

Sleep deprivation and its association with depression in first-year medical and dental students in Kanchipuram District, Tamil Nadu, India

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ABSTRACT

Introduction

Sleep deprivation is a major problem for college students. A single sleepless night can make one irritable and moody the following day, it is not surprising that chronic sleep deprivation may lead to long-term mood disorders like depression. Medical and dental students are exposed to tremendous levels of pressure due to academic demands which could ultimately potentiate sleep deprivation.

Purpose

The objective of this study is to grade the level of sleep deprivation in first-year medical and dental students, to grade the level of depression in first-year medical and dental students, and to assess the relationship between sleep deprivation and depression.

Methods

168 students participated in this study. They were briefed about the study. Two questionnaires were used for the study. The questionnaires used were the Epworth Sleepiness Scale (to assess sleep deprivation) and Beck's Depression Inventory (to assess depression). Statistical Package for Social Sciences (SPSS) software was used for statistical analysis.

Results

72% of the participants suffered from moderate sleep deprivation and 26% suffered from borderline clinical depression. As sleep deprivation increased in the participants, their depression also increased. There was a statistically significant positive correlation between the depression score and the sleeping score ($p < 0.05$). However, there was no association between gender and depression ($p > 0.05$).

Conclusion

Policy efforts should be directed toward primary and secondary prevention programs that enforce sleep education interventions, particularly among first-year college students. interventions need to be youth-friendly, acceptable, feasible, and non-stigmatizing.

INTRODUCTION

Sleep deprivation has become a major problem these days. "Sleep deprivation" is a label for "the cumulative effect of a person not having sufficient sleep," according to the American Sleep Association (EESS, n.d.). 51% of Indians have said that they are sleep-deprived after the covid Pandemic (Akeman et al., 2020). This is mostly seen in younger individuals, especially college students. When a child goes to college, he/she misses the comfort of home and his or her room, living with strangers as roommates, trying to make new friends, and adapting to a new environment and newer contradictions and obligations.

Many studies have reported that the prevalence of psychological distress among medical students during medical training was high (Alalageri, et al., 2017). Students should make the effort to accept new experiences, and changes in social aspects, behavioral, academic, and economic situations. This is an integral part of any education system. Acute sleep deprivation is defined as being awake for 16 hours or more in a row without naps or other sleep periods. Chronic sleep deprivation is an ongoing problem that involves a regular lack of sleep each night over a longer period (Beck's Depression Inventory, n.d.). Sleep deprivation is often confused with Insomnia. Insomnia is a sleep disorder in which you have trouble falling and/or staying asleep. The condition can be short-term (acute) or can last a long time (chronic). It may also come and go (Bhatia, 2007). Sleep deprivation is a condition that occurs if you don't get enough sleep. Sleep deficiency is a broader concept. It occurs if you have one or more of the following:

1. You don't get enough sleep (sleep deprivation)
2. You sleep at the wrong time of day
3. You don't sleep well or get all the different types of sleep your body needs
4. You have a sleep disorder that prevents you from getting enough sleep or causes poor-quality sleep.

(Bostanci, 2005)

Sleep deprivation interferes with work, education, life, and family. It can make you feel frustrated, cranky, or worried in social situations. It also leads to various medical conditions from stress or diabetes to stroke. It is commonly said that people can last a day with little sleep with no

negative effects. However, research shows that getting enough quality sleep at the right times is vital for mental health, physical health, quality of life, and safety.

Students are the backbone of the society. These dependent individuals are going to become independent soon and be the pillars of a family, the society and in the end take care of our country. These youngsters have a lot of distractions. Gone are the days of paper magazines and newspapers. Now their recreation time is filled with OTT platforms online games and Virtual Chatting. And a student that is new to the dormitory will naturally get latched on to the above very quickly. Direct consequences of poor sleep among college students include increased tension, irritability, depression, confusion, reduced life satisfaction, or poor academic performance (Buboltz, 2021).

Taking all this into consideration this study was conducted to assess the association between Sleep deprivation and depression in a tertiary medical and dental college

METHODS

The study is a cross-sectional study conducted on first-year year MBBS and BDS students who have enrolled in a tertiary medical and dental college through NEET counseling. Thereby students from different states across the country have been admitted to the college. There is a drastic change in environment, language, friends circle, social life culture, study load, etc., which may cause the freshers to become victims of seclusion which may ultimately result in sleep deprivation and its ill effects.

In a study in Bangalore by Kavya (2012), 31.5% were having abnormal sleep. Taking this as 'index Prevalence' and an absolute precision of 8%, with a non-response rate of 10%, the sample size for this study was calculated to be 150.

168 participants were selected for this study. The participants were briefed about the study. Only those who gave consent to participate in the study were included. A silent room was selected for the questionnaire sessions which lasted for 25 to 30 minutes per student. The questionnaire was administered to each student, separately, by the investigator to maintain confidentiality.

Two scales along with socio-demographic details were used for the study. The questionnaire used for assessing sleep deprivation is the Epworth Sleepiness Scale (Ekundayo,

2007; The ESS - Epworth Sleepiness Scale, n.d.). The ESS (Cronbach's alpha (0.88)) is an eight-item questionnaire that assesses daytime sleepiness, it measures average sleep propensity as well as more time-consuming procedures. The University of Zurich stated that the ESS questionnaire has good reliability, good validity, excellent specificity, and critical applicability.

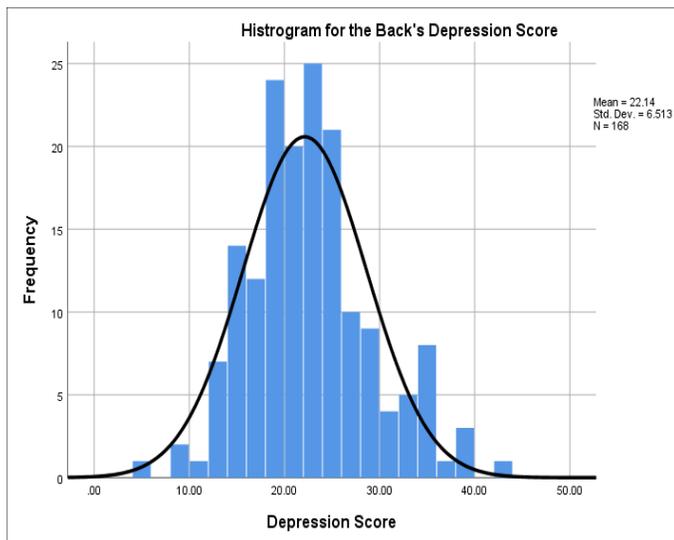
This was followed by the questionnaire used to assess depression, the Beck Depression Inventory (Beck's Depression Inventory, n.d.; Hazarika, 2022). The Beck's Depression Inventory (Cronbach's alpha > or = 0.84) demonstrates good reliability and validity in both clinical and non-clinical samples. It is a validated, quick, and most frequently used self-rating scale to assess depression.

Numbers and codes were assigned to each variable. Data entry was done in an Excel spreadsheet. Data was subsequently transformed into SPSS (Statistical Package for Social Sciences) software for analysis. Descriptive statistics were used to present the data and the Pearson Correlation Coefficient was done to assess the association between sleep deprivation and depression. P-value < 0.05 was considered statistically significant.

RESULTS

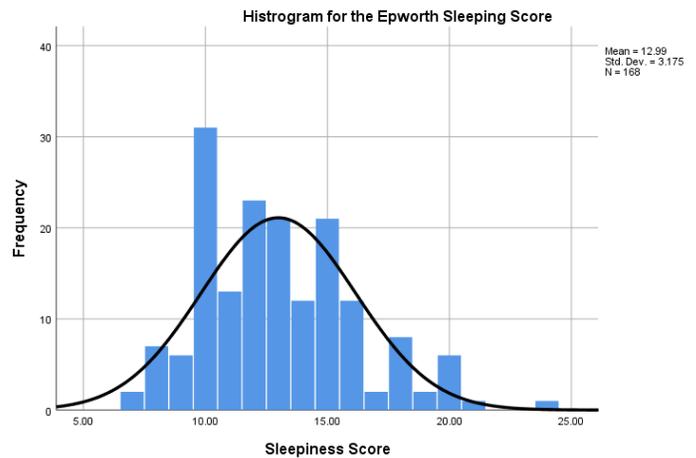
168 students participated in this study. 60% of the participants were female while 40% were male. 26% of the participants suffered from borderline clinical depression (Figure 1).

Figure 1:
Becks Depression Score



72% of the participants suffered from moderate sleep deprivation (Figure 2).

Figure 2:
Sleep Deprivation score



38% suffered from moderate depression (Table 1).

Table 1:
Descriptive statistics for the categorical variables according to the study objective

FACTORS	FREQUENCY (N)	%	
Gender	Male	67	40
	Female	101	60
	Normal	11	7
Depression	Mild mood disturbance	37	22
	Borderline clinical depression	43	26
	Moderate depression	64	38
	Severe depression	12	7
	Extreme depression	1	1
Sleep deprivation	Normal	2	1
	Mild Sleep deprivation	13	8
	Moderate Sleep deprivation	121	72
	Severe Sleep deprivation	32	19
Total	168	100	

A chi-square test was conducted to find the association between gender and depression. The probability value is at a 5% level of significance than 0.05. The test result shows that $\chi^2 = 3.598, p = 0.609$. Therefore, it can be inferred that there is no association between the gender of the student participants and depression. Hence, the null hypothesis is accepted. So, there is no association between gender and depression levels (Table 2).

Table 2:
The association between gender and depression

	NORMAL	MILD MOOD DISTURBANCE	BORDERLINE CLINICAL DEPRESSION	Moderate Depression	SEVERE DEPRESSION	EXTREME DEPRESSION	INFERNAL STATISTICS
Male	3 (4.5%)	17 (25.4%)	16 (23.9%)	28 (41.8%)	3 (4.5%)	0 (0%)	$\chi^2 = 3.598$ $P = 0.609$ Not Significant
Female	8 (7.9%)	20 (19.8%)	27 (26.7%)	36 (35.6%)	9 (8.9%)	1 (1%)	
Total	11 (6.5%)	37 (22%)	43 (25.6%)	64 (38.1%)	12 (7.1%)	1 (0.6%)	

A chi-square test was conducted to find the association between gender and sleep deprivation levels. The probability value is at a 5% level of significance than 0.05. The test result shows that [$\chi^2 = 8.659, P = 0.034$]. Therefore, it can be inferred that there is an association between the gender of the student participants and sleep deprivation levels. Hence, the null hypothesis is rejected. So, gender and sleep deprivation levels are significant (Table 3).

Table 3:
The association between gender and sleep deprivation

	NORMAL	MILD SLEEP DEPRIVATION	MODERATE DEPRIVATION	SEVERE DEPRIVATION	INFERNAL STATISTICS
Male	2 (3%)	7 (10.4%)	51 (76.1%)	7 (10.4%)	$\chi^2 = 8.659$ $P = 0.034$ Significant
Female	0 (0%)	6 (5.9%)	70 (63.9%)	25 (24.8%)	
Total	2 (1.2%)	13 (7.7%)	121 (72%)	32 (19%)	

Mild sleep deprivation and moderate sleep deprivation were more in males and severe sleep deprivation was observed to be on the rise in females.

Pearson Correlation Coefficient was computed to assess the relationship between Beck's Depression Score and the Epworth Sleepiness Scale score. The result showed that there was a positive correlation between depression score

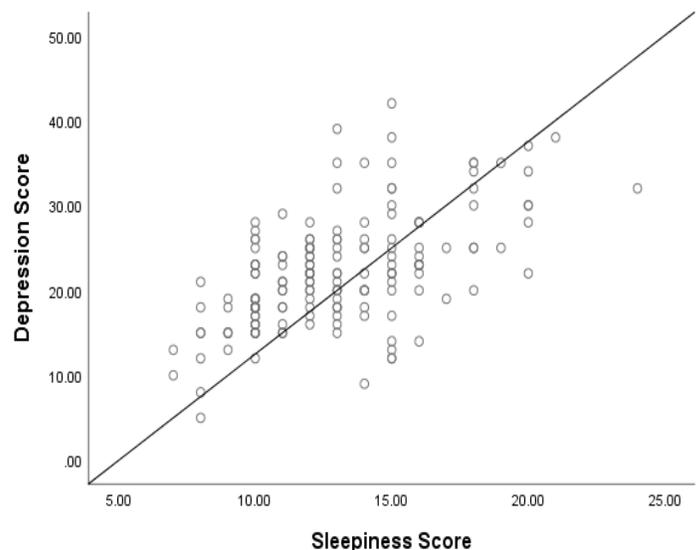
and sleeping score, $r = 0.573, n = 168, P = 0.000$. There is a statistically significant correlation between depression and sleep deprivation scores. Therefore, it can be inferred that as sleep deprivation increased, the participant's depression also increased. The p-value is highly significant (Table 4, Figure 3).

Table 4:
The Relationship between Depression and Sleepiness

		DEPRESSION	SLEEP DEPRIVATION
Depression	Correlation	1	0.573**
	Sig. (2-tailed)		0.000
	N	168	168
Sleep deprivation	Correlation	0.573**	1
	Sig. (2-tailed)	0.000	
	N	168	168

***Correlation is significant at the 0.01 level (2-tailed).
** p-value significant at less than 0.05

Figure 3:
Scatter diagram for depression score and sleepiness



72 % of the participants agreed that they slept 8 hours a day. The rest agreed to watching movies on OTT platforms, doing doom-scrolling, and chatting with friends late into the night. Sleeplessness leads to not being able to take part in classes and taking naps during breaks (Table 5).

Table 5:
Factors leading to sleep deprivation and its consequences

FACTORS	FREQUENCY (N = 168)	%
Normal sleep of 8 hours	121	72
Use mobile and watch movies on OTT platforms past 11 pm	37	22
Doom scrolling	69	41
Chat with friends	64	38
Early to bed, early to rise	18	10
Can't sleep comfortably in a new place	1	1
Nap during Lunch break	35	20
The nightly routines of the roommate cause sleep disturbance.	53	31
Felt sleepy in the classroom	11	6.5
Have slept in class	32	19

DISCUSSION

There are various recent studies suggesting that India is sleep deprived. A study by wakefit.co has stated that 59% of Indians sleep late (Wake Fit, n.d.). In this study, most of the students are sleep-deprived and sleep after 11 pm. In a study by Wake Fit, 39% agreed to have been on social sites leading them to be awake late. In this study, Doom scrolling and Watching movies on OTT platforms have been noted to be on the rise leading to sleep deprivation.

Due to sleep deprivation, students have felt sleepy during classes and have slept which leads to students not being able to concentrate. Some students have stated that their roommates staying up late has affected their sleep. So not only does one's habit spoil their sleep, but it also leads to others' sleep being deprived. People with sleeplessness exhibit psychological profiles (poor coping skills, poor health status, ruminative traits) that herald the onset of depression (Khemka 2020).

This study has proved that there is a significant correlation between sleep deprivation and depression. Hence sleep deprivation leading to depression must be considered seriously. Various recent studies by Mbous et al. (2022) suggest that tending to sleep issues, which aren't frequently considered a hazard factor for depression and academic disappointment, ought to be thought about. Moderate Depression in the younger population was 38%. Studies

conducted by some researchers have stated that Moderate depression was 10% to 28% (Olsson, 1997; Pössel, 2018; The Sleep Doctor, 2022). Severe depression was 7% in the present study, but it has been as high as 10% in a study in Sweden (NHLBI, NIH, 2022). Depression in college students not only leads to lower grades it also leads to dropouts. Depression has been listed as one of the top reasons for suicidal youth (Swaminathan, 2023). Colleges are stressful environments for students. Teachers should take proper care to notice if there are any behavioral changes in students. It is necessary to take care of first-year students as they will have trouble changing from the school phase where they are mostly at home with parents, to the college phase, where they are paired with strangers as roommates in a different place.

CONCLUSION

Policy efforts should be directed toward primary and secondary prevention programs that enforce sleep education interventions, particularly among first-year college students. Interventions need to be youth-friendly, acceptable, feasible, and non-stigmatizing

RECOMMENDATIONS

Students are often reluctant to seek help due to the stigma associated with depression. So, parents, friends, and teachers need to get involved if they suspect a student is suffering from depression. A mental health evaluation that encompasses a student's developmental and family history, school performance, and any difference in opinion with roommates should be performed to evaluate students regularly

Students should be encouraged to call home regularly and keep in touch with their families. A high level of family support can be used as a buffer against the influence of a high-stress reaction to prevent the development of depression (Admissions.usf.edu, n.d.). However, it should be noted that family support and perfect family functioning depend more on objective characteristics related to family socioeconomic status, such as parents' level of education (Vieira, 2021). Family emotional support can significantly alleviate the symptoms of depression when the perceived stress reactivity is low, but when the individual shows a high level of the perceived stress response, the effect of

family emotional support in preventing depression will be greatly reduced.

The university can also play a role in curbing depression. It can run programs, provide leisure hours, and conduct games and cultural activities regularly. Some studies have indicated that the implementation of related courses and projects in universities, such as resilience programs (including goal-building, mindfulness, and resilience skills) might be effective in improving college students' mental health.

Apart from help from family and universities, the individual must take into consideration that his or her efforts play a major role in curbing depression. Studies have shown that healthy lifestyles, including proper physical exercise, healthy sleep and diet, and regular sun exposure, can help prevent or reduce the occurrence of depression in college students (XU, 2016). Studies have suggested that students with a consistent sleep schedule and sufficient sleep duration are less likely to suffer from depression. Meanwhile, regular sun exposure aids in the synthesis of vitamin D in the body, which is crucial to release fatigue and changing the negative moods that individuals with mild or moderate depression may experience (Yusoff, 2013). Hence, Sleep deprivation must be considered one of the major factors leading to depression.

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Ethical Approval: Clearance was obtained from the KVIMS Institutional Ethical Committee and consent was sought from the participants.

Conflicts of Interest: None declared.

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