Effect of BMI on Sleep Pattern Among Non-Tribal Female College Students of Tripura: Cross-Sectional Study

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Abstract

This study investigates the relationship between sleep patterns as well as the quality of sleep and Body Mass Index (BMI) among non-tribal female college students of Tripura, India. The present research reveals that despite normal BMI values students suffer from poor sleep quality. The study also highlights the higher obesity patterns among the female tribal student community, primarily attributed to their dietary habits. This article emphasizes the need for further research in this area, considering the significant impact of quality of sleep on non-tribal students' overall well-being and academic performance.

Keywords: Non-tribal female college students, BMI, sleep pattern, sleep quality, obesity, and health status

Introduction

One of the most crucial physiological needs is thought to be sleep. It is regarded as being the biological function of the human body that is most crucial. Many vital bodily processes, including muscle recovery from lactic acid build up, tissue repair, cognitive functioning, body cell and tissue growth and development, enhancement of cardiac function, body metabolism, etc., take place when we sleep. Sleep is thought to be quite advantageous for psychological factors as well. Sleep improves learning, memory, and other cognitive processes as well as mood. Additionally, sleep aids in regaining a healthy weight. It lessens stress, decreases the likelihood of significant health problems, and promotes social interaction.

Poor sleep is associated with illnesses like obesity, mental illness, and cardiovascular disease. While having cardiovascular illness is associated with poor sleep, some evidence suggests that bad sleep may also play a role (Hale et al., 2020). Less than seven hours of sleep per night is associated with coronary heart disease and a higher risk of dying from the condition. According to Jackson et al. (2015), sleep duration beyond nine hours is also associated with coronary heart disease, stroke, and cardiovascular events.

Short sleep duration is linked to an increased risk of obesity in both children and adults, with several studies finding a risk increase of 45–55%. Obesity has also been linked to other sleep-related issues, such as daytime naps, irregular sleep schedules, and poor sleep efficiency. The impact of sleep duration on obesity has, nevertheless, received the most research (Wang et al., 2017). Sleep issues are typically seen as symptoms rather than causes of mental illness (St-Onge et al., 2016). But mounting data indicates that they are both a root cause and a symptom of mental disorder. Major depressive disorder is significantly

predicted by insomnia; a meta-analysis of 170,000 individuals revealed that insomnia at the start of a study period suggested a more than twofold increased risk for major depressive disorder. Additionally, several studies have found a link between sleeplessness and depression, post-traumatic stress disorder, and suicide. According to Hale et al. (2020), sleep disturbances can make psychotic episodes more severe and increase the likelihood of psychosis.

Pittsburg Sleep Quality Index (PSQI) is a tool for evaluating sleep quality. The PSQI was developed in 1988 by Buysse and his colleagues to provide a clear index that both clinicians and patients can use. It is a standardized measure that was created to gather consistent information about the subjective nature of people's sleep habits. It rose in prominence as a tool for studying the potential links between sleep and bipolar disorder, depression, and sleep disorders. Researchers that work with persons from adolescent through old age increasingly employ the PSQI. Independent evaluations have endorsed the PSQI since it has amassed a significant body of scientific evidence.

The measure has a great deal of potential for use in clinical practice in addition to showing promise in terms of reliability and validity (Currie, 2008). It has been translated into 56 other languages so far.[2] The PSQI is often referred to as BPSQI, where 'B' refers for Bengali (Tomfohr et al., 2013). With rising rates in both adults and children, obesity is a leading cause of death globally (WHO, 2015). In 195 countries in 2015, there were 600 million obese adults (12%) and 100 million obese children (Haslem et al., 2005). Women are more likely than men to be obese (WHO, 2015). Obesity was designated as a disease in 2013 by a number of medical groups, including the American Medical Association and the American Heart Association (Yazdi et al., 2015; Afshin et al., 2017). Obesity is a medical condition, occasionally referred to as a disease, in which excessive body fat has built up to the point where it may be harmful to one's health (Pollack, 2013). When a person's body mass index (BMI), which is calculated by dividing their weight by height squared, exceeds 30 kg/m2, they are considered obese; between 25 and 30 kg/m2 is considered overweight (WHO, 2015). According to Luppino et al. (2010), obesity is a significant contributor to disability and is linked to a number of illnesses and ailments, including osteoarthritis, type 2 diabetes, obstructive sleep apnea, and some types of cancer. The main variables for controlling obesity are thought to be physical exercise, a healthy lifestyle, and nutrition, although risk factors such inadequate sleep quantity and quality have gotten less attention.

The goal of the current study is to determine whether obesity and poor sleep quality are likely to be related in non-tribal female college students in Tripura. The quantity and quality of the sleep that those state's college students get has received very little attention. Therefore, the current study will usher in a new era of understanding of college students' health standards in this regard.

Methods:

This cross-sectional survey was carried out between October 2022 and January 2023 in several colleges throughout West Tripura. Female college students were the subjects, and they were selected from non-tribal groups. All of the subjects, who were college students between the ages of 19 and 21, gave their informed consent. The exclusion criteria included having at least one obese parent, taking medicine for a condition for longer than three months, smoking and drinking regularly, having a history of diabetes mellitus in the family, and/or having genetic health problems.

Height (cm) and weight (kg) are measured with the help of an anthropometric measurement and weighing machine. Their Body Mass Index (BMI) was calculated. According to the BMI value, subjects were categorized as underweight, normal-weight, and over-weight subjects. All the subjects filled up the

information data questionnaire and PSQI form. The PSQI is a reliable tool for accurately evaluating a person's sleep patterns, latency, quality, and quantity, among other factors. "Good quality sleep" is indicated by a worldwide score of 5. On the other hand, a global score of >5 denotes "poor quality sleep". The student's sleep quality declines as the PSQI score rises.
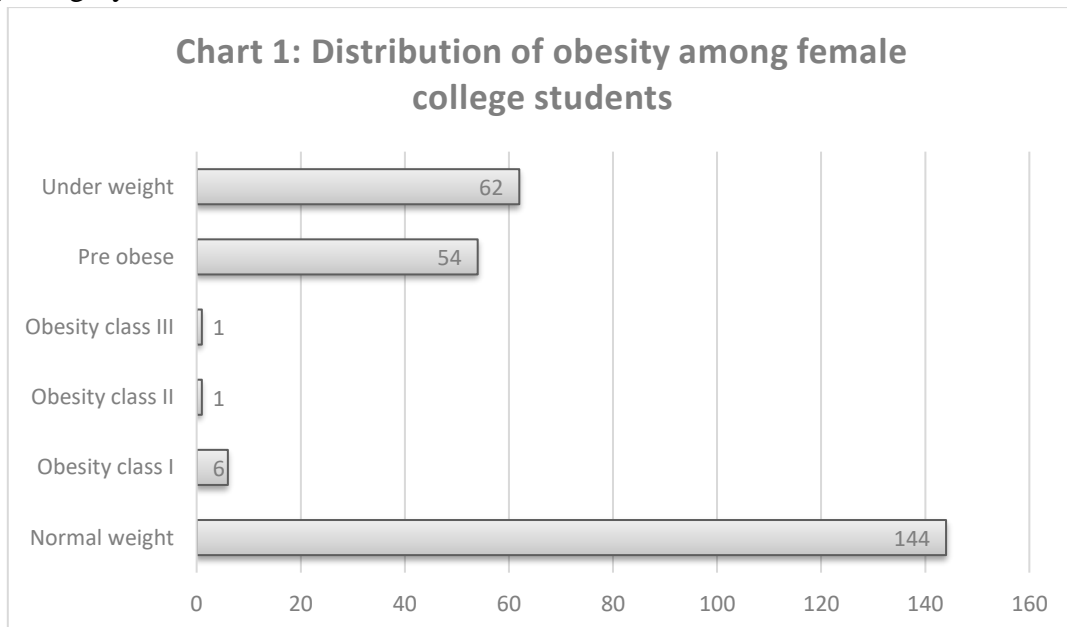
Results:

A total of 269 female students responded.

The baseline characteristics of the students are given in **Table 1.**

Table 1. Baseline health parameters of the subjects under study

Parameters	Non-tribal female
Age (years)	19.5 ± 1.41
Height (cm.)	154.2 ± 8.88
Weight (Kg.)	51.5 ± 9.83
BMI (Kg./m^2)	21.7 ± 4.46
PSQI value	5.6 ± 2.42

Chart 1 reflects the health status of the female participants. Among 269 of the total female college students who participated in the present study, 144 students are out from obesity. So, 53.53% of female students maintain a normal BMI. A total of 62 students (23.05%) are underweight. A total of 54 students (20.07%) are pre-obese. Whereas, 6 students (2.23%) are obesity class I, and 1 student each (0.37% in ease case) belongs to obesity class II and obesity class III respectively. So, the total number of female students under the obesity category is 62 i.e., 23.05%.

Chart 1: Distribution of obesity among female college students

Chart 2: Comparison of sleep quality accoring to the health status of the female college students
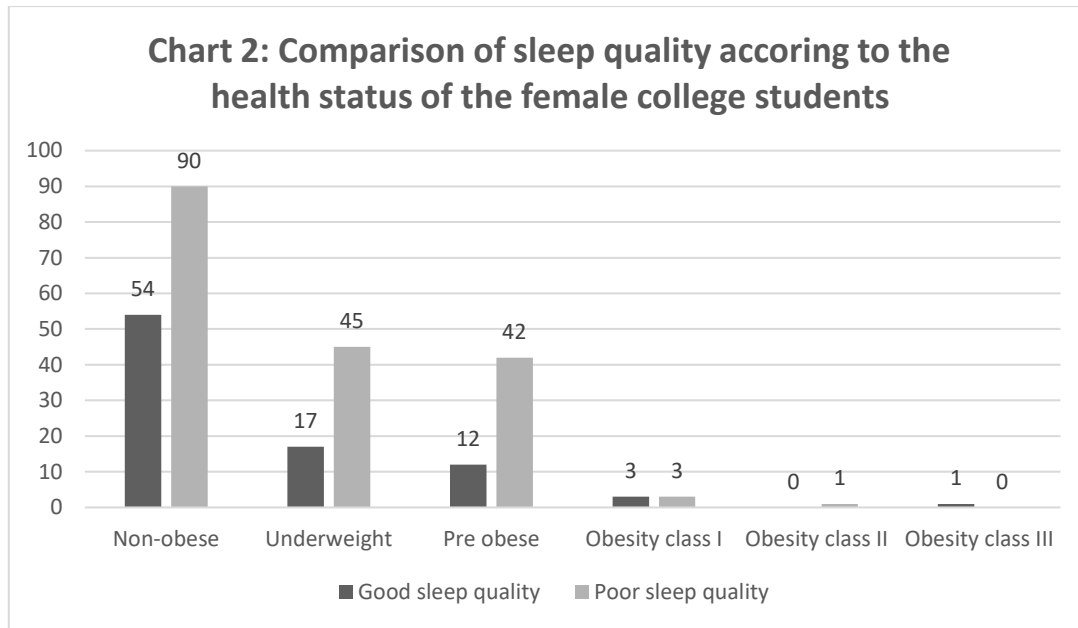
Chart 2 shows the distribution of PSQI values among different categories of health status. Females also showed poor PSQI values in all categories except in obesity class III.

Discussion

The main goal of the current study was to determine how BMI affected the quality of sleep among female college students from Tripura who were not from a tribe. There aren't many research projects being carried out in this region of India. Tripura has both tribal and non-tribal inhabitants, hence the health of the tribal community receives more focus. The literature study reveals that there hasn't been any work done on a thorough analysis of the pattern of health distribution and its impact on the sleeping habits of typical (non-tribal) female college students.

The result shows that the BMI value (Kg/m^2) is within the normal range, but the PSQI values are consistently poor. When the health category according to BMI value was plotted against PSQI value, it is clear from charts that, in most of the cases PSQI value is poor, even in the case of the non-obese female students also. So, even in a person with a normal BMI value, the person can suffer from poor sleep. A study was conducted to investigate the effects of BMI on health behaviors among 334 Chinese college students. The result of that study showed a significant difference between genders and high BMI values were found to be associated with disturbance in sleep (Wong. C.A., et. al.;2017). Another cross-sectional study was done by Wang et.al in 2019 with college students to find any probable effect of BMI on sleep quality (Wang et.al.; 2019). The outcome of the study shows that BMI and sleep quality vary with gender. A study was conducted by Meena M et.al (2019) on 230 college students 18-24 years. The result concluded that there is an association between BMI values and sleep duration.

In all the cases PSQI values are found to be of poor quality. According to a report from June 2013, almost 190 million internet users are present in India, and most of them are in college and university going population. It was also in the report that the social platforms mostly accessed by the youth are Facebook, WhatsApp, Instagram, and Twitter (Sharma, et.al., 2014). The participants were reported to use the internet mostly during night time i.e., after 11:00 P.M. and it continues up to late night. Most of them were engaged in social networking. As reported by them, surfing the internet is a part of their leisure activity which is possible only at night before going to bed. Next to social networking, comes engagement in

games, which are played either single or in a group. The educational search comes third in the row of interest. Few students have their own YouTube channel to run. So, content-making for the channel is another reason for poor PSQI value. A study was conducted to analyze the internet use pattern among professional students of Tripura (Ghosh and Bhattacherjee, 2020). The study concluded that most of the participants come under the category of average internet users. On the contrary, 7.4% of participants were found to have excessive addiction to using the Internet irrespective of the course. The report also added that the level of mental problems like depression, anxiety, etc. differs according to the involvement with the internet. The relation is like more involvement and more mental problem. If a person does not have adequate sleep according to age and work pattern, the tendency of suffering from mental problems will increase. Sufficient sleep, especially REM sleep helps the brain to work better regarding processing of signals. Whereas, lack of sleep hinders the process of various brain activities like signal analyzing, proper thinking ability, positive thinking, tiredness, emotional outburst, and ultimately mental and physical health disorders. Good sleep influences good mood, acceptable social behavior, and good interaction with other members of the concerned group. Adequate sleep helps a person to concentrate on what he/she is doing. This fact is very important from the educational standpoint of a student. It has been reported in a study that almost 300 million of the population are suffering from depressive moods, worldwide (Friedrich, 2017). The study also added that almost 75% of the depressed population is suffering from the symptoms of insomnia. Daytime sleepiness and lack of concentration are two very common symptoms of an insomniac person. Anxiety disorders are also strongly associated with lack of sleep.

Conclusion

The study found that BMI values do not affect the sleep pattern of the college-going non-tribal female students of Tripura. A person with a normal average BMI value can suffer from sleep-related issues. Sleep quality was found to be consistently poor in all the health categories taken into consideration. Poor sleep quality is found to be a very bad health issue for college students of Tripura, irrespective of sex.

Limitations

The samples under study are suffering from restrictions from the standpoint of age, educational status, as well as community status. The results might be the reflection of the homogeneity of the samples. Future studies should include samples with different age groups, a good comparison with the tribal counterparts. The study was restricted to the area of the West part of Tripura only. Other regions might also be included.

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