Insomnia among medical students and its association with exams

Salman Sufian Qasim1*, Abdullah Alrasheed1, Fahad Abdullah Almesned1, Mohammed Alduhaymi1, Talal Aljehaiman1, Aamir Omair2

ABSTRACT

Background: Insomnia is a sleep disorder associated with several significant daytime consequences such as fatigue, low mood, lack of energy, and daytime sleepiness. Medical students appear to be more prone to developing sleep-related problems potentially due to long study years in college and a stressful lifestyle. The primary objective of the present study was to determine the association between exams and insomnia among medical students at King Saud Bin Abdulaziz University for Health Sciences (KSAU-HS), Riyadh, Saudi Arabia. In addition, it also aimed to determine the association between naps, sleep medications, medical conditions, and insomnia.

Methods: This cross-sectional study was conducted among male medical students at KSAU-HS, Riyadh. Students were surveyed using the Insomnia Severity Index to evaluate the prevalence of insomnia 2 weeks prior to exams and 2 weeks after exams.

Results: A total of 367 medical students were included. The prevalence of insomnia before and after exams were 32.9% (n = 49) and 27.1% (n = 59), respectively. The association between insomnia and exams was not statistically significant (p = 0.27). A total of 47.25% of the students reported taking naps and 5.96% took sleep medications. Napping and medical conditions affecting sleep did not significantly influence students’ quality of sleep. There was a significant association between insomnia and sleep medications (p = 0.006).

Conclusions: The prevalence of insomnia among medical students in the present study was similar to other studies. Insomnia among medical students was not related to exams. Furthermore, taking sleep medications such as melatonin and antihistamines was associated with insomnia. More than half of the students who took sleep medications had insomnia, while only one-quarter of the students who did not take sleep medications had insomnia.

Keywords: Insomnia, medical students, quality of sleep, exams, Saudi Arabia.

Introduction

Insomnia is a sleep disorder characterized by persistent difficulty falling or staying asleep despite sufficient time dedicated for sleep [1]. Insomnia is associated with several significant daytime consequences such as fatigue, low mood, lack of energy, and daytime sleepiness [2]. Depending on the criteria utilized to define insomnia and the population studies, different prevalence rates for insomnia have been reported [3]. According to population-based studies, nearly 30% of adults selected from different countries demonstrated at least one symptom related to insomnia, including difficulty initiating or maintaining sleep and poor quality of sleep [3,4]. In a recent study conducted in Saudi Arabia, subjects demonstrated a high prevalence rate of insomnia with approximately 92% of the sample presented with at least one symptom of insomnia, and a crude prevalence of 77.7% [5]. Insomnia can be a primary sleep disorder that is a non-organic disorder not attributable to a medical or psychiatric condition, substance abuse, or other environmental factors [6,7]. Moreover, insomnia can be secondary to and associated with another medical condition. For instance, psychiatric conditions such
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as depression, anxiety, panic disorder, and personality disorders are a well-known cause of insomnia with comorbidity rates of 40%-50% according to multiple epidemiological studies [8-11]. In addition, a wide range of medical disorders may contribute to the development of secondary insomnia. These include respiratory diseases such as asthma, chronic pain, diabetes, gastroesophageal reflux disease, obstructive sleep apnea, and others [8,12]. For the diagnosis of insomnia, a complete sleep, medical, and psychiatric history and assessment should be performed [13]. Various self-reported sleep instruments exist for the evaluation of insomnia, and they remain the most useful method for diagnosing insomnia in clinical practice [14]. The Pittsburgh Sleep Quality Index and the Insomnia Severity Index (ISI) are among the most commonly used instruments for the assessment of sleep disturbance and insomnia, respectively [13]. The management of insomnia can involve pharmacological, non-pharmacological, cognitive-behavioral treatment, or combined approaches including both medications and psychotherapy, which is proven to be more effective than single approaches [15].

Medical students appear to be more prone to developing sleep-related problems potentially due to long study years in college and a stressful lifestyle [16,17]. Studies conducted among medical students in different populations demonstrated a high prevalence rate of sleep disturbance [17]. Several factors such as stress, high levels of emotional exhaustion, and lifestyle can be attributed to the occurrence of sleep disturbances and insomnia among medical students [17,18]. The primary objective of the present study was to determine whether there was an association between exams and insomnia among medical students at King Saud Bin Abdulaziz University for Health Sciences (KSAU-HS), Riyadh, Saudi Arabia. In addition, it aimed to determine the association between naps, sleep medications, medical conditions, and insomnia.

Subjects and Methods

This cross-sectional study was conducted among male medical students at KSAU-HS, Riyadh from November 2018 to February 2019. The prevalence of insomnia was measured 2 weeks prior to final exams and 2 weeks after using the ISI [19]. The association between insomnia and exams was assessed. The inclusion criterion was all-male medical students in phase two (third- and fourth-year students). Exclusion criteria were students who abstained from taking the survey or did not provide consent of participation. A non-probability convenience sampling technique was used for data collection. The calculated sample size was 386, and 367 responses were included in the study. Participants were approached prior to their problem-based learning (PBL) sessions and were asked to complete the questionnaire. The objectives of the study were explained to each participant. All participants were informed that participating in the study was voluntary and no personal information was required.

The questionnaires were collected by the research team after the PBL sessions, and the researchers were present to answer any questions from the participants regarding the questionnaire.

Students were surveyed using a self-administered questionnaire that was developed according to the literature review and the ISI. Variables including age, frequency, and duration of naps, the use of sleep medications, and the presence of medical conditions affecting sleep were recorded. The ISI consists of seven questions related to the quality of sleep, which assesses a person’s perception of their insomnia during the last 2 weeks. Each answer to those questions represents a numerical value. Values reflecting each answer are added up to produce a total score that is used to determine the clinical status of the participant. Each question has five outcomes (from zero to 5) representing none, mild, moderate, severe, and very severe outcomes on a Likert scale. Total score interpretation is divided into four groups or results: no insomnia (0-7); subthreshold insomnia (8-14); moderate insomnia (15-21); and severe insomnia (22-28) [19].

Data were entered using a Microsoft Excel Sheet then analyzed using the Statistical Package for the Social Sciences (SPSS version 20, IBM, Armonk). Descriptive statistics were presented as frequency and percentage for categorical variables. The outcome variable of the ISI was converted into a categorical variable. A Chi-square test was used to test the association between insomnia and categorical variables. A p-value <0.05 was considered to show a statistically significant association.

Results

A total of 367 valid responses were included in the present study. 149 responses were collected 2 weeks before final exams and 218 were collected 2 weeks after. (Figure 1). All participants were male medical students with a mean age and standard deviation of 21.55 and 1.65 years, respectively. Distributing the survey to female students was difficult due to the lack of data collectors from the female side. Therefore, only male students were included in the present study.

The prevalence rates of insomnia before and after final exams were 32.9% (n = 49) and 27.1% (n = 59), respectively (Figure 2). A Chi-square test was calculated to evaluate the association between insomnia and exams, which showed no statistically significant association between the two variables (p = 0.27) (Table 1).

Participants’ responses collected after exams (n = 218) were used to calculate the frequency and duration of naps, the use of sleep medications, and the presence of medical conditions that may disrupt students’ sleep and the association of those variables with insomnia. Of the included participants, 103 (47.25%) reported taking naps during the day with a mean duration of 119.2 minutes (≈2 hours). The most common time at which naps were taken was two o’clock in the afternoon (2 PM), reported.
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Table 1. Prevalence of insomnia among medical students before and after exams.

<table>
<thead>
<tr>
<th>ISI score interpretation</th>
<th>Overall insomnia</th>
<th>p-value</th>
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<tbody>
<tr>
<td>Period</td>
<td>No insomnia</td>
<td>Subthreshold</td>
</tr>
<tr>
<td>Before exams, n (%)</td>
<td>45 (30.2)</td>
<td>55 (36.9)</td>
</tr>
<tr>
<td>After exams, n (%)</td>
<td>59 (27.1)</td>
<td>100 (45.9)</td>
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</tbody>
</table>

Table 2. Association between insomnia and naps, sleep medications, and conditions affecting sleep.

<table>
<thead>
<tr>
<th>Insomnia</th>
<th>No insomnia</th>
<th>Total</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naps, n (%)</td>
<td>26 (11.93)</td>
<td>77 (35.32)</td>
<td>103 (47.25)</td>
</tr>
<tr>
<td>Sleep medications, n (%)</td>
<td>8 (3.67)</td>
<td>5 (2.29)</td>
<td>13 (5.96)</td>
</tr>
<tr>
<td>Conditions affecting sleep, n (%)</td>
<td>5 (2.29)</td>
<td>9 (4.13)</td>
<td>14 (6.42)</td>
</tr>
</tbody>
</table>

Chi-square test.

*Statistically significant value.

Discussion

Medical students are particularly vulnerable to developing poor sleep habits given the long study hours and lifestyle challenges they encounter [16]. Insomnia and poor quality of sleep have a profound impact on physical and psychological health and are associated with several adverse daytime consequences, such as fatigue, low mood, and lack of energy [2,20]. According to multiple studies, university students demonstrated a high prevalence of poor sleep quality ranging from 19.17% to 57.5%, being remarkably high among medical students [21,22]. The prevalence of insomnia among medical students in the present study was 32.9% and 27.1% before and after exams, respectively. Similarly, Alsaggaf et al. [17] reported a prevalence of 33% in a study conducted among medical students in Jeddah, Saudi Arabia. In a meta-analysis involving medical students from 13 different countries, results showed that 55% of the students demonstrated a poor quality of sleep with variations observed between countries [23]. Differences in the prevalence of insomnia among medical students in different countries may suggest cultural, behavioral, and social factors influence the quality of sleep. For example, a higher prevalence of self-reported sleep difficulties was associated with a lower socioeconomic position according to several studies conducted in different countries [24]. Many factors such as lifestyle and academic demand were reported to affect sleep quality among medical students [16]. However, and up to the authors’ knowledge, the effects exams have on the quality of sleep among medical students were not closely investigated in previous studies. In the present study, students were surveyed using the ISI [19] twice, 2 weeks before exams and 2 weeks after. The association between insomnia and exams was not statistically significant (p = 0.27). It was hypothesized that students before exams may demonstrate poorer sleep habits due to stress-related to taking the exams. Students surveyed before exams scored higher in the ISI compared to students surveyed after exams, but this difference was not statistically significant. Thus, exams alone may not...
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In the present study, 47.25% of the students reported taking naps during the day. Another study conducted among medical students in Kerala, India showed that 37.2% of the students took naps after lunchtime and had higher alertness during class [25]. In our study, there was no association between insomnia and naps (\( p = 0.427 \)). Napping did not significantly influence sleep quality among medical students given no significant difference in the ISI score among students who took naps and students who did not. Only 5.96% of the students in the present study reported taking sleep medications. The association between insomnia and sleep medication was statistically significant (\( p = 0.006 \)). Specifically, 61.5% of the students who took sleep medication had insomnia, while only 24.9% of the students who did not take sleep medications had insomnia. Similarly, Alsaggaf et al. [17] found that 9% of medical students took hypnotic medication. In their study, the association between the use of hypnotic medications and sleep patterns was significant, as more than double the students who took hypnotics were classified as “daytime sleepers” in contrast with students who did not take hypnotics. This may suggest that taking sleep medications does not necessarily improve the quality of sleep among medical students. Students with severe insomnia may not benefit from conventional sleep aids such as melatonin and antihistamines, which are reported to be used by students

Figure 2. Prevalence of insomnia among medical students before and after exams.

Figure 3. Association between insomnia and naps, sleep medications, and conditions affecting sleep.
in the present study. 6.42% of the students in the present study reported having a condition that affects their sleep, with asthma and IBS being the most common. Insomnia in those students may be secondary to their condition and not related to other factors such as exams. Asthma and IBS among other conditions reported in the present study affecting sleep were not associated with insomnia ($p = 0.437$). Students with those medical conditions were not more likely to have insomnia compared to healthy students.

The present study was limited by a relatively small sample size consisting of only male medical students at a single academic institution. In order to generalize these findings, large scale studies involving both male and female students at various medical colleges should be conducted. Furthermore, recall bias in students may have influenced the legitimacy of the findings. Lastly, the ISI used to assess symptoms of insomnia among medical students has limited ability to distinguish between primary insomnia and insomnia secondary to comorbid psychiatric or medical conditions.

**Conclusions**

According to the ISI, about one-third of medical students in the present study had clinical insomnia. There was no association between insomnia and exams. Students with insomnia who were surveyed before exams were more than those after, but this difference was not statistically significant. About one-half of the students reported taking naps, mostly in the afternoon. Napping did not significantly influence sleep quality among medical students. The most commonly reported conditions that affected sleep were asthma and IBS, but they were not associated with insomnia. Taking sleep medications such as melatonin and antihistamines was associated with insomnia. More than half of the students who took sleep medications had insomnia, while only one-quarter of the students who did not take sleep medications had insomnia.

**List of Abbreviations**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>IBS</td>
<td>Irritable bowel syndrome</td>
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<tr>
<td>ISI</td>
<td>Insomnia Severity Index</td>
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<td>KSAU-HS</td>
<td>King Saud bin Abdulaziz University for Health Sciences</td>
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<tr>
<td>PBL</td>
<td>Problem-based learning</td>
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**Conflict of interest**

The authors declare that there is no conflict of interest regarding the publication of this article.

**Funding**

None.

**Consent to participate**

Informed consent was obtained from all the participants.

**Ethical approval**

This study was approved by the Institutional Review Board (IRB) of King Abdullah International Medical Research Center (KAIMRC) (Approval: SP18/310/R).

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**References**


