ORIGINAL RESEARCH PAPER
Volume-9 | Issue-3 | March-2020 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

EFFECT OF SEROTONIN ON MOOD CHANGES IN FIRST YEAR MEDICAL STUDENTS.

Physiology

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ABSTRACT

Mood is the behavioral and emotional state of mind. It is documented that serotonin is neurotransmitter plays a pivotal role in mood regulation and has image feelings of well-being and happiness been studied as mood changer during various responses. The present study was performed to evaluate the relationship between serotonin levels and mood changes among first year medical students. The study revealed that a relationship does indeed exist between serotonin levels and various responses related to mood change and overall feeling of well being. This study hopes that further clinical implications may be done in cases of mood changes and mood disorders by monitoring and treating serotonin deficiency in these patients.

KEYWORDS

Serotonin, Mood, Neurotrasmitter

INTRODUCTION:

In past over view through neurophysiology, the nervous system is an electrical organ. Various neurological effects are studied with the help of neurotransmitter. Serotonin or 5-hydroxytryptamine (5-HT) is a monoamine neurotransmitter. which has a popular image as a contributor to feelings of well-being and happiness, though its actual biological function is complex and multifaceted (1), Found in various dietary content like meat, dairy, fruits, seeds (2). Tryptophan hydroxylase, the rate-limiting enzyme on the pathway from tryptophan to serotonin, is not normally saturated with tryptophan. In humans, increasing tryptophan levels can increase serotonin synthesis (3), while decreasing tryptophan availability can cause a substantial decline in serotonin synthesis and turnover in human(3), When tryptophan is given it increase serotonin synthesis, is increases the saturation of tryptophan hydroxylase and increases the rate of serotonin synthesis (4). Changes in serotonin level causes various neurological effects in nervous system. That acts directly or indirectly on the nervous system causing morphological, chemical, or electrical changes in the nervous system**.** This lead to neurological effects in brain influencences to the final manifestation of these effects seen in psycophysiological changes, e.g., memory, mood, learning, sleep and perception (3). The change in serotonin level lead to change in electromagnetic fields could lead to neurological, morphological, and behavioral changes have been reported in animals cells and in humans. Transient decline in tissue tryptophan and in brain serotonin can result in lower mood and increase in irritability or aggressive responding .

The behavioral and neuropsychological processes modulated by serotonin, modulates the neural circuitry of behavior and emotion is, the neural circuitry responsible for each of these behavioral processes. In many cases there is at least one specific brain region or nucleus that is critical for a given behavior(4). The expression pattern of each serotonin receptor within the human CNS is also known. The lack of synaptic specializations at serotonergic terminals, varicosities in many brain regions, serotonergic innervation may be particular to conscious feeling or the cognitive aspect of emotion involves learning and memory(4). The serotonergic system may be particularly well suited for modulating mood. Manipulations of serotonergic neurotransmission alter emotional processing, attentional bias, emotional memory, dysfunctional attitudes and decision-making. In healthy human subjects, increases in serotonergic neurotransmission result in enhanced attention and recognition of positive emotional material (5). Contrary to expectation, acute increases in serotonergic neurotransmission also increase attentional bias towards negative or fearful stimuli. In general, decreased serotonergic neurotransmission results in impaired attention and recognition of positive emotional material, and increases the attentional bias towards negative stimuli in healthy subjects(6). Serotonin modulates each behavioral process can usually be framed in terms of how specific serotonin receptors modulate the specific brain regions, nuclei involved in producing the behavioral output(7). As each behavior is regulated by multiple serotonin receptors, each serotonin receptor is expressed in multiple brain regions and likely contributes to the modulation of multiple behavioral processes(8,10). For example, anxiety-like behavior is regulated primarily by 5-HT1A and 5-HT2C receptors, among others, but the 5-HT2C receptor regulates not only anxiety but also reward processing, locomotion, appetite, and energy balance(8,10). In this study we have observed various responses related to mood like Irritability, Distraction, Worry, Upset, Decisive, Problem, Mood state, mood changes, no of mood changes, Anxiety, Anger, in pre & post condition. The present study is done in Dr D Y Patil medical college, Navi Mumbai, in first year medical student. The aim of study is to study the effect of serotonin on mood changes in healthy first year medical students.

METHODOLOGY

The present study was a prospective study conducted at Department of Physiology, Dr. D. Y. Patil medical college, Hospital and Research center, Nerul, Navi Mumbai. In this study participants were first year medical students aged between 18 to 25 years. Institutional ethical clearance was obtained prior to starting the study. Total number of participants were 100, comprising of 51 male and 49 female participants without any pre morbidities and not on any medications. Daily 30 gms of protein power was given to participants in morning at the same time for 10 days. Serotonin level of blood was measured before and after completion of 10 days period by using a Serum Enzyme Immunoassay (EIA) method .The effect of serotonin on their mood and behaviors was assessed before and after study period, using standard questionnaires.

The data was analyzed before and after administration by using SPSS statistical analysis software, in consultation with institutional statistician (9). A limitation of the study is the small sample size which invites the need for future replications with larger samples and more heterogeneous populations which includes individuals who are healthy as well as unstable mood.

OBSERVATION

Mean age for male and female was 18.47, all the subjects successfully completed the entire study trail within the stipulated study period. The mean serotonin levels were 107.64 ng/ml with a standard deviation of 32.696. before the study trial, and mean serotonin levels post administration was 114.33 ng/ml with a standard deviation of 34.663. No statistically significant difference was observed in the values among males and females in terms of mean serotonin levels(11). Statistically significant P values were revealed in serotonin level. After post administration the significant increase seen in serotonin level. Various responses like Irritability, Distract, stability, Worry, Upset, Decisive, problem, Mood state, Mood change, No of mood changes, Anxiety, Anger studied with the help of various questionnaire. Statistically significant P values were revealed the state of distraction is reduced in selected study group. In mood stability response shown

there was more stability in mood in pre administration, In anger state more angerness in post administration stage, In worry less worried in post administrative stage. Upset in mood shows less upset in post administrative stage in the selected study group. Other responses not statistically significant but there responses are positive reveales positivity in mood and stability in mood state. (table shows).

Test Statistics		
	Z	Asymp. Sig. (2-tailed)
Irritable (Post) - Irritable (Pre)	.000	1.000
Distract (Post) - Distract (Pre)	-2.832	.005
Stay at home (Post) - Stay at home (Pre)	-.949	.343
Worry (Post) - Worry (Pre)	-.457	.647
Upset (Post) - Upset (Pre)	-.302	.763
Decisive (Post) - Decisive (Pre)	-1.406	.160
Problem (Post) - Problem (Pre)	-.956	.339
Mood (Post) - Mood (Pre)	-1.808	.071
Mood change (Post) - Mood change (Pre)	-1.581	.114
No. of mood changes (Post) - No. of mood changes (Pre)	-1.581	.114
Anxiety (Post) - Anxiety (Pre)	-.146	.884
Anger (Post) - Anger (Pre)	-.781	.435

DISCUSSION

The present study revealed a relationship between administration of protein and levels of serotonin in otherwise healthy subjects. There was no significant difference in serotonin levels based on age or gender among the selected study population (11,12). On mood certain differences were observed in terms of overall changes in mood of healthy individual after administration of protein powder. Significant reduction of distraction in mood shown statistically significant P value and reduction of worry, reduction in decisive response, reduction in upset of mood, reduction in mood stability, and in responses like anxiety, anger, state of problem, also shown changes in post administration but no statistically significant difference was visible in these parameters. However it shows the subjects having a statistically significant difference in mood changes in regular protein intake. Study revealed that there are changes in various parameter of mood due to lack or less protein intake. No difference was observed based on age or gender. The present study is consistent with hypothesis that serotonin enhances prefrontal regulation of action, most likely through structures such as the medial prefrontal and orbitofrontal cortices, which are involved in value-based decision making. Serotonin 1A (5-HT1A) receptors have been implicated in psychiatric illnesses such as mood and anxiety disorders. The 5-HT1A receptor is present in serotonergic cell body areas, in particular the dorsal and median raphe nuclei (8,13,14) where it functions as the somatodendritic autoreceptor (12). The 5-HT1A receptor is also present postsynaptically in the structures of the limbic system e.g. hippocampus, hypothalamus, amygdale (7,8).

CONCLUSION

Our findings have implications for understanding and treating health conditions such as mood, mood changes and mood disorder by undertaking medications aimed at improving mood releated disorder and maintain mood. Serotonin have been implicated in psychiatric illnesses such as mood and anxiety disorders. Serotonin enhancing drugs could be given during initial stages of behavior change interventions aiming to change the mood upset, distractivness, worry, anxiety, anger, mood stability in individuals and in mood disorder. Similarly, the affected cognitive processes also have important implications for disorders of human decision making and impulsive behaviors.

Acknowledgment:

I am dedicating this paper to my mother who's blessings are always with me. I am thankful to Dr Vivek Nalgirkar sir for giving me proper guidance and mental support. I am thankful to Dr Deepak Lagade sir for helping me statistical analysis .I am also thankful to my daughter Deepika, Vaishnavi, son Gaurav and wife Shashikala for their continuous support. I am also thankful to our I year medical students for participating as subject in this study. I will not forget god And almighty for showering blessings to me.

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