

ASSESSMENT OF MELATONIN LEVELS IN NORMAL HEALTHY YOUNG UNIVERSITY STUDENTS, POST HYPNOSIS AND YOGA PRACTITIONERS

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Abstracts: Background: Melatonin, a hormone secreted by pineal gland in response to circadian rhythm has receptors on all the cells in human body. Thus, its effects can be wide ranging. The standards in the western adult are established as 2-4 pg/ μ l. However, the data for Indians are lacking. The research aims as to arrive at normal levels for melatonin in adult Indian subjects and to further study melatonin levels in yoga practitioners as well as after a session of hypnotic trance. Study was conducted at M S University, psychology department in 20 healthy volunteers and 20 regular yoga practitioner. Melatonin level in blood was measured by ELISA. **Results:** The melatonin range was found to be 0.8-54.2 pg/ μ l. Median values ranges from 12.2 – 17.2 pg/ μ l in controlled subjects. The average concentration of melatonin was found to be 15.56 ± 10.96 pg/ μ l. The results in yoga practitioners were ranging from 17.08 – 75.45 pg/ μ l with average concentration as 34.25 ± 11.89 pg/ μ l and post hypnosis session were ranging from 1.92 – 32.693 pg/ μ l with average concentration as 12.86 ± 10.93 pg/ μ l. Statistical analysis is done. **Conclusions:** Melatonin levels were found to be higher in yoga practitioners (17.08 – 75.45 pg/ μ l) compared to controlled (12.2 – 17.2 pg/ μ l and posthypnotic (15.56 ± 10.96 pg/ μ l) values.

Key Words: Melatonin hypnosis yoga

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Introduction:

Melatonin is a hormone produced by pineal gland. It regulates the body functions with synchronization to circadian rhythms. Sunlight inhibits its secretion while with darkness, pineal gland releases melatonin through neuronal signaling from supra chiasmatic nucleus. During regular hours of sleep, the secretion rises to reach a peak around 4:00 am and, subsequently the levels decline to arrive to a standard norm of 2-4 pg/ μ l during the day.

Where in the Melatonin synthesis is regulated by only two genes, the receptors (MT1 and MT2) for melatonin are present on the cell surface all over the body¹. Once Melatonin enters the cells through MT1, the enzyme aryl alkylamine N-acetyl transferase (AANAT) causes further processing of melatonin which is then released via autocrine fashion and circulates in the body. The result may be hyperplasia and regeneration. Physiological processes of melatonin have been extensively studied^{2,3,4}. The kinetic modality of melatonin extends to several hormones like hypothalamic

release factor, pituitary hormone and peptides like Gastro Intestinal and brain peptides, Gastro Intestinal and pancreas, circulatory peptides, opiate peptides, neurohypophyseal peptides etc.

Sleep is a naturally recurring state of mind and body, characterized by altered consciousness, relatively inhibited sensory activity, inhibition of nearly all voluntary muscles, and reduced interactions with surroundings⁵. The repair and regeneration in this process can be attributed to a large extent to the variegated actions of melatonin on several information substances release and interactions. However, the therapeutic application was limited to counter effect of jet lag. W Pierpaoli and W Regelson⁶ has found that melatonin helps in delaying aging and also helps in rejuvenation. Meditation is an altered state of consciousness that seems akin to sleep to an extent. Hatha-yoga and Raj-yoga is a form of meditation. The benefits through yoga practice in health promotion and lifestyle diseases are well documented.

Hypnosis is too akin to meditation when practiced as self hypnosis. Hypnotherapy is accepted as a standard discipline in UK, Europe and United States. The efficacy of therapeutic strategies applied by a hypnotherapist in curing or alleviating numerous ailments may also have a beginning with secretion of melatonin. Melatonin was therefore selected as the molecular biological substance of choice for this study. Moreover, there are indications that electron transfer mechanisms are also involved in melatonin metabolism⁷.

There are several protocols to study melatonin levels. Though it is recommended to include, low threshold measures of dim light melatonin onset to facilitate comparison between studies, it is difficult to implement. Awake levels of melatonin are reported in wide range in western literature⁸. P Govindraj et al⁸ stressed the melatonin role in Indian subjects since the behavior of individual is culturally conditioned and personality types – *prakriti* is determined by selective gene expression.

Material and Methods:

Objectives:

1. To assess the melatonin levels and establish range for normal Indian adults.
2. To assess the effect of yoga practice of >1 year on melatonin levels
3. To assess the effect of a session of hypnosis on melatonin levels.

This study was carried out in **20** Healthy and 20 regular yoga practicing volunteers in age group of 18–30 years. The volunteers were recruited from the general student and staff population to participate for establishing normal levels of melatonin and the same group was subjected to post hypnotic study. Yoga practitioners were selected from Yoga Niketan, Vadodara. After approval from Independent ethical committee, the volunteers were recruited through an announcement of the study on the notice board of Department of Psychology, M.S. University, Vadodara. They were briefed about the aims, procedure and risk (if any) of the study. They were advised to regulate their sleep hours at 10:00 pm to 7:00 am at least 5 days prior to the day of the study. Melatonin levels were determined with Enzyme Linked Immuno Sorbent Assay (ELISA) kit.

Inclusion criteria;

Apparently healthy individual (assessed by the physician and psychiatrist), willingness for participation, normal melatonin level.

Exclusion criteria;

Any organic or functional disorder, unwillingness, sleep disorder, on any medication.

A. Control group

The volunteers were called for study to psychology department of SSG university on Sunday at 10:00 am. After relaxing for 15 mins in a fairly lighted (natural) room the blood sample was obtained. 5 ml of blood was drawn from the anti-cubital vein 21 no. needle and was collected in 2 separate vials; 3 cc for doing haemogram, liver function tests and kidney function tests and 2 cc for melatonin estimation. Simultaneously urine was collected for routine check-up.

Melatonin kit was obtained from MP Biomedicals, catalog no: 193596. The estimation was done as per the protocol provided by the suppliers. The results were obtained from the serum by comparing optical density quotient of the sample with that of distilled water.

B. Post Hypnosis Group;

The above group, was not familiar with hypnosis was tested for hypnotic suggestibility, initially with Harvardⁱ Hypnotic Suggestibility Test administered to a large group. 20 subjects with suggestibility score of 30 were selected. They were hypnotized by Modified Stanfordⁱⁱ Hypnotic Suggestibility Test, at the Department of Psychology, M.S. University, Vadodara.

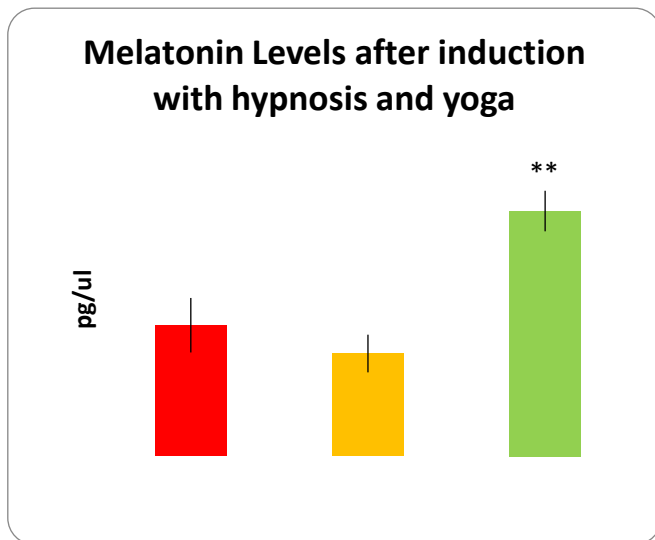
We utilize induction technique derived from Classical Indian tradition so that Yoga practices of *pranayama* and *shavasana* are combined with the Stanford script. All the subjects in the experiment were in awake & alert stage when the sample of blood was drawn. 2 cc of blood from anti-cubital vein is drawn for melatonin estimation.

C. Yoga practitioners;

Twenty volunteers were selected from Yoga Niketan, Vadodara. They were regularly practicing Hatha Yoga Asana for 20 minutes and pranayama practice for 20 minutes by coming to Yoga Niketan at 5:00 A.M. for more than one hour. The protocol was same as in group A. Results were analysed with 'T' test.

Result: Table 1: Melatonin mean concentration in pg/ μ l of normal individuals, Post Hypnosis subjects and yoga practitioners

Sr. No.	Control	Post Hypnosis	Yoga Practitioners
Mean	15.56 \pm 10.96	12.86 \pm 10.93	34.25 \pm 11.89



Graph 1: Bar Charts for melatonin concentration in control group, post hypnosis subjects and yoga practitioners.

Statistical analysis is performed with T-test with significance value ($p < 0.05$) Values are expressed as Mean \pm SE. ($n=20$) Control is compared with Post Hypnosis and Yoga practitioners. * $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$ groups.

Discussion:

Table 1 reflects the melatonin levels in control group (pre and posthypnotic state) and yoga practitioners. The results show a wide range of fluctuations. This could be because the sleep was not under the control of investigator as the volunteers were asked and advised to follow a normal sleep and wakefulness pattern. Hence it had become subjective. It is evident from table 1 data that posthypnotic values were least, contrary to our

hypothesis which expected the values to be higher than the control group A as hypnotic state can be compared with that of a sleep. The reason could be that the individuals had encountered only one session of hypnosis and for hypnosis to have significance the regular sessions of hypnosis is needed. Melatonin levels during sleep rises¹⁰, rather melatonin is a sleep promoting hormone¹¹. However, the significant increase levels in yoga practitioners indicates, for therapeutic application of hypnosis more than 1 session is required for enhancement of melatonin levels. Study by Harrinath et al 2004¹² has linked well being effect of yoga to increased melatonin level following three months of Hath yoga practice. In present study also those in regular yogic practice had the highest level of melatonin. This study is but one finger pointing the way, larger studies with an internationally collaborated paradigm are warranted.

Conclusion;

Melatonin values in blood begin to increase around 11:00 pm and start declining around 5:00 am. The recommended design for the study is to enroll the subjects for the 5 days. They established exact correlation with sleep patterns and activity during day and then melatonin estimation was performed during 11:00 pm – 5:00 am. This preferred paradigm had to give way to practicability of the first ever study in India.

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