Sleep habits and patterns among medical students

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ABSTRACT

Objectives: This study was designed to assess sleep patterns among male medical students at different academic levels.

Methods: Participants in this study were healthy male medical students in the first (L1), second (L2) and third (L3) academic levels of the College of Medicine, King Saud University, Riyadh, Saudi Arabia. The study was conducted during November 2001. A self-administered questionnaire was distributed to students to assess age, academic level, registered credit hours, sleep-wake schedule, naps, quality of sleep, total sleep time at night, possible factors affecting bedtime, and daytime sleepiness using the Epworth Sleepiness Scale (ESS).

Results: The final analysis included 129 students. Total sleep time at night + nap of the whole group was 5.9 ± 1.6 hours. Twenty-nine students (22.4%) were defined to have excessive daytime sleepiness (EDS) based on ESS score of >10. Also, 83.3% of students reported napping during the daytime more than twice per week.

Conclusion: Analysis of the sleep pattern of male medical students revealed that this group is sleep deprived, which in turn may affect their academic performance.

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Sleep is an important component of normal human physiology. It serves a restorative homeostatic function and appears to be crucial for normal thermoregulation and energy conservation.[1] College students are generally a healthy population with few sleep-related complaints.[2] As a group, they are prone to psychological and physical stress due to the transitional nature of college life.[3] To be a qualified physician requires a great deal of knowledge and extensive training. Therefore, the burden put on medical students is tremendous. They face the challenges of trying to maintain a high level of academic achievement, trying to acquire adequate medical knowledge, learning clinical skills and adjusting to an ever-changing hospital environment in a limited period of time. Unfortunately, students who experience academic difficulties do not realize that poor sleep habits may contribute to their problems. It has been reported that sleep deprived students performed significantly worse than students who have a normal night's sleep.[4] In general, few studies have assessed sleep habits among medical students as a specific group. We had previously looked at the sleep pattern of medical students during the months of Shaban and Ramadan.[5] Despite inherent importance of sleep, there is limited information about sleep behavior and sleep disturbances in college students. This study was designed to assess sleep patterns among male medical students at different academic levels during weekdays and describe their sleep habits and compare our results to published data.

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Methods. *Study group.* This descriptive study was conducted during November 2001 (for 2 weeks) in the College of Medicine, King Saud University, Riyadh, Saudi Arabia. Participants in this study were healthy male medical students in the first (L1), second (L2) and third (L3) academic levels of the college. Students were recruited randomly by selecting students in every other row in classrooms. Trained medical students, with one of the authors, met the selected students and explained to them the study objectives and protocol. During this initial interview, basic information and screening for common sleep disorders or other medical problems was performed. Students who did not have full academic load for their corresponding academic level, repeaters and those with chronic diseases or sleep disorders were excluded. None of the participants drank alcohol. Students during these academic levels do not do night calls. School usually starts at 07:30-08:00.

Questionnaire. A self-administered questionnaire was designed in Arabic containing 23 closed-ended questions regarding age, academic level, registered credit hours, sleep-wake schedule, naps, quality of sleep, total sleep time at night, possible factors affecting bedtime, and daytime sleepiness using the Epworth Sleepiness Scale (ESS).[6] The above questionnaire was pre-tested on a sample of 60 students before starting the study and the required modifications were carried out. The ESS is a specialized, reliable, validated sleep questionnaire that is accepted internationally as a measure of the general level of daytime sleepiness. It consists of 8 different situations and activities that are often part of everyday life. The total ESS score is a measure of the average sleep propensity of falling asleep in those conditions. The total score ranges from 0-24. The upper limit of normal based on previous work in healthy adults is estimated to be 10.[6] Hence, an ESS score of >10 indicates increased daytime sleepiness.

Study protocol. The participants were asked to monitor their sleep habits, and other parameters described in the questionnaire during weekdays and then, complete the questionnaire on the last weekday of each week (for 2 weeks), namely, Wednesday. Also, sleep diaries and ESS questionnaires were completed daily during weekdays (for 2 consecutive weeks) and the mean values of the 2 weeks were used in the final analysis. Based on the information extracted from sleep diaries, total sleep time (TST), nap duration, wake-up time, and bedtime were calculated. Trained medical students contacted participants regularly during weekdays to assure completeness and accurateness of data collection.

Data were expressed as mean ±SD. Comparisons were made using one way ANOVA and chi-square. Significance was considered at the *p* value ≤0.05.

Results. Of the 290 questionnaires distributed, 182 (63%) were returned. One hundred and forty-six questionnaires (50.3%) were properly completed. Of those, 129 (44.4%) satisfied the inclusion criteria of having a full academic load (L1: 44 students, L2: 32 students and L3: 53 students). Mean age of the participants was 21.2 ± 0.8 years. **Table 1** summarizes the main sleep characteristics of the studied subjects in each academic level. The TST + nap of the whole group was 5.9 ± 1.6 hours. There was no significant difference between the 3 studied groups in TST,

Table 1 - Sleep characteristics of the students.

Characteristic	L1 (n=44)	L2 (n=32)	L3 (n=53)	Total (n=129)
Age	20 ± 0.8	21 ± 0.7	22 ± 0.7	21 ± 0.8
TST	4.6 ± 1.6 h	4.7 ± 1.7 h	4.5 ± 1.6 h	4.6 ± 1.6 h
Students who nap (%)	84%	86%	81%	83.3%
Duration of nap(s)	1.4 ± 0.6	1.3 ± 0.6 h	1.1 ± 0.7 h	1.25 ± 0.6 h
TST + nap	6.1 ± 1.4	6.15 ± 1.4	5.5 ± 1.8	5.9 ± 1.6 h
ESS score	7.4 ± 2.8	8.3 ± 3.7	7.1 ± 3.8	7.9 ± 3.1
Subjective sleepiness	19%	37%	12%	20.6%
Reporting to school late	59%	53.6%	64%	63%
Sleep satisfaction	60%	44%	55%	54%

TST - total sleep time, ESS - Epworth Sleepiness Score, L1, L2, L3 - first, second and third academic levels

frequency of naps, nap duration or TST + nap. The mean ESS score for the whole group was 7.9 ± 3.1. No difference between individual groups was noticed. Twenty-nine students (22.4%) were defined to have excessive daytime sleepiness (EDS) based on ESS score of >10 and 20.6% reported the feeling of sleepiness on direct questioning. The TST in students who had EDS was less than those who did not have EDS (3.8 ± 1.7 hours versus 4.7 ± 1.7 hours, $p = 0.05$). Students with EDS and low TST compensated for that by taking naps during daytime. Hence, TST + nap was not significantly different between students with EDS and those without (5.5 ± 2.1 hours versus 5.9 ± 2.4). Seventy (54%) of students reported self-satisfaction with their sleep quantity and quality. Those who were not satisfied with their sleep attributed that to the following reasons, thinking about the difficulty of study (61.1%), poor personal organization (61%), studying at the expense of sleep (37%), and drinking stimulants (tea, coffee, soda) (24%). Twenty-nine percent of students reported praying Fajr prayer on time. Sixty-three percent of students reported late to classes once or more per week, which was attributed to waking up late. There was no difference in TST between students coming on time and late comers.

Discussion. We all need sleep to be able to function the next day. However, the unanswered question is, how much sleep do we need? Sleep researchers do not seem to agree on how much we should sleep. With the new civilization, sleep restriction has become a global problem.[7] Most young adults report sleeping on average approximately 7.5 hours a night on weekday nights and slightly longer, 8.5 hours, on weekend nights.[8] Medical students are a special group of young adults who have life constraints that can cause irregular sleep habits or shortening of mean sleep length, compared with individual's sleep need. There is some evidence in literature supporting the hypothesis that sleep difficulties and deprivation can significantly impair student's academic performance.[9]

Total sleep time in our studied group was low compared to previously reported studies. In a recently published study carried out among psychology students,[10] total time slept during week days was 8 hours and 2 minutes which is considered normal for most individuals. Our students slept much less and tried to compensate by taking daytime naps. Even when TST + nap was calculated, the total time slept was much less than that of normal individuals at this age group.[8] In a local study among Saudi health care workers with a mean age of 32 years, Wali et al[11] reported a total sleep time of 6.3 hours only. These findings raised the concern that Saudis sleep less than the internationally accepted number of sleep hours, which in turn calls for the urgent need to study sleep habits and pattern among Saudis on a nationwide scale taking into consideration the serious consequences of sleep deprivation. Sleep deprivation is associated with a variety of adverse consequences that can be potentially life-threatening.[12] Moreover, sleep deprivation can result in significant changes in cognitive functioning, short-term memory and concentration.[13] The impact of the previous consequences are expected to be more deleterious if the afflicted are students.

Another interesting finding is the high percentage of students who nap during the daytime. Our findings concurred with Wali et al[11] who showed that 88% of Saudi males nap during the daytime. It seems that napping during the daytime is related to cultural background. In a survey conducted among human sciences faculty students in Morocco, Taoudi et al[14] had shown a much lower percentage of daytime napping (41%). An increase in the percentage of those who nap may indirectly reflect an increased bodily need or wish for more sleep due to sleep deprivation.[15]

Daytime sleepiness was assessed using the ESS. The ESS is a standardized validated subjective way to assess daytime sleepiness that has been used across different age groups.[6,16,17] Twenty-two percent of our subjects scored >10 indicating increased daytime sleepiness, which concurs with the findings published previously by Wali et al[11] among health care workers and BaHammam[5] among Saudi male and female medical students during the month of Shaban. It is established that, up to 20% of tested subjects may clearly underestimate the risk of dozing off (sleepiness) using the ESS,[12] which may indicate that the actual percentage of reported sleepiness is underestimated.

Forty-six percent of our subjects were unsatisfied with their sleep quantity and quality. These perceptions of reduced sleep quantity and quality may lead to more difficulties for students; those who believe that they are not getting enough sleep may act as if they should be tired.[10]

The present study has some inherent limitations; the problem of self-reported data raises the possibility that students may not have accurately reported their sleep habits or the nature of the difficulties they were experiencing, although we tried to ameliorate that by contacting participants on a regular basis during the study period. Another limitation is the fact that sleep pattern during weekends was not assessed. However, the primary value of this study is that it provides important information about sleep habits among college students in Saudi Arabia and Arab countries for the first time and opens the door for further research in this field.

In conclusion, analysis of the sleep pattern of male medical students revealed that this group is sleep deprived, which in turn may affect their academic performance. University authorities should acknowledge that students' sleep habits are significant concerns that may affect their academic performance and hence, warrant educational programs and interventions. The need for further local research on students' sleep is clear. Research in particular should examine factors that may affect the quality and quantity of students' sleep and its effects on academic achievements and solutions that will help students combat sleep difficulties and avert the deleterious effects of sleep deprivation.

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