Sleep Quality among Medical Students at King Abdulaziz University: A Cross-sectional Study

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Abstract

Poor sleep quality and Excessive Daytime Sleepiness (EDS) can affect the performance of medical students, their future work as practitioners, and the whole health care system.

A cross-sectional study was done among 576 medical students who were selected through multi-stage stratified random sample. A standardized, confidential, self-administered data collection sheet was utilized. Pittsburg Sleep Quality Index (PSQI), Epworth Sleepiness Scale (ESS), and Hospital Anxiety and Depression Scale (HADS) were utilized. Descriptive, inferential statistics and multiple logistic regression analysis were done.

Results revealed that prevalence of poor sleep quality and EDS among medical students were 70.4% and 37.3%, respectively. Poor sleep quality was associated with students’ gender, age, high-Grade Point Average (GPA), anxiety, depression, EDS and drinking caffeinated beverages. Students with poor sleep quality had low ability to attend educational sessions. After controlling confounding, the first predictor of poor sleep quality was having anxiety. Those with morbid anxiety were about 4 times more liable to have poor sleep quality compared to others (aOR=3.92; 95% CI: 2.46-6.24). The second predictor of poor sleeping was enrollment in the basic academic years.

It is concluded that poor sleep quality was prevalent among medical students in KAU. Anxiety and enrollment in basic-years were the predictors. Screening programs for sleep disorders, anxiety, and depression among medical students are required. Sleep educational programs, stress management courses and lifestyles modifications are recommended.

Keywords: Sleep quality; Daytime sleepiness; Anxiety; Depression; PSQI; ESS

Introduction

Sleep medicine is an important medical discipline [1] which has gained a considerable attention nowadays [2]. Poor sleep quality is considered one of the most striking public health problems. The rates of poor sleep quality is increasing in both developing and modern societies [3,4]. It was estimated that the prevalence of sleep disorders among the general population ranged from 22%-65% [5,6].

Sleep deprivation may have grave health consequences: resulting in increasing disease morbidity and mortality. It was postulated that sleep deprivation may be associated with defect in the immune function, and may be implicated in the pathogenesis of psychological problems and metabolic problems (diabetes mellitus, metabolic syndrome and obesity) [7]. Attention and concentration difficulties were linked to poor sleep quality among students [8] as good sleep is essential for the best of neuro-cognitive functions, psychomotor performance, physical and mental health [4].

Medical students are vulnerable group to poor sleep 4. Studies showed that prevalence of poor sleep quality is higher among medical compared to non-medical students and the general population. Medical students are considered a stressful group of students [9,10] and this may be attributed to their extended study years, high academic load (long duration and high concentration), clinical duties, emotionally challenging work, and the highly demanding lifestyle [4].

Poor sleep quality and Excessive Daytime Sleepiness (EDS) may affect the performance of medical students [11] and their future work performance as practitioners. So, this can affect the health care system also [4]. Abdulghani et al. conducted a study in Riyadh and reported that 36.6% of their medical students had abnormal sleep habits [5]. Screening for poor sleep quality among medical students is an essential step for identifying the magnitude of the problem, and managing it. This can ultimately lead to improve the quality of patients’ care provided by upcoming future physicians [4].

Limited number of studies were done to determine sleep quality among a large sample of medical students from all grades in King Abdulaziz University (KSA), Jeddah, Saudi Arabia. So, it is necessary to explore this important issue among a big sample of students. The objective of the study was to identify the prevalence and predictors of...
poor sleep quality among medical students in KAU, Jeddah, Saudi Arabia.

Material and Methods

Ethical statement

The study was complied with standards of “Helsinki declaration”. The study proposal was approved by the Institutional Review Board (IRB) of KAU, with a Reference Number of 336-14. Approval for using PSQI was obtained from the author. Administrative approvals and participants' informed written consents were taken. A cross-sectional study was conducted among medical students who completed the freshman year, during 2015/2016. A multi-stage stratified random sampling technique (considering gender and academic year) was used. The sample size was calculated according to the formula [12]:

\[ n = Z^2 \times p \times q / d^2 \]

The total calculated sample was size 560 participants; \( Z=1.96, p \) was set as 0.37 (according to the recent study from Riyadh) [5], \( q=1- p=0.63 \), and \( d \) was set at 0.04.

A standardized, anonymous, confidential, self-administered data collection sheet was used. It inquired about personal, socio-demographic information, habits and educational achievement. Pittsburgh Sleep Quality Index (PSQI) self-rated scale, [13] the standardized ESS scale [14], and Hospital Anxiety and Depression Scale (HADS) [10] were used. All these scales had good validity and reliability [10,13,14]. Sleep hygienic practices were also determined. The face and content validity of the sheet was assessed by 2 experts. Internal-consistency reliability was found to be 0.81 using Cronbach’s alpha test.

Statistical analysis

SPSS version 21 (SPSS Inc., Chicago, IL) was used. The seven components PSQI were summed and the total score ranged from 0 to 21. The higher scores (a total score ≥ 5) indicates poorer sleep quality [13]. ESS score was calculated, and participants who had a score>10 were classified as having EDS [14]. Furthermore, the score of HADS (HADS-Anxiety) and (HADS-Depression) [10], crowding index and Body Mass Index (BMI) were calculated. Descriptive statistics was done. Inferential statistics were done using Pearson’s Chi-Square (\( X^2 \)), Odds Ratio (OR) with 95% Confidence Intervals (C.I.s). A multiple logistic regression analysis was done to detect the predictors of poor sleep quality after controlling confounding factors, with calculation of the adjusted Odds Ratio (aOR). All P-value <0.05 were considered statistical significant.

Results

The total number of students participated in the research was 576 students, with a slight increase more than the sample for the stratification purpose. Their mean age was 21.0 ± 1.46 years. Most of participants (88.5%) were night users of social media. The prevalence of morbid anxiety (HADS-A) was 34.0% (28.6% and 41.9% among males and females, respectively). The prevalence of morbid depression (HADS-D) was 16.8% (16.0% among males 17.3% among females). It was found that 70.4% of our participants had poor sleep quality as classified by PSQI, and 37.3% had EDS.

Table 1 shows that females reported significantly higher prevalence of poor sleep quality (73.8%) compared to males (64.6%). Younger students (aged ≤ 21 years) were about two and half times more prone to have poor sleep quality compared to older participants (OR=2.4; 95% CI: 1.62-3.55). Obese students, smokers and the night users of social media had a higher prevalence of poor sleep quality compared to their comparative partners, but without statistical significant difference (P>0.05).

| Sleep quality/Variable | Poor (No=406) | Good (No=170) | \( X^2 \) | P | OR | 95% | C.I. |
|------------------------|--------------|---------------|---------|---|----|-----|-----|
| Gender                 |              |               |         |   |    |     |     |
| Female                 | 273          | 73.8          | 97      | 26.2 | 5.41 | 0.02 | 1.55 | 1.07 | 2.23 |
| Male                   | 133          | 64.6          | 73      | 35.4 | 5.41 |      |      |      |     |
| Age                    |              |               |         |   |    |     |     |
| ≤21                    | 272          | 74.9          | 91      | 25.1 | 9.32 | 0.002 | 1.76 | 1.22 | 2.54 |
| ≥21                    | 134          | 32.9          | 79      | 37.1 |      |      |      |      |     |
| Educational year       |              |               |         |   |    |     |     |
| Basic                  | 188          | 80.7          | 45      | 19.3 | 19.57 | 0.000 | 2.40 | 1.62 | 3.55 |
| Clinical               | 218          | 63.6          | 125     | 36.4 |      |      |      |      |     |
| Residence              |              |               |         |   |    |     |     |
| With family            | 360          | 69.4          | 159     | 30.6 | 3.17 | 0.08 | 0.54 | 0.27 | 1.07 |
| Dormitory              | 46           | 80.7          | 11      | 19.3 |      |      |      |      |     |
Table 1: Relationship between sleep quality with personal, socio-demographic variables and habits of medical students in King Abdulaziz University.

Table 2 demonstrates that students who obtained excellent grades (GPA ≥ 4.5) in the preceding semester had significantly higher prevalence of poor sleep quality compared to others (P<0.05). Participants who attended <50% of the educational sessions were more poor sleepers compared to others. It is apparent from the table that prevalence of poor sleep quality was higher among students diagnosed as having morbid anxiety (83.2%) or borderline anxiety (73.5%) compared to normal students (54.1%). A highly statistical significant difference was present (P<0.001). A similar trend was observed regarding depression (p<0.01). The table also reveals presence of positive association between poor sleep quality and daytime sleepiness (X²=6.46, P<0.05).
Table 2: Relationship between sleep quality with academic variables, anxiety, depression and daytime sleepiness among medical students in King Abdulaziz University.

Relationships between sleep quality and medical students’ sleep hygienic practices is presented in Table 3. A significant statistical association was found between consumption of caffeinated beverages and poor sleep quality (P<0.05). On the other hand, taking daytime nap and practicing physical exercise were not associated with sleep quality.

| Sleep quality/Variable | Poor (No=406) | Good (No=170) | X2 | P | aOR | 95% CI |
|------------------------|---------------|---------------|----|---|-----|--------|
| Consumption of caffeinated beverages | | | | | | |
| Yes | 247 | 74 | 87 | 26 | 4.59 | 0.03 | 1.48 | 1.03 | 2.13 |
| No | 159 | 65.7 | 83 | 34.3 | | | |
| Daytime nap | | | | | | |
| Yes | 360 | 71.9 | 141 | 28.1 | 3.47 | 0.06 | 1.61 | 0.97 | 2.66 |
| No | 46 | 61.3 | 29 | 38.7 | | | |
| Practice physical exercise | | | | | | |
| Yes | 184 | 69.2 | 82 | 30.8 | 0.41 | 0.52 | 0.89 | 0.69 | 1.27 |
| NO | 222 | 71.6 | 88 | 28.4 | | | |

Table 3: Relationships between sleep quality and sleep hygienic practices among medical students, King Abdulaziz University.

Logistic regression analysis Table 4 illustrates that the first predictor of poor sleep quality was having anxiety. Those with morbid anxiety were about 4 time more prone to poor sleep quality compared to others (aOR: 3.92; 95% CI: 2.46-6.24). The educational year of student was the second predictor; students enrolled in the basic medical years were about twice more likely to be poor sleepers compared to those in the clinical years (aOR: 1.82; 95% CI: 1.11-3.00).
In addition, nowadays there is a marked increase in the night use of social media and sleep quality. On contrary, the Indian study [23] revealed a positive correlation between total sleeping hours and GPA. This difference may be attributed to the latter study involved medical students enrolled in the first 3 grades (1st-3rd) of medical education, or may be because they used ESS for assessing sleep quality, or because they had a lower cut-off point for measuring the academic achievement (GPA ≥ 3.75).

Vagas et al illustrated presence of negative associations between BMI and sleep quality [27]. Similarly, obese students in the current work had a higher prevalence of poor sleep compared to others, but without statistical significant difference.

Smokers in the current study were more poor sleeps compared to others, but without statistical significant difference. On the other hand, the results from India revealed presence of such association [23]. This difference might be explained by the low smoking prevalence among our participants.

EDS was significantly higher among participants with poor sleep quality in the present work compared to others. This result agrees with the results of a many other studies [5,19,20,24]. Our results revealed absence of statistical association between BMI and sleep quality [27]. Similarly, obese students in the current work had a higher prevalence of poor sleep compared to others, but without statistical significant difference.

Concerning sleep hygienic practices, our results found that consumption of caffeinated beverages was associated with poor sleep quality. This result agrees with the findings of Sanchez et al. [30] in their study done among Students from Peruvian College (Peru). In the current study, students who took a daytime naps had a higher percentage of poor sleep quality compared to others, but without statistical significant difference.
Conclusion

A high prevalence of poor sleep quality and EDS were prevailed among medical students in the current study. Gender, age, GPA, anxiety, depression, EDS and drinking caffeinated beverages were associated with poor sleep in bivariate analyses. Anxiety and enrollment in basic academic years were the predictors of poor sleep quality. There is a need for public health policies for screening for sleep quality, anxiety and depression among medical students among medical students. This will help in early detection and management of such conditions. Behavioral and educational interventions for improving sleep quality are essential for ensuring proper sleep and lifestyle of medical students and the future practitioners. Sleep educational programs, stress management courses and lifestyles modifications are required.

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