Research Article

Effect of stress on sleep quality in young adult medical students: a cross sectional study

Renu Lohitashwa[1]*, Ningamma Kadli[1], Ravikiran Kisan[2], Sindhuja A[1], Dileep Deshpande[1]

[1]Department of Physiology, SSIMS & RC, Davangere, Karnataka, India
[2]Department of Physiology, KIMS, Madikeri, Kodagu, Karnataka, India

*Correspondence:
Dr. Renu Lohitashwa,
E-mail: renukusagur@gmail.com

ABSTRACT

Background: Because of demanding clinical and academic duties, medical students are at an increased risk for development of sleep disruption. Studying the relation between sleep quality and psychological stress can be useful in implementing an organized mental health program in medical colleges. The main objective is to study the prevalence and the effect of stress on sleep quality in young adult medical students.
Methods: A cross sectional study to recognize the effect of stress on sleep quality among 50 medical students. The instruments used for data collection were a self-report Pittsburg Sleep Quality Index (PSQI) and the General Health Questionnaire (GHQ).
Results: Results of present study showed that 58% of subjects were poor sleepers. Furthermore, there was a significant correlation between general health status and sleep quality of students (r = 0.5118, p = 0.0001).
Conclusions: A considerable proportion of medical students are affected by poor sleep quality. Sleep disruption acts as a barrier for students' performance in examinations. So, it is important to implement health promotion and educational programs for them.

Keywords: Psychological distress, Sleep quality, General health, Medical students

INTRODUCTION

One of the important physiological processes in humans is sleep. The study of sleep quality includes measurement of both quantitative and qualitative components. Quantitative components of sleep measures the duration of sleep whereas qualitative component assesses the subjective measure of the depth and feeling of restfulness upon awakening.[1] Studies have shown that sleep deprivation causes serious health hazards.[2] Some studies have linked reduction in sleep duration and sleep quality to changes in life style, increased work and social demands and also excess use of technology.[3]

Research done among university students[4–6] have resulted in high prevalence estimated (≥40%) of short sleep duration (<7 hours) and poor sleep quality as considered by PSQI.[2] Sleep duration and sleep quality are usually expected to vary by age and gender. Studies have shown an association between increased age and poor sleep quality.[7] Other studies have also identified female students having amplified risk of poor sleep quality.[8,9]

Studies done on university students have reported that stress, anxiety and depressive symptoms are common psychological correlates found among them[10,11] and there is a direct relationship between sleep quality and academic performances. Studies have shown sufficient

sleep and shorter sleep latency lead to higher academic performances and insufficient sleep lead to fatigue, concentration and attention disturbances. Sleep deprivation also results in school absenteeism and suppression of other cognitive functions like abstraction and problem solving.[12]

Medical students are a group who have high risk for sleep deprivation because of demanding clinical duties and academic expectations. Along with this they have to accept the change in their living style like poor housing, staying away from their family. The above mentioned factors put them at a greater risk of reduced sleeping and affect their physical and mental activities.

The objective of this study was to evaluate the prevalence and correlation of sleep quality and general health in young adult medical students.

METHODS

A cross sectional study was conducted in a medical college. Study participants were MBBS students. The study was approved by the institute's ethical committee.

We planned for purposive sampling, so our sample size was 50(25 boys and 25 girls). They were invited to meet in their classroom where they were informed about the purpose of the study and asked to participate in the study. Informed written consent was obtained from all the participants.

Data collection

A self-administered questionnaire was used to collect information for this study. PSQI is a self-rated questionnaire which helps to assess the sleep quality for the past 1 month. It has 19 self-rated questions and 5 other questions which are to be answered by the bed partner or room partner. The last 5 questions (rated by bed partner or roommate) of the scale do not contribute to the PSQI scoring, so these were not included to get the global score. The 19 questions assess various factors related to sleep quality. The questions are again grouped into 7 component scores and all are reflected equally on a 0 – 3 scale. These components are: sleep quality, sleep latency, habitual sleep efficiency, sleep disturbances, use of sleep medications and daytime dysfunction. Questions 1- 4 was based on estimations for the past and they included "bed time", "number of minutes to fall asleep", "getting up time" and "hours of sleep per night". While questions 5 to 10 was based on a score ranging from 0 - 3 points (0 - Not during the past month, 1 - Less than once a week, 2 - Once or twice a week, 3 - Three or more times a week). The seven component scores were added to yield a global PSQI score ranging from 0 - 21. Higher the score, worst is the sleep quality. A global score of more than 5 indicates poor sleep quality in the person for the last 1 month.[1]

GHQ 12[13] consists of 12 questions designed for evaluating the general health in the past month. For each item, the participants were asked to rate their level of general health on a four point scale (0 - more than usual, 1 - same as usual, 2 - less than usual, 3 - much less than usual). Six items were reversed (0 - not at all, 1 - no more than usual, 2 - rather more than usual, 3 - much more than usual) and the total score was summed for all 12 items for each participant and the final score would be from 0 to 36. A global score of >15- 19 indicates evidence of stress and score >20 signals sever problem and psychological distress in the past month.

Statistical analysis

Statistical analysis was done using SPSS software for analysing the general description of the questionnaires results and comparison of the score of girls and boys groups. A confidence interval of 95% was achieved with 0.05 level of significance. Association between PSQI and GHQ 12 was assessed using chi square test, regression model and Pearson correlation coefficient.

RESULTS

A cross sectional study was conducted to find out the effect of stress on sleep quality in young adult medical students. The data was collected from 50 medical students (25 girls & 25 boys) enrolled among first year medical students.

Of all the subjects, 58% were grouped as poor sleepers with global PSQI score >5. Most of the students described their sleep quality as very good to fairly good as shown in Table 1. As regards with the gender differences, boys suffered from poor sleep quality when compared to girls. Boys had a tendency to go to bed sooner, they fell asleep later, had shorter sleep duration and less habitual sleep efficiency, while girls had more day time dysfunction because of more sleep disturbances as in Table 1.

According to the results of GHQ 12, 66% of all students had poor general health. The distribution between boys and girls was 60% and 72% respectively with significant difference (p <0.05) and 66% of the girls suffer from severe problem and psychological distress when compared to only 20% of boys.

General health was affected in both good sleepers and poor sleepers. But severe problems and psychological distress was more significant in poor sleepers when compared to good sleepers as shown in Table 2.

The relationship between the quality of sleep and the general health was significantly positive (r = 0.199 &p <0.05) as shown in figure 1.

Frequency of using sleep medications at least once a week was significantly affected in students with severe

problem and psychological stress (n = 2) when compared to students suffering from stress alone. Sleep disturbances and more frequent daytime dysfunction were also high in students with severe problem and psychological stress as shown in Table 3.

Table 1: Results of PSQI according to gender and in all students.

PSQI items	Statistical characters	Boys	Girls	Total
Time of going to bed (hrPM)	Mean (±SD)	10.86 + 0.78 *	11.28 + 0.52 *	11.09 + 0.68
Time of getting up (hr AM)	Mean (±SD)	6.13 + 1.2	6.13 + 0.78	6.13 + 0.99
Subjective sleep quality (%)	Frequency of very & fairly good state	75%	80.76%	78%
Sleep latency (min)	Mean (±SD)	18 + 15.07	15.38 + 12.48	16.64 + 13.7
Sleep duration (hr)	Mean (±SD)	6.77 + 1.13	6.37 + 0.87	6.56 + 1.13
Habitual sleep efficiency	Mean (±SD)	92.4 + 9.48	93.04 + 8.03	92.73 + 8.67
Sleep disturbances (%)	Frequency of at least once a week	20.83%	34.16%	28%
Use of sleep medications (%)	Frequency of at least once a week	4%	4%	4%
Daytime dysfunction (%)	Frequency of at least once a week	37.5%*	53.84% *	46%
Poor sleep quality (%)	Frequency of $\geq$ 5 global score	58.33%	57.69%	58%

*p <0.05 significant

DISCUSSION

There is always an increased risk for deprivation of sleep with mental and physical morbidity because of working on a tight schedule and changes in pattern of sleep wake cycle. Studies done on professionals working in a tight schedule have shown an elevated percentage of errors during work because of partial sleep deprivation. Sleep deprivation leads to a variety of neurophysiological and psychological imbalances like decreased alertness and mood variations which have direct effects on an individual's performance. Investigators have seen a direct correlation between insomnia and sleep disruption due to stress with development of depression in medical students.[14]

Table 2: Frequency of stress and severe stress in good and poor sleepers.

	Score 15 – 19 Evidence of stress	Score > 20 Severe problems & psychological distress
PQSI $\leq$5	66.67% *	33.33% *
PQSI >5	47.61% *	52.39% *

In our study, we found a high prevalence of poor sleep quality (58%) among medical students. Researchers in United States have found that 16.3% of adolescents, 25.9% of adults older than 18 and 71% of college students suffer from at least one type of sleep problems.[15,16] While in China 16.9% of adolescents suffer

from sleep disturbances and in Taiwan it has increased upto 40%.[17,18]

A longitudinal study that followed up adolescents from early adolescents to young adulthood discovered that, the proportion of subjects reporting of not attaining sufficient sleep ranged between 54% and 75%.[19] The possible causes could be because of variations in social and physical developments, emotional and behavioral harms, substance use and misuse by this age group.[20]
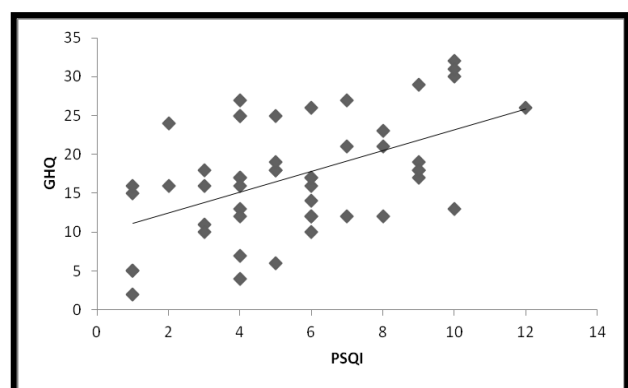

Figure 1: Correlation between PSQI and GHQ 12 scores.

Adolescents living in a developing country like India can have an exaggerated responsibility in increased prevalence of poor sleep quality among them. Along with that, some factors like psychiatric illness and high dominance of poor general health quality among

participants can contribute towards an increased prevalence of poor sleep quality. In future, studies enquiring about etiology can simplify the reasons for such a high prevalence of poor quality of sleep.

Table 3: Differences between students with evidence of stress and severe psychological distress expressed in terms of PSQI components.

PSQI components	Statistical characters	GHQ - 15 to 19 N= 18	GHQ ≥20 N = 15
Subjective sleep quality	Frequency of very and fairly good state	14 (77.78 %)	11 (73.34 %)
Sleep latency	Minutes mean ± SD	17.33 ±13.6	17.34 ± 14.98
Sleep duration	Hours mean ± SD	6.75 ± 1.46	6.25 ± 0.9
Habitual sleep efficiency	Mean ± SD	94.66 ± 7.66	92.32 ± 8.76
Sleep disturbances	Frequency of at least once a week	4 (22.22 %)	7 (46.67 %)
Use of sleep medications	Frequency of at least once a week	0	2* (13.33%)
Daytime dysfunction	Frequency of at least once a week	7 (38.89 %)	12 (80%)

*p < 0.05 significant

As a matter of fact, practically analyzing the impression of poor sleep quality on school functioning and screening students for sleep problems by education system plays an important role, mainly in those students who are poor performers.

In our study, we have found a significant difference between the subjective and objective measures of sleep quality. From the subjective component, 78% of the subjects reported their subjective sleep quality as very good or fairly good and 4% of them were on sleep medications. Simultaneously from the objective component, the results from PSQI revealed that 58% of all the subjects had poor sleep quality and 46% had daytime dysfunction.

This difference in results can be explained by some possibilities: Firstly, the subjects were unaware that their symptoms had a relation to the kind of sleep problem. So they reported that their sleep quality was well or very well. Secondly, we have to consider both subjective and objective assessments of sleep quality while assessing poor sleep quality. Because these two are moderately interrelated and that subjective component partly may reflect an individual's opinion or state of mind in addition to some components in their objective sleep patterns. Finally, it could be because of unreliable answers given by subjects.

Our research also revealed a close correlation between self-assessed quality of sleep and self-assessed general health. These finding gives an idea that sleep quality can be used as one of the indicator for general health. This correlation is consistent with the studies that advise a two way connection between sleep and general health statuses of adolescents, in which anyone can be the cause or result of the other.[20]

CONCLUSION

In our study greater part of medical students reported poor quality of sleep. This should be an important alarm to educators. This could be because of inadequate sleep hygiene behaviors for general population to protect sleep in medical students. In future studies can be planned on medical students with comparison to local populations and also studies including screening of individual (e.g., anxiety, depression, sleep attitudes) and school-related (e.g., academic schedule) risk factors with objective sleep outcomes. We can also try to improve quality of sleep in medical students by including sleep hygiene education programs in their curriculum.

Our finding also recommends the health system to try and increase the general public's knowledge about sleep health with the help of media, and also the physicians should try to assess sleep problems in detail and utmost care. There is also requirement for training sleep specialists.

Limitations:

We have some limitations in our study. We did not explore the possible causes of poor sleep quality and poor general health. Both PSQI and GHQ 12 assess participants during the past month, we could not discriminate acute and chronic problems. There are studies showing correlation between results of PSQI and sleep laboratory studies, but in our study such laboratory investigations were not applied.

REFERENCES

1. Buysse DJ, Reynolds CF, Timothy HM, Susan RB, David JK.The Pittsburgh sleep quality index: a new instrument for psychiatric practice and research. Psych Res. 1988;28:193-213.
2. Lavie P, Pillar G, Malhotra A.Sleep disorders: Diagnosis, management & treatment, A hand book for clinicians. London: Martin Dunitz Ltd; 2002.
3. Chokroverty S.Sleep disorders medicine: Basic science, technical considerations, and clinical aspects. 3rd edition. Philadelphia: Saunders, an imprint of Elsevier Inc. 2009.
4. Taylor DJ, Bramoweth AD. Patterns and consequences of inadequate sleep in college students: substance use and motor vehicle accidents. J Adolesc Health. 2010;46:610-12.
5. Steptoe A, Peacey V, Wardle J.Sleep duration and health in young adults. Arch Intern Med. 2006;166:1689-92.
6. Lund HG, Reider BD, Whiting AB, Prichard JR: Sleep patterns and predictors of disturbed sleep in a large population of college students. J Adolesc Health. 2010;46:124-32.
7. Alex D, David A. Adolescence sleep disturbances as predictors of adulthood sleep disturbances—a cohort study. J Adolesc Health. 2010;46:482-7.
8. Suen LK, Hon KLE, Tam WW. Association between sleep behavior and sleep-related factors among univeristy students in Hong Kong. Chronobiol Int .2008;25(5):760-75.
9. Cheng SH, Shih C-C, Lee H, Hou Y-W, Chen KC, Chen K-T et al. A study on the sleep quality of incoming University students. Psych Res. 2012;197(3):270-4.
10. Hsieh Y-H, Hsu CY, Liu CY, Huang TL. The levels of stress and depression among interns and clerks in three medical centers in Taiwan- a cross sectional study. Chang Gung Med J. 2011;34:278-85.
11. Sreernamareddy CT, Shankar PR, Binu V, Mukhipadhyay C, Ray B, Menezes RG. Psychological morbidity, sources of stress and coping strategies among undergraduate students of Nepal. BMC Med Educ. 2007;7:26.
12. Wolfson AR, Carskadon MA. Schedulues and day time funcyioning in adolescents. Child development. 1998;69(4):875-87
13. EHS M270: Work and Health, Spring 2007. Available from: URL: http://www.workhealth.org/UCI%202007/practicum%2008%20GHQ%202007.pdf
14. Sahraian A, Javadpour A. Sleep disruption and its correlation to psychological distress among medical students. Shiraz E-Medical Journal. 2010;11(1):12-7.
15. Strine TW, Chapman DP. Associations of frequent sleep insufficiency with health related quality of life and health behaviors. Sleep Med. 2005;6(1):23-7.
16. Hicks RA, Fernandez C, Pellegrini RJ. Striking changes in the sleep satisfaction of university students over the last two decades. Precept Mot Skills. 2001;93(3):660.
17. Yang CM, Wu AH, Hsieh MH, Liu MH, Lu FH. Coping with sleep disturbances among young adults: a survey of first year college students in Taiwan. Behav Med. 2003;29(3):133-8.
18. Strauch I, Meier B. Sleep need in adolescents: a longitudinal approach. Sleep. 1988;11(4):378-86.
19. Wolfson AR, Carskadon MA. Schedules and day time functioning in adolescents. Child Development. 1998;69(4):875-87.
20. Roberts RE, Roberts CR, Chen RG. Impact of insomnia on future functioning of adolescent. J Psychosom Res. 2002;53(1):561-9.