Working conditions of agricultural workers are extremely difficult due to severe environmental conditions, long working hours, strenuous work and the use of improper equipment. The ignorance of the majority of ergonomics principles in the design of agricultural equipment makes the condition more difficult⁵. Posture is recognized as an important aspect of work loading, often acting to limit the time and effectiveness of the workers performance. It is also well recognized by Grandjean and Hunting⁶, that inadequate posture, when adopted for long periods, cause bodily damage and ill health. High repetition, excessive forces and awkward postures are major cause of musculoskeletal disorder and complaints in industry and industrializing countries^{7, 8, 9}. The present Investigation is aimed to assess the occupational health hazards of the women agricultural workers. Efforts have been made to evaluate different musculo-skeletal disorders (MSD) and reproductive problems of women

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during performing different agricultural activities.

Materials and Method : The present investigation is carried out on women agricultural labourers only. The subjects are selected from different districts (Purba Medinipur and Paschim Medinipur) in the state of West Bengal (India). About 375 women (200 from Purba Medinipur and 175 from Paschim Medinipur) have been selected at random for the study. The age range of the subject is 19 years to 68 years. The occupational health problems of the workers who are engaged in different agricultural tasks of rice cultivation have been evaluated by questionnaire technique. Questions are asked to the subjects during work, just after finishing the work, and in the evening after returning to their home from the field.

Statistical analysis: The body composition of the subject is also determined. From the measures of height and weight the body mass index (BMI) has been calculated and from the skin fold thickness different body composition parameters are computed¹⁰. The formulae used for the same are as follows:

Body mass index= Weight (Kg) / Height² (meter)
 Body density (gm/cc) = 1.0994921 – 0.0009929 (sum of triceps , supra-illium and thigh skin folds) + 0.0000023 (sum of the same three skin folds)² – 0.0001392 (age in years)
 Fat % = { (4.95 / Body density) -4.50} X 100
 Total body fat = (weight (kg) X fat %)/ 100
 Lean body mass (Kg)= Total body weight – Total body fat

The nutritional status of the subject has been evaluated by twenty four hours recall method. The amount of food intake has been recorded from the subjects for three consecutive days.

Results: It has been noted that in rice cultivation jobs the most affected body part of the woman workers was the upper limb (100%). A detailed study of the work related problems of upper limb have been made and the results are presented in Table 2. It has been reported

by the subjects that the major parts of the upper limbs, viz., shoulder, finger, wrist and upper arm are affected in most of the subjects whereas palm, forearm and elbow joint are the less affected parts of hand arm system.

Table 1: Percentage (%) of musculoskeletal disorders (MSD) and other health hazards of agricultural women workers (n=50 for each activity) during different rice cultivation tasks

Affected parts of the body	Agricultural activities				
	Uprooting	Transplantation	Reaping	Binding	Threshing
Neck	92	96	100	74	80
Upper back	38	32	6	0	4
Lower back	100	100	100	76	100
Upper limb	100	100	100	100	100
Lower limb	100	100	100	64	100
Problems in eyes	28	24	40	20	30
Problems in head	54	64	78	42	74
Digestive disorder	66	64	76	48	80
Fatigue	50	100	100	46	100

The prevalence of lower limb problems has been also noted (Table 3). The most affected part of lower limb is thigh. All women workers reported the occurrence of pain in the thigh during performing transplantation, reaping and threshing jobs.

The women agricultural workers also have job related problems other than musculoskeletal disorders. Among them fatigue, digestive disorder, and headache are prevalent (Table 1). The most striking disorder is acidity. They have also reported about the indigestion and pain in the abdomen. The diurnal variation of digestive disorders of the workers has been also studied (not shown in the table) and it has been noted that the complaints of acidity increases in the afternoon (28.1%) and in the night (34.1%). Different types of eye related problems

such as pain in eyes, burning sensation in the eyes, watering and blurred vision have been found in this investigation.

The women-related problems have also been studied among the female agricultural workers. It includes the problems of reproductive cycle, problems related to pregnancy etc. From the

results it has been found that 56% of women workers have menstrual problems (Table 4). They have reported different kinds of menstrual problems such as amenorrhea, dysmenorrhoea, menorrhoea, and leucorrhoea. Among these, leucorrhoea (30.5%) is the most prevalent problem among the workers

Table 2: Percentage (%) of women agricultural workers (n=50 for each activity) reported problems in different parts of the upper limbs during different rice cultivation jobs

Parts of the upper limb		Agricultural activities					
		Uprooting	Transplantation	Reaping	Binding	Threshing	All activities
Fingers	Left	60.0	8.0	82.0	0	20.0	34.0
	Right	78.0	100.0	82.0	100.0	22.0	76.4
Palm	Left	0	0	82.0	18.0	6.0	17.6
	Right	0	0	64.0	18.0	10.0	18.4
Wrist joint	Left	54.0	0	64.0	20.0	60.0	45.2
	Right	56.0	74.0	92.0	78.0	74.0	72.4
Lower arm	Left	0	0	80.0	0	6.0	1.6
	Right	4.0	0	2.0	0	6.0	2.4
Elbow joint	Left	0	8.0	2.0	2.0	0	2.4
	Right	0	0	2.0	2.0	0	1.2
Upper arm	Left	48.0	58.0	4.0	72.0	70.0	64.8
	Right	52.0	72.0	76	80.0	70.0	72.4
Shoulder	Left	78.0	50.0	88.0	80.0	90.0	76.4
	Right	100.0	100.0	88.0	88.0	100.0	97.6

Table 3: Percentage (%) of different parts of lower limbs of women agricultural workers (n=50 for each activity) being affected during work

Parts of the lower limb		Agricultural activities					
		Uprooting	Transplantation	Reaping	Binding	Threshing	All activities
Feet	Left	4.0	4.0	2.0	0	0	2.0
	Right	4.0	4.0	2.0	0	0	2.0
Ankle joint	Left	4.0	8.0	4.0	4.0	2.0	4.4
	Right	6.0	8.0	4.0	4.0	2.0	4.8
Lower leg	Left	38.0	62.0	38.0	12.0	30.0	36.0
	Right	38.0	62.0	38.0	12.0	30.0	36.0
Knee joint	Left	18.0	12.0	20.0	8.0	16.0	14.8
	Right	20.0	12.0	24.0	10.0	16.0	16.4
Upper leg	Left	94.0	100.0	100.0	64.0	100.0	91.6
	Right	94.0	100.0	100.0	64.0	100.0	91.6
Hip joint	Left	20.0	30.0	28.0	14.0	16.0	21.6
	Right	20.0	30.0	28.0	14.0	16.0	21.6

Table 4: Frequency and percentage of different Menstrual problems among affected women workers

Problems	Percentage (%)	Rank
Amenorrhea	4.2	6
Dysmenorrhea	20.6	3
Menorrhiza	24.8	2
Olegomenorrhea	13.5	4
Leucorrhoea	30.5	1
Other difficulties (i.e. irregular cycle)	8.5	5

Table 5: Body composition of female agricultural workers

Parameters	Weight (kg)	Height (cm)	Body mass Index (BMI)	Fat %	Total body fat (kg)	Lean body mass (kg)
Mean ±SD	39.5 ± 5.6	148.5 ± 5.3	17.95 ± 2.1	11.5±3.3	4.3± 1.9	34.9±4.1

Discussion: Women agricultural workers are engaged most of the rice cultivation jobs. The workers do all the rice cultivation jobs manually. Most of the workers (98%) report pain in right shoulder but the problems in left shoulder are less prevalent. This difference may be due to fact that all workers used their right hand more actively than that of left hand during performing different tasks. In most of agricultural operation the shoulder has been found to remain abducted for long time and as a result static load has been imposed on the shoulder. In addition to that frequent movement of shoulder takes place in all agricultural tasks. The arm rose to some extent that cause shoulder muscle tenderness disorder. This is due to the static fatigue of trapezius muscle¹². Working tasks with repetitive arm movements may evoke shoulder tendonitis or tendovaginitis probably due to friction¹³.

In case of reaping and binding jobs a large number of women have pain/discomfort in their upper arm. In reaping operation the workers have to cut rice straws by a sickle. During this process there may be frequent contraction of biceps and triceps leading to the development of pain in the upper arm after some time. Similarly, in case of binding job the above muscles are contracted frequently due to exerting pressure for making straw bundle.

The workers also report pain in their right and left wrist. There are dorsiflexion, ventriflexion

and lateral movements of wrist joint during different operations. The problem is highly prevalent in left wrist during reaping of rice straw. The left hands of the workers were required to hold a bundle of rice straw during cutting them by the right hand. The left wrist usually remained in dorsiflexed condition during

the whole operation imposing static load on it. In case of binding operation the problems of right wrist is more pronounced than that in left wrist probably because of greater movement at right wrist joint during making knots.

The occurrence of finger pain has been reported by 100% of women workers in case of performing transplantation and binding of straws. It is also prevalent in case of other rice cultivation jobs also where fingers are actively involved. The transplantation of rice seedlings is made by piercing the fingers in to the mud, which caused friction with solid and hard Materials present in the mud causing the problem in fingers. In case of binding of straws the fingers have frictions with the straws during making knot in the bundle, which might be the reason for developing pain in the fingers. The occurrence of pain gradually increases with the time and the maximum numbers of workers are found to be affected after finishing the work in all kinds of rice cultivation jobs. This may be due to the cumulative effect of repeated finger movement during work.

During performing transplantation, reaping and threshing job the movement of lower limb is very less. Therefore a great amount of static load is imposed on the upper leg muscles during working under bend (uprooting, transplantation and reaping) or erect posture (threshing). The problems are not much severe in other parts of lower limb.

The low back pain is also highly prevalent among women agricultural workers and it is predominant in most of the rice cultivation tasks. In different tasks the workers have to adopt stooping posture for major time of the work. This leads to chronic low back pain among the workers. In some of the cases they are compelled to twist their trunk frequently. The spinal rotation may cause chronic strain as when the workers twist their waist during work. Male agricultural workers were also reported that low back pain was extremely prevalent in reaping job and transplantation job¹⁴. Other investigators also reported such problems among the workers. Maeda et al¹⁵ reported that low back pain is related to bowing posture of greenhouse farmers. Van Dieen and Hildebrandt¹⁶ also reported health risks concerning the low back in agricultural workers. The low back pain might be associated with the damage of the intervertebral discs. The occurrence of pain occurs in greater number of subjects with the progress of the working hours and it became highest after finishing the job.

The occurrence of neck problem is very high. About 88% of the women reported the problem when all rice cultivation jobs were considered. It has been noted that more than 90% of the workers are affected by neck pain during performing uprooting, transplantation and reaping jobs. Flexion of the head and neck causes neck pain. The prolonged static muscle load has appeared as the major risk factor in the development of load-related problems. The risk of different levels of static load on trapezius muscles in term of the development of musculoskeletal illness located in shoulder and neck¹⁷. From the results it has been revealed that the neck problem becomes enhanced with

the time and the maximum number of workers (66.5%) is affected after finishing the job.

Indigestion and pain in the abdomen are mainly related to the food habit and personal hygiene. Usually they take the first meal (breakfast) within 9-10 am but they take the second meal (lunch) after finishing the job (within 3.00-4.00 pm). This long gap between the two meals might lead to these digestive problems. Digestive disorders are found to be the maximum in the threshing operation (80%) and the minimum in binding operation (40%). In addition to that acidity is regarded as psychosomatic disorder. The women workers are exposed to psychological stress because of their own household work and children. This may be an additional reason for the development of acidity.

In rice cultivation there is static as well as dynamic contractions of muscles in different parts of the body. The working muscle becomes fatigued and as a result whole body fatigue has been caused at the end of the day. Agricultural workers become fatigue due to one or more reasons together. It may be the general body fatigue that is physical overloading of the entire organism or may be the mental fatigue that is induced by the mental work or may be the nervous fatigue which is caused by oversteering one part of the psychomotor system, as in skilled work or might be the monotony of either occupation surroundings¹⁸. The occurrence of fatigue among the workers has been found to be increased with the time and a large number of workers (56.1%) become very much fatigue after finishing the rice cultivation job. The fatigue may also be attributed to the low lean body mass and nutritional status of the workers. Table 5 shows that the subjects have low lean body mass. The subjects also have poor nutritional status. The BMI value indicates that they have chronic energy deficiency (Grade I). The nutrient intake of the women also supports the energy deficiency of the workers.

The problems in eye are found to be the maximum in the reaping operation (40%), which

is followed by the threshing, uprooting, transplantation and binding. During reaping the dust particles and small fragments of straws have been evolved in the air and probably come in to contact with the eyes of the workers. This might be the reason for the maximum occurrence of eye problems in the workers during reaping job. The results show that the problems are gradually increased with the time of work and about 45.1% of the workers report the problem after finishing the work as the concentration of dust particles increases with the time.

Watering from the eye (23.32%) is the most prevalent eye related problems among the workers. Watering from the eye might be occurred as a result of irritation of the lachrymal glands due to entry of dust particles in to the eyes. The other eye related problems might be related to the entering of evolved dust particles from the straws and fine fragments of dried straws in to the eyes.

Different type of menstrual problems might be related to the bad personal hygiene and lack of awareness of reproductive health of the workers. Menstrual irregularities seem to be reported with greater frequency as women become more involved in high intensity, year round training programs. The study of Bonen and Keizer¹⁹ shows a relatively high incidence of athletic menstrual cycle irregularity associated with heavy training activities. These findings have also been confirmed in other reviews^{20, 21}. The women agricultural workers are also required to exert hard labour and they have a low percentage of fat in their body²². Table 5 shows the body composition parameters of female agricultural workers and from the results it appears that the subjects have low percentage of fat and total fat. These factors may be related to the menstrual abnormalities among the female agricultural workers. In addition to the hard physical activity the workers consume lower calories than they required. Although rice cultivation job is very stressful yet the women workers have to continue the work during the pregnancy because of their very low economic status.

Conclusion: It can be concluded that the occurrence of musculoskeletal disorder (MSD) is very common among the women agricultural workers. The MSD is more prevalent in uprooting and transplantation jobs than in other rice cultivation jobs. The occurrence of MSD in upper limb is the highest in reaping job whereas MSD in lower limb is most prevalent in transplantation job. The occurrence of other job related health hazards is greater in reaping job than that in other rice cultivation tasks. The problems of upper limb and lower back are the most prevalent among all body segments. The low back pain is associated with the postural stress. Modifying the work-rest cycle can reduce the MSD and postural stress. The workers should be aware of bad working posture. The muscle mass of the workers is low which may be related to the MSD hazards. The percentage of fat in women workers is remarkably low. The muscle mass and the amount of fat in the body of the women agricultural workers can be improved by providing good nutrition. The strenuous posture is one of the major problems in rice cultivation jobs. The best solution of this problem is to devise new equipment, which can relieve them from adopting harmful bend postures. Avoiding loads during acute pain and performing some special types of exercises can reduce the low back pain.

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