

## Sleep Anomalies & Mood Disorders: A Review Study of Adults

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### ABSTRACT

Sleep has been comprehensively studied and affects our quality of life in many ways —be it our competence at work, our endurance in daily tasks, or the anticipation and maintenance of mental health, just to name a few. It is a crucial biological process for the survival for all species. Sleep deprivation can affect the body in physical, psychological, and biological ways. Optimum amount of sleep is needed for proper functioning of the human body. Researches have proven that sleep abnormalities have a negative impact on the mood, attitude towards one's life and the overall wellbeing of a person. According to DSM IV, Mood disorders is a psychiatric condition in which the principal feature is a prolonged, pervasive emotional disturbance, such as a depressive disorder, bipolar disorder, or substance-induced mood disorder. It is a mental illness which targets specifically emotions and mood, people suffering from mood disorder may experience prolonged sadness, extreme happiness and in some cases. The purpose of this literature review research is to assess the relationship between sleep anomalies and mood disorders among adults. Findings suggests that psychiatric disorders and more specifically mood disorder is positively linked with sleep disturbances. The use of sleep and circadian rhythm as a method of intervention works well in the treatment of mood disorders accompanied by regular sleep pattern.

**Keywords:** *Mood disorders, Depression, Insomnia, Sleep Anomalies*

Sleep occupies almost one third of our life and it is vital for survival of all species, including humans. There is no denial to the fact that sufficient, restorative sleep plays a critical role in sustaining physical and mental health. Sleep disorders are quite prevalent in India with 33% of the adult population of our country facing some kind of sleep anomaly (National medical journal of India,2019). Sleep deprivation has a great impact on the health and the overall functioning of a person. The role of sleep is to provide the required rest and replenish the energy levels of the person in order for the optimal functioning of the organs.

People suffering from various kinds of sleep disorders struggle with their energy levels throughout the day which in turn affects their productivity and their activities of daily living.

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Until the 1950s, most people thought of sleep as a passive, dormant part of our day to day lives. It has been reported in various researches that our brains are very active during sleep. Moreover, sleep affects our daily functioning and our physical and mental health in many ways. Among the various sleep disorders insomnia is the most prevalent with approximately 10 to 30% of adults suffering from insomnia worldwide, it has been found that insomnia affects women more than men and this rate is as high as 40% (MSD manuals). Women are much more likely to develop it than males. Insomnia is also seen very often in older adults with over 38% of older adults have shown signs of insomnia, this might be caused by other physical and cognitive changes happening during old age.

It is often seen that lack of enough sleep causes agitation in mood and irritated behavior even for people not suffering from any kind of sleep disorder. Constant sleep deprivation might cause imbalances in body due to inability to replenish the energy which might result into long term changes in people. The changes can be in the form of burnout or other psychological problems.

Research has found sleep problems to be a prevalent symptom in any psychological disorder. It is commonly seen in people with depression that they experience some kind of changes in their sleeping pattern, it may be due to lack of sleep or excessive sleeping. Depression is the most commonly diagnosed psychological disorder in primary care settings. Mood disorders can have a prevalence rate of as low as 0.05 and as high as 7.8 in every 100 people in India (Ministry of Health and Family Welfare).

### *Meaning of Sleep*

Sleep is a critical biological process and affects nearly every type of type of tissue and organ in the human body, from brain, kidneys, heart to the respiratory system, metabolism and many more. Chronic sleep deprivation can result into increased risk to diabetes, blood pressure and other diseases.

It is extremely important for a person's physical and mental wellbeing. For a grown up adult, 6 to 8 hours of sleep at night is what is required. It is a known fact that during the sleep, the body reenergizes, gathers the energy to function to its full potential the next day. It replenishes our energy and makes us a fully functional human being. A survey found that an average Indian sleep for about 9.2 hours a day (news 18). There are two types of sleep REM sleep and non-REM sleep. The Non-REM stage of sleep is further divided into three parts

- Stage 1: Non-REM sleep- is the change from wakefulness to sleep, which is light sleep where heartbeat brainwaves and muscle movement slows down.
- Stage 2: Non-REM sleep- this is the period before entering the deep sleep, here the muscles relax further, and the body temperature drops.
- Stage 3: Non-REM sleep this is the period of sleep which is required to feel fresh in the morning. It occurs in long periods during the initial phases of the night.

REM sleep is a kind of sleep usually seen in about 90 minutes after falling asleep. Here the eyes move rapidly from side to side. Most of the dreams occur in this stage of sleep, and the muscles in legs and hands are temporarily paralyzed in order to stop any kind of actions to the dreams.

### *Sleep Anomalies*

Sleep anomalies are disorders which negatively impact the ability to sleep well on a daily basis. Any kind of problem which changes the pattern of sleep can be considered as a sleep anomaly, it can either cause hypersomnia or insomnia.

Sleep disorders can be caused by physiological or psychological factors. Stress is a known cause to have an affect on the sleep as according to the General adaptation syndrome model of stress; when the body is in a flight or fight response the sympathetic and parasympathetic nervous systems are in high alert and produce hormones like cortisol which inhibit the production of melatonin which is the hormone responsible for sleep. People commonly experience changes in their sleeping pattern due to anxiety, frantic schedules, mental exhaustion, stress, and burnout. Though these occasions arise in everyone's life but if problems with sleep are encountered for an extended period of time, it can then have lasting effects.

### *Types of sleep Anomalies*

- **Insomnia-** It is a sleep disorder which hinders with a persons' ability of falling asleep or staying asleep. Insomnia can be caused by several factors, including jet lag, stress, hormonal imbalance, anxiety, or digestive issues. It usually also commonly seen as a symptom of other physiological or psychological disorders.
- **Hypersomnia** It is the condition of experiencing excessive sleepiness during the day. It is also called as long sleeping; hypersomnia is a fairly rare condition and is found in only about 2% of people. People suffering with hypersomnia might need approximately 10 to 12 hours of sleep every night to function normally.
- **Parasomnia** These include all the issues with the aberrant movement and behaviors during sleep. This disorder involves unusual or undesirable movements during sleep such as, sleep walking, talking in sleep, expressing emotions etc.
- **Sleep apnea** – It is a serious sleep anomaly in which breathing abruptly stops and starts in the middle of the sleep. These alterations in the breathing often cause the person to wake up in the middle of the sleep with a jerk and a feeling of asphyxiation.
- **Sleep apnea** is of two types- **Obstructive sleep apnea-** where the breathing is uneven because the passage of air is too narrow. And **Central sleep apnea-**which is caused where there is a neural dysfunction in the brain and the muscles to that control the respiration during the sleep.
- **Restless leg syndrome-** It is an uncontrollable need to move the legs due to an uncomfortable sensation which is eased when the leg moves especially during the evening and at nights, its frequent occurrence during the evening it is associated with the circadian rhythm hence this comes in the category of a sleep disorder.
- **Narcolepsy-** Narcolepsy is a chronic sleep disorder, people with narcolepsy have a hard time staying awake for extended periods of time. Narcolepsy seriously hampers the quality of life of the patients since there are various disturbances in the routine.

### *Mood disorder*

Mood disorders is a mental illness which targets specifically emotions and mood, people suffering from mood disorder may experience prolonged sadness, extreme happiness and in some cases both.

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Mood disorders also known as affective disorder is a psychological disorder which impacts the mood severely and impairs all the related functioning of the person. These disorders do not have any fixed symptoms but can cause any kinds of alterations in the person's mood, it can either be extremely low and depressive or it can be manic or high energy irritable behavior. Mood disorder is an umbrella term and various disorders come under it such as bipolar disorder, cyclothymia, dysthymia, major depressive disorder.

Most mood disorders have three common types of episodes-manic episodes; hypomanic episode and depressive episode. Manic episode is a distinct feeling of high levels of energy and elevated mood; it can include a feeling of grandiosity and an inflated self-esteem; the person in a manic episode might feel well rested in a mere 3 hours of sleep. Hypomanic episode essentially just like a milder version of a manic episode and comparatively shorter in length whereas Depressive episode is characterized by a feeling of immense sadness and grief, which can be a result of a traumatic event in life such as, loss of loved one, unemployment or any other personal problem.

Depression can be described by loss of interest in activities of daily living, getting no joy out of activities that the person might have previously enjoyed; changes in sleep patterns, i.e., either over sleeping (hypersomnia) or not sleeping at all (insomnia); change in appetite overeating or undereating which also leads to unintentional weight gain or loss (more than 5% of body weight in a month); feeling of worthlessness, loneliness, or emptiness etc.

### *It's type*

Many disorders come under the term of "mood or affective disorders namely,

- Bipolar disorder I - A person is diagnosed with bipolar disorder I when they have at least had one manic episode. The mean age of onset of bipolar I disorder is said to be 18 that is when one or more manic or hypomanic episodes have already occurred.
- Bipolar disorder II- For getting diagnosed with bipolar disorder II the person has to meet the criteria of having at least one manic episode and one depressive episode. The mood fluctuations should be severe enough to cause clinically significant distress. A common characteristic in bipolar disorder II is impulsivity which in turn known to cause substance abuse and to suicide temptations.
- Cyclothymic disorder to be diagnosed with cyclothymia there should be symptoms of hypomanic episode and depressive episode but not enough to meet the criteria of either one of those for two years. In the duration of those two years the symptoms of hypomanic episode and depressive episode should be present, and the patient should not go without those symptoms for more than two months.

### *Can sleep predict one's mood?*

"Mood dysregulation and sleep dysregulation seem to go hand in hand," says Matthew Walker, a sleep researcher at the University of California, Berkeley. The link between sleep disturbance and psychiatric disorders is well established, but the causal relationships are less clear. Do sleep disturbances trigger episodes of these disorders, or do mood and anxiety disorders lead to difficulty sleeping? Both could be true and that it is considered as a two-way street.

On the same lines as mentioned above, sleep disorders are often seen as a symptom in many mental illnesses. Sleep or lack thereof has shown to cause changes has shown to increase irritability and aggression in people. Due to the fact that less sleep makes people act in ways

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which is different than their regular reaction, it makes a point to ponder on if prolonged sleep problem causes our body chemistry to change and cause alterations in the mood and behavior of patients with mood disorders. It is also not clear if sleep disorders cause mood alterations or mood disorders bring about the changes in sleep if the two are even related. There is ample evidence that sleep and mood are entangled at the very root. People who sleep poorly are more likely to develop depression than those who sleep well.

### *Objectives*

- To investigate the relationship between sleep anomalies and mood disorders.
- To assess the implications of sleep anomalies on mood and overall wellbeing of adults.

## **REVIEW OF LITERATURE**

Hannibal et al., (2021) studied the relationship between music, sleep, and depression. This research studied the impact of music as a sleep aid option in depression-related insomnia. The sample included 4 patients from the outpatient department of a hospital with depression-related insomnia. Three out of four patients reported music as an effective intervention for the symptoms of insomnia and it helped calm the patients and reduced anxiety. It was said that music decreased the effects of external stimuli and impacted mood and arousal in a positive manner.

Riemann et al., (2020) assessed the relationship between three variables: insomnia, sleep, and depression. They studied the circadian rhythm, REM sleep, depression, and different aspects of insomnia and other smaller aspects. It was deduced from the study that various variables like insomnia and sleep regulate the hormones and can be said to cause depression. Further studies should be done in this area to understand the relationship between these variables in a better way.

Radwan, Liu, and Chaudhury (2019) identified the role of dopamine in mood and the sleep-wake cycles. The evidence in the research demonstrated that dopamine has a significant role in regulating the mood and the circadian rhythm, but it is still hard to say if mood disorders such as depression precede abnormal sleep-wake cycles or the abnormal circadian rhythm triggers mood disorders. The neuroanatomical evidence shows that the area in the brain which regulates the circadian rhythm and sleep are very close in circuit to the area which regulates the mood, which might be one of the reasons for interlinking of the two.

Steiger and Pawlowski (2019) conducted a research to study the linkage between sleep and depression. Objective sleep was assessed using EEG (electroencephalogram) changes, measure of REM sleep, impairment of sleep, etc. The studies said that most antidepressants were seen to suppress REM sleep in people suffering from depression and the ones who are not. The research presents sleep electroencephalogram (sleep EEG) as a reliable tool for psychiatric research and to measure affective disorders.

Palagini et al., (2019) studied the role of insomnia in the dysregulation of the systems involved in mood disorders. The authors analyzed various literatures available until January 2018 to understand the role of insomnia in mood disorders. The findings demonstrated that, insomnia or any other sleep disorder contributes to mood in three ways- (a) by over-activating the stress response of the body. (b) state of chronic inflammation has a negative impact on the neurotransmitter serotonin. (c) dysregulations in serotonin also disbalance dopamine and reduce the neurotrophic factors.

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Takaesu et al., (2017) found that sleep wake cycle and circadian rhythm are predictors of mood disorders (specifically bipolar disorder) the study included 104 participants with bipolar disorder (both type I and II) and 73 participants with major depressive disorder. The mood status of the patients was evaluated by young mania rating scale and Montgomery-Asberg depression rating scale; the sleep disorders were evaluated by clinical interview. The findings stated that the rate of sleep disorder was significantly higher in bipolar disorder patients than in major depressive disorder patients. Hence circadian rhythm and sleep wake disorders can be a good diagnostic predictor for bipolar disorder.

Mondin et al., (2017) conducted research to analyze the relationship between mood disorders and biological rhythms in young adults. It is a cross-sectional study, the methodology includes a sample of 1023 adults in which depression and bipolar disorder was identified using the mini-international neuropsychiatric review, the biological rhythms were self-reported, and the circadian rhythms were analyzed using a questionnaire. Participants with bipolar disorder and depression experienced more imbalance in biological rhythm as compared to the control population which did not suffer from any mood disorder. Euthymic participants who were living without mood disorders fell between the spectrum between the two.

Gold and Sylvia (2016) studied the impact of sleep on bipolar disorder. In the study they analyzed the circadian rhythm, sleep wake cycle and optimal functioning, they also analyzed the disruptions in each of the areas. The results showed sleep to be a biomarker of bipolar disorders as sleep disturbances existed throughout the phases of the disorder, sleep disturbances were seen to deteriorate the situation of the disorder. It was also found in the study that cognitive behavioral therapy (CBT) specially targeting insomnia reduced the frequency of manic episodes in the patient. Further research of this topic would help clinical practitioners to use it in creating more effective diagnosis and interventions.

Melo et al., (2016) researched on the circadian changes in people who are vulnerable to bipolar disorder. Sleep anomalies are quite common in people with bipolar disorder, the researchers have analyzed the high-risk population for bipolar disorder. The methodology used were an electronic search of all the articles with the keywords up to December 2016, thirty articles were studied by the researchers, and it was found that sleep disturbances were frequently observed in objective and subjective measures of sleep using actigraphy. The individuals vulnerable to BD reported irregular circadian rhythms, odd sleep wake times and cycle and poor quality of sleep. Many studies suggested that irregular biological rhythms indicate the start of bipolar disorder. Sleep and irregular circadian rhythms are common in high-risk individuals of bipolar disorder.

Murphy and Peterson (2015) conducted a literature review on sleep disturbances and major depressive disorder. In the review of studies, they found positive effects of sleep disturbance on symptoms of depression. Multiple studies in this research showed that a night of complete sleep deprivation helped depression patients by 50% which is comparable to the results shown by antidepressants. Mild sleep deprivation including the REM showed mild to moderate increase in depression scores. In conclusion both variables were found interrelated to each other.

Demirci et al., (2015) studied the correlation between severity of smartphone use with sleep quality, depression, and anxiety in young university students. The smartphone usage in the last few years has been nearing to an addiction for the current generation. The participants in

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this study included 319 university students with mean age 20.5 divided into three groups with varying severity of the usage of smartphones (non-users, low users, and high users). The findings showed that the high smart phone female users had the higher score than males. On a comparative basis the high smart phone users had a higher score on the depression, anxiety, and daytime dysfunction scale than the low smart phone user group. The findings indicated that depression anxiety and sleep were correlated with smartphone overuse.

Robillard et al., (2013) studied melatonin balances and sleep wake rhythms in young adults and adolescents with mood disorders, in a comparative study of unipolar and bipolar phenotypes. The study evaluated circadian rhythm as early signs of mood changes. The results found that patients with unipolar disorder had a significantly higher level of melatonin secretion as compared to patients with bipolar disorder. Patients with bipolar disorder also had a late onset of melatonin i.e. they were more prone to sleeping late as compared to patients with unipolar mood disorder.

### ***Key findings and Future Implications***

The aim of this paper was to assess the relationship between sleep anomalies and mood disorders. Researches of the past have supported that there is a link between these two although there are mixed findings as well.

Sleep disturbance has impact on personal and professional life. In terms of short term consequences, it increases the stress responsivity because increased sympathetic activation leads to the disruption and discontinuity of sleep. Long term problems include somatic and psychosocial issues. Sleep disruption changes cognition and performance in many domains like attention, executive function, emotional reactivity, memory formation, decision-making, risk-taking behavior, and judgment. Therefore, sleep anomalies have negative consequences and adversely impacts overall wellbeing. Sleep deprivation is said to regulate hormones and cause fluctuations in mood but on the other hand some researchers use sleep therapy and sleep deprivation as a way to control depression. Mood disorders has been related with sleep-wake cycle.

*Some key findings are as below:*

- High correlation between scores of stressful life events and sleep quality were found. Stressful life events or life event stressors, are undesirable, unscheduled, non-normative, and uncontrollable. It disturbs the sleep quality of adolescence and adults.
- Mood disorders are found in one-third to one-half of people with chronic sleep problems. Likewise, most patients with mood disorders experience insomnia. Those who experience depression show characteristic like abnormalities in sleep continuity, slow-wave sleep and REM sleep patterns. But differences in sleep patterns cannot reliably distinguish patients with depression from those with other psychiatric disorders, but sleep changes may provide a window on neurobiological abnormalities in depression.
- Remarkably, insufficient sleep has been linked to the development and management of a number of chronic diseases and conditions, including type 2 diabetes, cardiovascular disease, obesity, and depression.
- Sleep plays an important role in the development, progression, and maintenance of mood disorder symptoms among children and adolescents. Lack of sleep also leads

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to behavioral and social issues which in turn influences their adaptability to environment.

- Many researchers have reported the role of various hormones and neurotransmitters in sleep patterns. Findings suggest that melatonin secretion was more prominent in people with unipolar disorder than bipolar disorder hence people with bipolar disorder experienced sleep regularities more often. Sleep irregularities also cause an increase in serotonin which increases the inflammatory response of the body causing mood alterations.
- The study in the area of sleep anomalies can help in the development of a suitable intervention plan to alleviate sleep problems and symptoms of mood disorders. Early diagnosis of the same can prove to be beneficial for improvement in the quality of life.

### CONCLUSION

Thus, it is evident that sleep and mood disorders are related to each other in one way or the other. It can be that the hormones which cause mood disorders are also responsible for the irregularities in sleep or the irregularities in the circadian rhythm tend to have some other psychological or social reasons which make people more prone to mood disorders. Although it is not yet clear that out of these two variables what precedes but sleep anomalies and mood disorders have a bidirectional relationship, i.e., the two variables are correlated to each other, but significant evidence is not found.

Positive results of sleep therapy in mood disorders is found to be effective. Better sleep has psychological benefits and lack or irregularities of the same increases the likelihood of premature death and illness. With the increasing interest in the role of sleep health for development and management of chronic diseases in times to come there would be many more initiatives and interventions with an aim to enhance the quality of life at personal and professional level.

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### **Conflict of Interest**

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