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Original Research Article

Sleep quality among medical students in Moradabad, Uttar Pradesh, India

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ABSTRACT

Background: Good quality sleep is necessary for overall health. Especially medical students are more prone to have sleep difficulties and with this context present study was done to assess the sleep quality among medical undergraduate students.
Methods: This cross-sectional study was conducted among undergraduate students of a medical college in Moradabad, during April to May 2019. Assessment of sleep quality was done by means of self-administered questionnaire based on sleep quality scale. Data was analysed with help of SPSSv21 and statistical tests used were Welch t-test, Chi square test and logistic regression analysis.
Results: Mean age of all 149 students was 20.99±0.91 years and mean sleep quality score of all students was 37.90±9.73. Overall 29.53% students had poor sleep quality scores. 8.7% students always have difficulty in falling asleep and 32.9% students were rarely satisfied with their sleep. Poor sleep quality has not been found to be significantly associated with age, gender, BMI and level of physical activity.
Conclusions: Sleep quality vary considerably among medical students and approximately one third of medical students had poor sleep quality. Sleep quality scale used has been found reliable.

Keywords: Medical, Quality, Sleep, Students

INTRODUCTION

Good quality sleep is essential for good health and approximately one third of human life span is spent in sleeping.[1] However sleep quality has consistently been found deteriorating due to lifestyle changes, stress, environmental disturbances and modern technologies. According to WHO at single instant, as many as 50% of adults suffer from one or more sleep disorders globally and for 13% they are severe with significant morbidities.[2] Nearly one-fifth of apparently healthy Indian population in age group 16 to 55 years have difficulties in adhering to a consistent sleep-wake schedule.[3] Therefore assessment of quality of sleep is imperative particularly for susceptible ones like medical students to know the extent of problem and its prevention. Medical students because of busy academic and clinical schedules are vulnerable for poor quality of sleep which results in difficulties in concentrating and learning, and can potentially affect cognitive functions leading to psychiatric morbidities.[4]

Sleep is a subjective experience and its quality therefore can best assess by using subjective self-reported questionnaires. Sleep quality scale (SQS) developed by Hyeryeon et al is one such available scale for assessment

of sleep quality which measures five different domains including difficulties in falling asleep, maintaining sleep, getting up and restoration after sleep and satisfaction with sleep.[5] Using this scale present study was done to assess sleep quality among medical students in Moradabad.

METHODS

This cross-sectional study was conducted among undergraduate students of a medical college in Moradabad during April to May 2019. All second- and third-year students were asked to participate and were required to complete the given predesigned structured self-administered anonymous questionnaire during specific sessions to assess their quality of sleep during preceding month. Based on sleep quality scale (SQS) developed by Hyeryeon et al, the decoded questionnaire was simple to administer and well understood by the respondents.[5,6] SQS is a comprehensive self-reported measure to assess different subjective aspects related to sleep quality and has been found valid and reliable for use among varied research populations aged 18-59 years.[5] SQS consists of 28 items evaluating six domains of sleep quality including daytime symptoms, restoration after sleep, problems initiating and maintaining sleep, difficulty waking, and sleep satisfaction. SQS is also strongly correlated with results obtained on the Pittsburgh sleep quality index.[5] Besides questions related to sleep quality other self-reported particulars in questionnaire were age, gender, body mass index (BMI) and level of physical activity of students. For assessing physical activity, a dichotomous variable was created based on global physical activity questionnaire and students were categorized on basis of number of days in a typical week in previous month, they did moderate/vigorous intensity activities including sports, fitness or recreational activities for at least 10 minutes continuously.[7] Informed verbal consent was taken and students were assured of anonymity and confidentiality of ingenuous responses. Exclusions included incompletely filled questionnaires and the students who refused to participate in study. Subjective answers to 28 items of SQS were recorded on a four ranked Likert scale as rarely, sometimes, often and always, representing the frequencies experienced for a particular question during previous month respectively as 0-3 times/month, 1-2 times/week, 3-5 times/week and 6-7 times/week.[6] Responses as rarely, sometimes, often and always were respectively scored as 0, 1, 2 and 3. Reverse scoring was done for 8 items out of total 28 items, which were positively correlated with good sleep quality and included in domains of restoration after sleep and satisfaction with sleep. Finally, the total score for each student was calculated by summing up scores on all 28 items. Total scores can range from minimum 0 to maximum 84, with higher scores indicating poorer sleep quality. For determining frequency of poor-quality sleep, the scores above median obtainable score of 42 were considered as poor.

Completely filled 149 questionnaires were finally included in analysis. Data was analysed using SPSSv21. Statistical analysis was done with help of Welch t-test, Pearson's correlation, Chi square test and logistic regression. Two tailed $p<0.05$ considered significant. Scores obtained for all 28 items in present study had Cronbach's alpha reliability coefficient of 0.725.

RESULTS

Mean age of all 149 students was 20.99±0.91 years ranging between 19 to 23 years. Mean sleep quality score of all students was 37.90±9.73 ranging from 13 to 61. There were 85 (57.05%) female students and 64 (42.95%) male students in this study. Mean sleep quality scores among female and male students were 36.42±11.007 and 39.85±7.45 respectively. Shapiro-Wilk test ($p>0.05$) and boxplot revealed that sleep quality scores were distributed normally for both male and female students with mean score slightly higher among males as compared to females with greater variance among females. Levene's test for equality of variances was significant indicating significant difference in score variance among males and females. Welch's t test showed that difference between mean sleep quality scores among male and female students was not statistically significant (Table 1, Figure 1).

Table 1: Mean sleep quality scores among male and female students (n=149).

Gender	Mean sleep quality scores±SD	Welch's t-test*	P value (2 tailed)
Females	36.42±11.007	-1.650	0.103
Males	39.85±7.451		

*unequal variances.

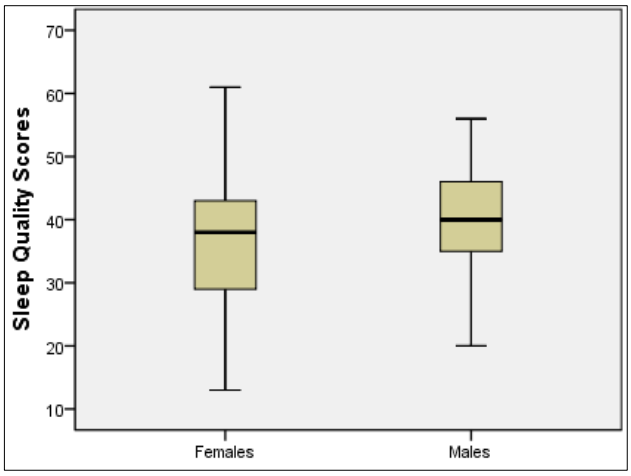

Figure 1: Sleep quality scores among male and female students.

Eight items of given scale were related to satisfaction and restoration after sleep, and therefore subjected to reverse scoring. 13 (8.7%) students responded that they had

rarely fell into deep sleep and 24 (16.1%) had rarely felt refreshed after sleep. 41 (27.5%) students responded that their sleep hours are rarely enough and in 25 (16.8%) fatigue is rarely relieved after sleep. 49 (32.9%) students were rarely satisfied with their sleep and 26 (17.4%) felt they rarely had clear head after sleep (Table 2).

Table 2: Sleep quality scale items considered for reverse scoring and corresponding rare frequency among students (n=149).

Items for reverse scoring (satisfaction, restoration after sleep)	Frequency (%) of students responded 'rarely'
Fall into deep sleep	13 (8.7)
Feel refreshed after sleep	24 (16.1)
Feel unlikely to sleep after sleep	56 (37.6)
Sleep hours are enough	41 (27.5)
Feel vigorous after sleep	46 (30.9)
Fatigue relieved after sleep	25 (16.8)
Satisfied with sleep	49 (32.9)
Clear head after sleep	26 (17.4)

Table 3: Sleep difficulties among medical students (n=149).

Sleep difficulties	Frequency (%) of students responded 'always'
Have difficulty in falling asleep	13 (8.7)
Wake up while sleeping	10 (6.7)
Have difficulty getting back to sleep once wakeup in middle of ni	20 (13.4)
Wake up easily because of noise	42 (28.2)
Toss and turn	28 (18.8)
Never go back to sleep after awakening during sleep	10 (6.7)
Poor sleep gives headache	49 (32.9)
Poor sleep makes irritated	55 (36.9)
Would like to sleep more after waking up	38 (25.5)
Poor sleep makes lose appetite	15 (10.1)
Poor sleep makes hard to think	32 (21.5)
Poor sleep makes lose interest in work/ others	47 (31.5)
Poor sleep causes to make mistakes at work	20 (13.4)
Poor sleep makes forget things more easily	20 (13.4)
Poor sleep makes hard to concentrate at work	35 (23.5)
Sleepiness interferes with daily life	29 (19.5)
Poor sleep makes lose desire in all things	22 (14.8)
Have difficulty in getting out of bed	38 (25.5)
Poor sleep makes easily tired at work	33 (22.1)
Poor sleep makes life painful	24 (16.1)

A total of 13 (8.7%) students responded that they always have difficulty in falling asleep and 10 (6.7%) always wake up while sleeping. Toss and turn during sleep was common among 28 (18.8%) and 10 (6.7%) responded that they never go back to sleep after awakening during sleep. 49 (32.9%) have always suffered headache due to poor sleep and appetite was lost among 15 (10.1%) students. Poor sleep resulted in mistakes at work and forgetting things easily among 20 (13.4%) students. 38 (25.5%) students always felt difficulty in getting out of bed and 33 (22.1%) felt easily tired due to poor sleep. In 29 (19.5%) students' sleepiness always interfered with daily life and 24 (16.1%) responded that poor sleep makes life painful always (Table 3).

Overall 44 (29.53%) students had poor sleep quality scores in present study. Majority of students 55 (36.92%) were 21 years of age followed by 47 (31.54%) below and 47 (31.54%) above 21 years respectively. Occurrence of poor scores has increased with increasing age and was 36.17% among students above 21 years age as compared to 29.09% and 23.40% among students aged 21 years and < 21 years respectively, with no statistically significant difference. Students above 21 years of age were approximately two times more likely to have poor sleep quality compared to those aged below 21 years (OR: 1.8; 95% CI: 0.7-4.5). 32.81% males had poor scores as compared to 27.06% females with no statistically significant difference. Male students were 1.3 times more likely to have poor quality sleep as compared to female students (OR: 1.3; 95% CI: 0.6-2.6). 112 (75.17%)

students had BMI ≤25 kg/m^2 and 37 (24.83%) were either overweight or obese with BMI >25 kg/m^2. Pearson correlation was not significant between BMI and sleep quality scores (r=0.12, p=0.27). Occurrence of poor scores was more common (35.14%) among overweight/obese students as compared to 27.68% among students with BMI ≤25 kg/m^2, however this difference was not significant statistically. Overweight/obese students were 1.4 times more prone for poor sleep quality compared to students with normal BMI (OR: 1.4; 95% CI: 0.6-3.1). 29.63% students with level of physical activity ≥5 days/week had poor scores for sleep quality as compared 29.27% students with level <5 days/week, with no significant difference (Table 4).

Table 4: Distribution and logistic regression analysis of poor sleep quality scores among medical students (n=149).

Characteristics	Frequency (%)	Poor sleep quality scores (%)	P value*	OR (95% CI)**
Age (in years)				
≤20	47 (31.54)	11 (23.40)	0.397	1
21	55 (36.92)	16 (29.09)		1.34 (0.55-3.27)
>21	47 (31.54)	17 (36.17)		1.85 (0.75-4.56)
Sex				
Females	85 (57.05)	23 (27.06)	0.446	1
Males	64 (42.95)	21 (32.81)		1.31 (0.64-2.67)
BMI				
≤25 kg/m^2 (normal)	112 (75.17)	31 (27.68)	0.389	1
>25 kg/m^2 (overweight/obese)	37 (24.83)	13 (35.14)		1.41 (0.64-3.12)
Physical activity				
≥5 days/week	108 (72.48)	32 (29.63)	0.966	1
<5 days/week	41 (27.52)	12 (29.27)		0.98 (0.44-2.16)

*Chi-square test, OR=Odds ratio, CI=Confidence interval, ** Reference category is first.

DISCUSSION

Sleep is a physiological state occurring in alternation with wakefulness and its quality is important for the quality of life. Sleep quality has direct influence on activities performed during waking as it plays important role in the recovery from exhaustion. Like non-communicable diseases, sleep related disorders are emerging health problem with some similar risk factors. According to International classification of sleep disorders, on basis of symptoms they are categorized as insomnia, hypersomnia, parasomnias, circadian rhythm sleep disorders, sleep-related breathing disorders and sleep-related movement disorders.[3] Assessment of quality of sleep is therefore imperative particularly for susceptible ones. Medical students because of busy academic and clinical schedules are vulnerable for poor quality of sleep which can potentially affect cognitive functions leading to psychiatric morbidities.[4] For assessment purpose use of available self-reported scales of measurement sufficiently provides important information about subjective problems related to sleep and consequent behavioral changes. In present study we have used comprehensive SQS which has good correlation with widely used Pittsburgh sleep quality index (PSQI).[5] In our study as well SQS has been found reliable with Cronbach's alpha for all items equal to 0.725.

In present study 29.53% students had poor quality sleep according to used scale cut-off. Similarly Rathi et al in Wardha found 32.53% of the medical students had poor sleep quality.[4] Kumar et al in Chennai found prevalence of insomnia among medical students to be 37%.[8] However Ibrahim et al reported high prevalence of poor sleep quality 70.4% among medical students in Saudi Arabia.[9] Variation may be due to use different measurement scale and target population. Nartiang et al in Mangaluru found sleep deprivation among 39% students of 11th and 12th grade, concluding lifestyle factors along with academic stress starts affecting sleep quality from this period.[10] It has also been found that poor sleep quality is possibly associated with personality trait-neuroticism in study from Wardha.[4] Sleep latency and daytime sleepiness have been found to be common among medical students according to previous studies.[11,12] In present study likewise 8.7% students always have difficulty in falling asleep and among 19.5% sleepiness always interfere with daily life. Much higher proportion is reported by Correa et al in Brazil where 36.9% medical students reported daytime dysfunction.[12]

Sleep is defined according to age and gender so should be the sleep quality. However, no significant gender differences in sleep quality have been found in present study which is similar to most of previous studies. Contrary to this Kumar et al in Chennai found insomnia significantly higher among males and Ibrahim et al found poor sleep higher among female medical students.[8,9] However variation in sleep quality was significantly more among females in present study. Although age range was small in present study, the occurrence of poor scores has increased with increasing age and students above 21 years of age were two times more likely to have poor sleep quality compared to those aged below 21 years. Contrary

to findings of present study Ibrahim et al found students ≤21 years had higher rates of poor sleep, which may be due to inadequate adaptation to study load.9 BMI is another important factor which has been found to influence sleep quality inversely in previous studies.[13-16] Similarly in present study overweight/obese students were 1.4 times more likely had poor sleep quality compared to students with normal BMI. In a systematic review moderate physical activity has been found impactful in sleep quality, however in present study sleep quality is not significantly associated with level of physical activity.[17]

CONCLUSION

Sleep quality vary considerably among medical students and approximately one third of medical students had poor sleep quality. Sleep quality scale used has been found reliable and suggested for further use. To improve quality of sleep, there is a need to give more of emphasis in identifying factors affecting quality of sleep and possible solutions to prevent any long-term consequences.

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