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**Original Research Article**

# Sleep disturbances and its associated factors among the college students in Tamil Nadu- a cross sectional study

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## ABSTRACT

**Background:** The key building block of good health is sleep. According to sleep foundation the term sleep disturbance is defined as a disruption in sleep that causes arousal or awakening. Sleep disturbances is a widespread common health problem among university students who are entering into adulthood. The present study was done with the objective of finding the prevalence of sleep disturbances among the college students studying in university of Tamil Nadu.
**Methods:** This was a cross sectional study done among 536 participants, whose sleep disturbances were assessed using pre-tested, pre-designed questionnaire. Descriptive and Analytical statistics were used. Analytical statistics was done using Chi-square test and binominal logistic regression.
**Results:** Out of 536 students, 299 (55.78%) were suffering from sleep disturbances among which 70.9% were females and 83% of them had less than 1 hour time gap between screen time and their regular sleep. There was a significant association between sleep disturbances and repeated worrying about lots of tests, feeling lost something in life, felt badly about pandemic/online teaching, felt isolated and often taking food out of hostel/home.
**Conclusions:** This study showed that majority of college students suffer from sleep disturbances, as their stress levels goes up and their physical activity goes down.

**Keywords:** Exercise, Fried foods, Sleep disturbances, Students, Worried

## INTRODUCTION

The key building block of good health is sleep, but the terminology surrounding it can make it difficult to comprehend how it functions and how to sleep well.[1] According to sleep foundation the term sleep disturbance is defined as a disruption in sleep that causes arousal or awakening.[1] Sleep disturbances is a widespread common health problem. Numerous sleep issues are covered under this, such as difficulty falling or staying asleep, early morning awakenings, brief periods of sleep, excessive daytime sleepiness, etc.[2-5] Because of the abnormally low quantity and poor quality of sleep (QoS), sleep disruptions are recognized as physical and psychological states that have a number of negative impacts.[6] In general, most adults needed 8 to 10 hours of sleep per night from ages 14 to 17 and 7-9 hours of sleep per night from ages 18 to 25.[7]

According to epidemiological surveys, the incidence of sleep disruption in the general population ranges from 8.3 to 45% worldwide.[4] Approximately one third of adults in the United States reported not receiving enough sleep or rest each night, according to the Centers for Disease Control and Prevention.[8] Nearly 40% of adults claim to unintentionally nod off during the day at least once each month. The National Sleep Foundation reports that 59% of adults between the ages of 18 and 29 consider themselves night owls.[9] The prevalence of sleep disorders among Indians ranges from 1.64% to 3.42%.[9]

University students, who are aging out of adolescence and entering adulthood, typically face a variety of difficulties,

including adjusting to new social situations, moving away from home, managing intense academic and social pressures, and having erratic schedules. All of these factors may increase the risk of sleep disturbances.[10] The feminine gender, lower education level, low socioeconomic status, and lifestyle factors like drinking alcohol etc. have all been linked to sleep disruptions in several research.[11] Studies have found that sleep disorders increase the likelihood of accidents, tension in relationships, and poor attention.[12,13] People with excess or little sleep were found to have higher mortality rates.[14] Adolescents and young people appeared to be more at risk. Studies on the topic are primarily conducted in western nations, and there is relatively little literature on the subject in India.[15]

There have been conflicting reports regarding the prevalence of sleep disorders among college students. Notably, gender, financial level, and cultural factors all affect the prevalence of these illnesses. In a study, roughly 30.7% and 13.6% of college students, experienced restless leg syndrome and obstructive sleep apnea respectively.[16] However, according to other researchers, the prevalence of these illnesses related to sleep is, 8% and 4% respectively.[17] Additionally, narcolepsy and nightmares are allegedly more prevalent in women than men.[16]

In order to determine the extent of sleep disturbance among college students as well as to identify numerous risk factors and health issues connected to it, this research was designed. In the present study, we aimed to find out the prevalence of sleep disturbances among college students attending Annamalai University (AU). The aim of the study is to find out the prevalence of sleep disturbances and its associated factors among the college students of Annamalai University, Chidambaram, Tamil Nadu.

## METHODS

### *Study population*

All undergraduate and postgraduate students who studied in Annamalai University during the study period of November 2021 to January 2022.

### *Sample size*

As this article was done as a part of dissertation work on "prevalence of obesity among college students of the age group 18-25 years in Annamalai University- a cross sectional study", the prevalence rate of obesity was found as 25.5% in Tamil Nadu as found in study by Karthick et al.[18] Sample size was determined by using a single proportional formula based with 95 % confidence interval and relative precision of 15%, required sample size for the study was estimated using the formula $n = Z\alpha^2*(1-p)/e^2*p$, where p = prevalence, e = relative precision, Zα = 1.96. The sample size obtained was 498, with 5% non-response rate adjusted sample size was calculated as 530.

### *Study area and period*

This cross-sectional study was conducted at Annamalai University, Chidambaram, Tamil Nadu for a period of 3 months from 1st November 2021 to 31st January 2022. Ethical committee approval was obtained from institutional ethics committee. Informed consent was obtained from all the study participants.

### *Study tool and procedure*

Among various departments of Annamalai University, four departments (diploma Agri, B.Sc. Agri, MBBS, BOT/BPT,) were randomly selected by lottery method (Figure 1). A total of 536 students of randomly selected departments participated in an in-class survey and completed a pre-tested, pre-designed questionnaire which consists of 35 items, including information about socio-demographic characteristics, dietary behaviours, psychosocial factors, physical activity and perceived quality of sleep of the subjects.

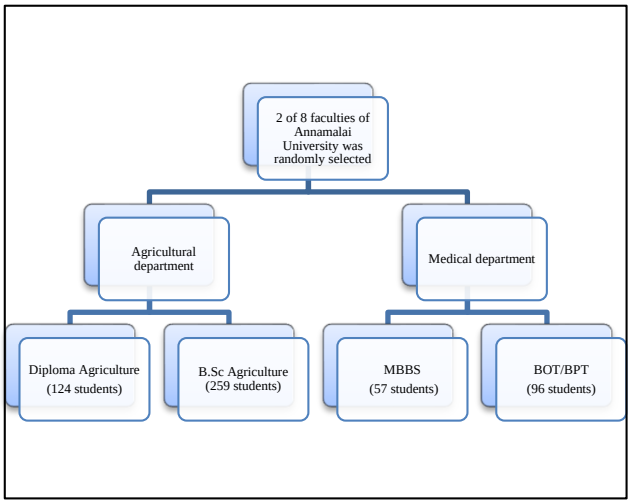


**Figure 1: Flow chart of study procedure.**

### *Sociodemographic factors include age, sex, religion, education, residence and nature of stay*

Dietary behaviours include frequency of intake of sweetened beverages, sweets, fried foods, high salted snacks, sugar/honey, fruits/salads, sprouted pulses/ vegetables, saturated fats, refined foods and ghee/butter/cream.

Psychosocial factors include frequency of worrisome about death of a family member, test/exams, isolation, breaking up relationship, lost something in life, not able to cope up, arguments/fights, projects/research due, thoughts of future, and felt bad about pandemic/online teaching.

Physical activity was assessed using global physical activity questionnaire (GPAQ) which includes vigorous, moderately vigorous physical activity and sitting/ reclining time.

Sleep disturbances was assessed by framing questions based on Perceived sleep quality index (PSQI) including subjective sleep quality, sleep latency, sleep duration, and screen time, time gap between sleep and screen time was used to assess sleep disturbances. Each variable was graded from 0 to 3 Likert scale and total score was calculated. Score above 5 had sleep disturbances and below 5 had no sleep disturbances.

### *Statistical analysis*

Data was entered in Microsoft excel (version 2019) and imported into IBM SPSS (Version 20). Descriptive and analytical statistics were applied. Categorical variables were expressed as proportion and percentage while continuous variables were expressed as median and interquartile range. Chi-square test and binominal logistic regression was used for analytical statistics. All p values were two-tailed and considered significant if <0.05.

## RESULTS

Out of 536 study participants, 70.3% were females and 29.7% were males. The mean age of the students was 19.90±1.5 (mean±SD) where the youngest students was 18 years and the eldest one was 24 years old. About 299 (55.78%) of the study participants were suffering from sleep disturbances which favours 70.9% females (Figure 2).

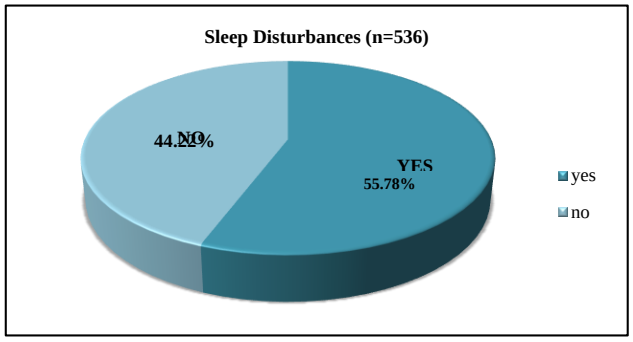


**Figure 2: Prevalence of sleep disturbances among the study participants.**

**Table 1: Association of sleep disturbances with other variables.**

| Variables | | Sleep disturbances | | Chi square value ($\chi^2$) | df | P value |
|---|---|---|---|---|---|---|
| | | Present (%) | Absent (%) | | | |
| **Age (in years)** | 18-20 | 185(52.1) | 170 (47.9) | 5.743 | 1 | 0.017* |
| | 21-25 | 114(63) | 67 (37) | | | |
| **Exercise regularly** | Yes | 63 (46.3) | 73 (53.7) | 6.612 | 1 | 0.010* |
| | No | 236 (59) | 164 (41) | | | |
| **Sitting/reclining category (in minutes)** | Less than 180 | 45 (45.9) | 53 (54.1) | 6.182 | 2 | 0.045* |
| | 181-480 | 213(59.3) | 146 (40.7) | | | |
| | 481-720 | 41 (51.9) | 38 (48.1) | | | |

**Table 2: Association of sleep disturbances with psychosocial factors.**

| Independent variables | Dependent variables | | Percentage | | | | | Chi square value ($\chi^2$) | df | P value |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Never | Almost never | Sometimes | Fairly often | Very often | | | |
| **How often have you been worried about lot of tests** | Sleep disturbances | Yes | 55.6 | 32 | 49.3 | 58.3 | 65.4 | 21.099 | 4 | <0.001* |
| | | No | 44.4 | 68 | 50.7 | 41.7 | 34.6 | | | |
| **How often have you felt lost something in life** | Sleep disturbances | Yes | 36.4 | 57.8 | 51 | 59.1 | 75.2 | 30.905 | 4 | <0.001* |
| | | No | 63.6 | 42.2 | 49.0 | 40.9 | 24.8 | | | |
| **How often had your projects and research papers due** | Sleep disturbances | Yes | 58.5 | 54.7 | 53.5 | 61.0 | 51.7 | 1.972 | 4 | 0.741 |
| | | No | 41.5 | 45.3 | 46.5 | 39.0 | 48.3 | | | |
| **How often have you felt bad about pandemic/ online teaching** | Sleep disturbances | Yes | 55.3 | 55.7 | 63.4 | 42.1 | 57.6 | 10.840 | 4 | 0.028* |
| | | No | 44.7 | 44.3 | 36.6 | 57.9 | 42.4 | | | |
| **How often have you felt breaking up relationship** | Sleep disturbances | Yes | 50.7 | 59.7 | 56.1 | 52.7 | 75.8 | 8.772 | 4 | 0.067 |
| | | No | 49.3 | 40.3 | 43.9 | 47.3 | 24.2 | | | |
| **How often have you felt isolated** | Sleep disturbances | Yes | 52.3 | 43 | 50.3 | 64.2 | 69.7 | 20.008 | 4 | <0.001* |
| | | No | 47.7 | 57 | 49.7 | 35.8 | 30.3 | | | |

**Table 3: Association of sleep disturbances with dietary factors.**

| Independent variables | Dependent variables | | Percentage (%) | | | | | Chi square value ($\chi^2$) | df | P value |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Never | Almost never | Sometimes | Fairly often | Very often | | | |
| **How often do you eat high salt snacks** | Sleep disturbances | Yes | 61.4 | 50.8 | 55.2 | 57.8 | 39.3 | 7.070 | 4 | 0.132 |
| | | No | 38.6 | 49.2 | 44.8 | 42.2 | 60.7 | | | |
| **How often do you eat fried foods** | Sleep disturbances | Yes | 60.2 | 53.0 | 57.2 | 54.4 | 47.1 | 2.218 | 4 | 0.619 |
| | | No | 39.8 | 47.0 | 42.8 | 45.6 | 52.9 | | | |
| **How often do you eat sweets** | Sleep disturbances | Yes | 60.5 | 59.3 | 54 | 50 | 55.9 | 2.644 | 4 | 0.619 |
| | | No | 39.5 | 40.7 | 46 | 50 | 44.1 | | | |
| **How often do you eat out of hostel/home** | Sleep disturbances | Yes | 42.1 | 54.2 | 54.7 | 50.8 | 69.8 | 12.792 | 4 | 0.012* |
| | | No | 57.9 | 445.8 | 45.3 | 49.2 | 30.2 | | | |

**Table 4: Binary logistic regressions for sleep disturbances with significant variables.**

| Variables | Options | Regression coefficient | Significant p value | Adjusted odds ratio |
|---|---|---|---|---|
| **How often have you worried about loss of something in life?** | Never | - | 0.000 | 1* |
| | Almost never | 1.029 | 0.001 | 2.797 |
| | Sometimes | 0.670 | 0.027 | 1.955 |
| | Fairly often | 1.132 | 0.002 | 3.102 |
| | Very often | 1.732 | 0.000 | 5.651 |
| **How often have you exercise regularly?** | Yes | - | | 1* |
| | No | 0.696 | 0.002 | 2.005 |
| **How often have you taken food out of hostel/home?** | Never | - | 0.002 | |
| | Almost never | 0.502 | 0.217 | 1.651 |
| | Sometimes | 0.449 | 0.249 | 1.567 |
| | Fairly often | 0.394 | 0.321 | 1.482 |
| | Very often | 1.429 | 0.001 | 4.173 |
| **How often have you spent time in sitting/ reclining position** | Less 180 | - | 0.019 | 1* |
| | 181-480 | 0.677 | 0.008 | 1.968 |
| | More than 481 | 0.284 | 0.389 | 1.328 |
| **How often have you worried about lot of tests in your daily schedule?** | Never | - | 0.037 | 1* |
| | Almost never | -1.300 | 0.008 | 0.273 |
| | Sometimes | -0.535 | 0.189 | 0.586 |
| | Fairly often | -0.349 | 0.418 | 0.706 |
| | Very often | -0.227 | 0.585 | 0.797 |

Among the study participants, nearly 83% of them had less than 1 hour time gap between screen time and their regular sleep. 58.2% had sleep duration less than 7 hours. Among the study participants who had sleep disturbances, there was significant association between the age groups of 18-20 years and 21-25 years ($p<0.05$). It was found that sleep disturbance was also associated with less physical activity and extreme time intervals of sitting/reclining time category ($p<0.05$) (Table 1).

There was a significant association between sleep disturbances and repeated worrying about lots of tests, feeling lost something in life, felt badly about pandemic/online teaching, felt isolated and often taking food out of hostel/home ($p<0.05$) (Tables 2 and 3).

Binary logistic regression between sleep disturbances and significant factors showed that those students who very often worried about lost something in life had 5.6 times sleep disturbances when compared to those who had no sleep disturbances and this difference was statistically significant (p value<0.05). There was also statistical significance between sleep disturbances and no periodic exercises, 181-480 minutes of sitting/reclining time. ($p<0.05$) There was significant inverse association between students who almost never worried about lot of tests had sleep disturbances. ($p<0.05$) (Table 4).

## DISCUSSION

This cross-sectional study was done with an objective of finding out the prevalence of sleep disturbances and its

associated factors among the college students of Annamalai University, Chidambaram. Prevalence of sleep disturbances in this study was found to be 55.78%. Overall, prevalence data have shown a steady tendency in favor of college students reporting short sleep duration and poor sleep quality.[19] Although the national sleep foundation advises college students to get seven to nine hours of sleep per night, the current study found that more than half were sleeping, on average, less than seven hours per night, suggesting that college students are frequently reporting difficulty in getting the advised amount of sleep.[20] The average amount of sleep each night for Korean University students was 6.7 hours, according to Ban et al.[12] While Ohida et al found that over 65% of Japanese students had slept for fewer than seven hours, 54% of Taiwanese teenagers slept for less time than was advised, according to Chen et al.[14,21]

More than half of the participants in the current study had some sleep disturbances while, Ohida et al reported subjective insufficient sleep in less than 40% Japanese adolescents of age group less than 19 years old.[22] Similarly difficulty in initiation of sleep was reported by less than 16% adolescents. Hence overall sleep disturbances observed by us were higher than observations of Ohida et al. But the age group of in the study of Ohida et al was adolescents, while age group in this study was higher (18-25 years).[22] Hence the difference in social life as well as use of social media may be the reason for observed difference.

Female preponderance in sleep disturbances was observed in current study similar to the findings of Korean University students by Ban et al, Japanese students by Ohida et al, Japanese general population by Ohida et al, adults from United States and in Hong Kong Chinese population by Li et al.[12,14,22-24] The prevalence of sleep disturbances in this study was found higher than elderly population in Taiwan as reported by Su et al which reflects the concern for younger generation.[25]

Although overall dietary behaviours like frequent intake of sweets, fried foods, high salted snacks has not shown to be significantly correlated with sleep duration in the current study, periodic eating outside home/hostel was found to be strongly correlated with sleep disturbances. This may be due to skipping of meals, intake of unhygienic foods or digestive problems. Faris et al has studied that eating habits and meal timing were significantly associated with sleep quality.[26]

The findings showed that overall sleep quality improves as physical activity levels rise. These results are in line with earlier studies showing that better sleep quality is a result of increased physical activity.[27] The level of physical activity in the present study was 25.3% which is similar to the findings of the study by Praveen et al.[28] Even though more physical activity seems to be associated with better sleep quality, it doesn't seem to result in more hours of sleep each night. College students may do better academically if they engage in more physical activity since it will enhance their sleep satisfaction and quality. Beneficial effects of exercise were appreciated by Urponen et al, Chen et al, Reid et al and Singh et al.[21,29-31] Participants who had regular exercise must be having overall healthy lifestyle that is why sleep disturbances are less common in them.

In the current study, we observed that worries about lost something in life or lot of tests, feeling isolated was significantly associated with sleep disturbances. Similar observations were made by Ohida et al.[22] Enjoying college life or feeling disinterested in life/depressed indicates the current mental health status; the positive relationship of mental health to sleep has been recorded.[32] Deborah et al found highly significant association of insomnia with life stress in Canadians.[13] While talking with parents' and discussing problems with parents may help in relieving stress and anxiety which in turn reduces sleep disturbances.

On considering use of media, we observed that, excessive screen time was associated in poor sleep. Similarly, over use of mobile phones for talking, messaging and internet was an important determinant of sleep disturbances. Van den Bulck, on investigating effect of media on sleep among Belgian adolescents concluded that, television, computer and internet all had effect on sleep.[33] He concluded that the unstructured leisure activities i.e. use of internet, not being time bound or having clear end point lead to decreased actual time spend in the bed; while structured leisure activities like sports did not hamper sleep pattern. Cain et al reviewed thirty six articles that investigated the relationship between sleep and electronic media in children and adolescents of age group 18 to 20 years; and observed that use of media was consistently associated with delayed bedtime and reduced sleep hours. They hypothesized that use of media may displace sleep or it may result in increased mental or emotional or physiological arousal or the exposure to bright light from television, computer etc. delay the circadian rhythm.[34]

This study has some limitations. Firstly, this study was based on a single institution, so the specific environment of this institution may have had an impact on the accuracy of the generalizability of the results. Secondly, due to the self-administered nature of the study tool, there is a possibility of biased reporting, leading to underestimated results.

## CONCLUSION

This study showed that the college students experience sleep disturbances as their stress levels are elevated, reduced physical activity and frequent intake of foods out of home/ hostel. Hence in- campus health interventions such as counselling, regular mentor-mentee system, providing high quality food, and exercises should be

given high priority in promoting healthy self-care behaviours in relation to sleep.

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