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# Difference of sleeping patterns and habits between first and third year medical students

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**Abstract**
**Background:** The study of medicine makes students more susceptible to sleep disorders. Previous studies have shown that first-year medical students more susceptible to stress than others; there is a relationship between sleep and stress problems. For that we conducted this study on the hypothesis that poor sleep quality and habits are more common among first year students than third year students.
**Methodology:** A cross-sectional study was carried out during the academic year 2017-2018 among first and third year medical subtends, Qassim Medical College. A total 150 students were chosen using simple random sampling method. The questionnaire was adopted from the Medical Kentucky College. Demographic data, sleep duration, naps, sleep hygiene practices and sleep quality were collected.
**Result:** Students acquired on average (first year 6.34 ± SD 1.84, third year 6.38 ± SD 1.8) hours of sleep each night, Poor sleep quality was reported more by first year students (2.51 ± SD 0.89) than third year (2.25 ± SD 0.65) other parameters; total number of naps per day(first year 0.66 ± SD 0.58, third year 092 ± SD 0.67), nighttime awakenings (first year 25.8%, third year 57.4%), sleep during lectures (first year 2.61 ± SD 0.54, third year 2.38 ± SD 0.58) reported more by third year students.
**Conclusion:** Student's perception of the quality of their sleep is inconsistent with the objective measurement; the actual result of other parameters of poor sleep quality and insomnia measurements were poorest among 3rd year than the 1st year.

**Keywords:** sleep habits, insomnia, medical students, Qassim, Saud Arabia

## Introduction

Sleep is an essential process for life; it's a vital process for human's; physical and mental wellbeing [1]. Sleep- wake circadian rhythms are orchestrated by the suprachiasmatic nucleus (SCN) and in relation to some external factors such as light, physical activity, social behaviors and melatonin [2]. it's estimated that one-third of adults report difficulty in sleep [3]. sex, gender and race are known variation that affect sleep quality and duration [4]. sleep deprivation is known cause to: depression, anxiety and mood disturbance [5, 6, 7]. It also affects overall the cognitive performance, attention, concentration, memory, complex problem solving, critical thinking and increase the incidence of car accidents related to sleep [7, 8, 9].
Medical students are one of the groups that appear to be at increased risk of being sleep deprived [10]. Part of this appear to be highly associate to stress related to academic demands [10]. There is known relationship between sleep problems and stress [13]. previous studies have demonstrated that first year medical students are more prone to stress than others [14, 15, 16]. The new learning environment, academic demands and transition from school life to college may constitute some of the causes for this high level of stress [17, 18, 19]. It's also hypothesized that this make them also more susceptible to poor sleep quality. In one study it was found that sleep time decreased in college students from about 7.5 hours per night in 1969 to 6.5 hours per night in 1989.5 [20]. Students often deprive themselves of sleep during the weekdays and try to compensate for this by increasing their sleep time over the weekend [21]. To make up for varying sleep schedules it common among students to practice some poor sleep hygiene strategies such as drink coffee, energy drinks and take more naps to make up for lost sleep [1, 22]. For these reasons we conducted this study under the umbrella of the hypothesis that poor sleep quality and habits are more common among first year students than third year.

## Methods

This is an observational cross-sectional study carried out during the academic year 2017-2018 among first-year and third-year medical students, College of Medicine, Qassim University. Students from other academic levels and other colleges and universities are excluded. A total of 150 students was included in this study, 75 male students and 75 female students using a simple random sampling method. The data collected during the period from 25th May to 1st June by an electronic questionnaire provided. The questionnaire was adopted from the University of Kentucky College of Medicine [23]. A focus group discussion with medical graduates, senior medical students and of medical education experts at the college was done to assess the understandability and applicability of the questionnaire and the recommended modification was adopted. The questionnaire was translated to Arabic and validated by pre-testing a pilot study on 20 medical students graduate and necessary changes were made

accordingly.

The questionnaire includes the following data:

- Demographic data of the participants (age, gender, academic year and marital status).
- Sleep affecting habits (black coffee, tea, smoking, energy drinks, milk, sleeping pills and herbals, using electronic and mobile phone at night time)
- Signs of sleep deprivation (feeling sleepy during lectures or while driving, the number of naps taken throughout the day and duration, sleep latency, average number of sleeping hours per weekdays and weekends, personal evaluation of the overall sleeping quality and daily function for the past month and exercise).

Data entry and analysis was carried out using SPSS. Descriptive statistics are used to characterize the sample, both as a whole and academic-stratified. This includes the measures of frequencies, percentages and mean ± SD, t-tests, and chi-square.

Ethical approval was obtained from the Regional Research Ethics Committee – Qassim Province. Data are stored confidentially and coded in the database using a unique identification number. Only the research team will have access to the database for analyses. The report and publication will only present summary statistics and no identifying information will be used. No names or personal data will be collected.

- *Inclusion criteria:* 1st and 3rd year Saudi students of both genders
- Exclusion criteria: There was no specific exclusion criteria.

**Results:**

Table (1): The total student responses included in the analysis was 150; As shown in males 78 (52%) and females 72 (48%), mean age was 21.1 ± 1.42 (P=0.001). 59.3% of the sample were first-year medical students. Whereas, 40.7% of them were third-year medical students. Regarding the factors affecting sleep habits; 5.4% of the students were smokers and ex-smokers, while the majority of the sample were nonsmoker. There is no significance difference between; caffeine consuming between the two groups. Drinking milk before sleeping 16 (10.7%), P=0.061. Sleeping aids intake 35 (23.3%), using electronics after 8 pm 144 (96%), using mobile phones before sleeping 145 (96.7%).

**Table 1:** Demographic characteristics and factors affecting sleep habits

| Variables | | First Year 89 (59.3%) | Third Year 61 (40.7%) | Total 150 (100%) | p-value |
|---|---|---|---|---|---|
| Gender | Males | 53 (59.6%) | 25 (41%) | 78 (52%) | 0.025 |
| | Females | 36 (40.4%) | 36 (59%) | 72 (48%) | |
| Age (Mean ± SD) | | 20.38 ± 0.959 | 22.15 ± 1.327 | | 0.001 |
| Marital Status | Married | 1 (1.1%) | 1 (1.6%) | 2 (1.3%) | 0.788 |
| | Single | 88 (98.9%) | 60 (98.4%) | 148 (98.7%) | |
| Smoking | Yes | 2 (2.2%) | 2 (3.3%) | 4 (2.7%) | 0.475 |
| | No | 84 (94.4%) | 58 (95.1%) | 142 (94.7%) | |
| | Ex-smoker | 3 (3.4%) | 1 (1.6%) | 4 (2.7%) | |
| | Mean ± SD | 0.04 ± 0.334 | 0.07 ± 0.403 | | |
| Caffeine intake | Yes | 76 (85.4%) | 54 (88.5%) | 130 (86.7%) | 0.582 |
| | No | 13 (14.6%) | 7 (11.5%) | 20 (13.3%) | |
| | Mean ± SD | 1.15 ± 0.355 | 1.11 ± 0.321 | | |
| Drinking milk before sleeping | Yes | 6 (6.7%) | 15 (24.6%) | 16 (10.7%) | 0.061 |
| | No | 83 (93.3%) | 46 (75.4%) | 134 (89.3%) | |
| | Mean ± SD | 1.93 ± 0.252 | 1.84 ± 0.373 | | |
| Sleeping aids intake (pills/herbs) | Yes | 20 (22.5%) | 15 (24.6%) | 35 (23.3%) | 0.765 |
| | No | 69 (77.5%) | 46 (75.4%) | 115 (76.7%) | |
| | Mean ± SD | 1.78 ± 0.42 | 1.75 ± 0.434 | | |
| Using electronics after 8pm | Yes | 85 (95.5%) | 59 (96.7%) | 144 (96%) | 0.711 |
| | No | 4 (4.5%) | 2 (3.3%) | 6 (4%) | |
| | Mean ± SD | 1.04 ± 0.208 | 1.03 ± 0.18 | | |
| Using a mobile phone before sleeping | Yes | 85 (95.5%) | 60 (98.4%) | 145 (96.7%) | 0.342 |
| | No | 4 (4.5%) | 1 (1.6%) | 5 (3.3%) | |
| | Mean ± SD | 1.04 ± 0.208 | 1.02 ± 0.128 | | |

Figure (1): Shows the different types of caffeine consumption and daily intake, the majority of them were tea consumers (78%), 49% of them were black coffee consumers, while few of them were energy drink consumers (10%).

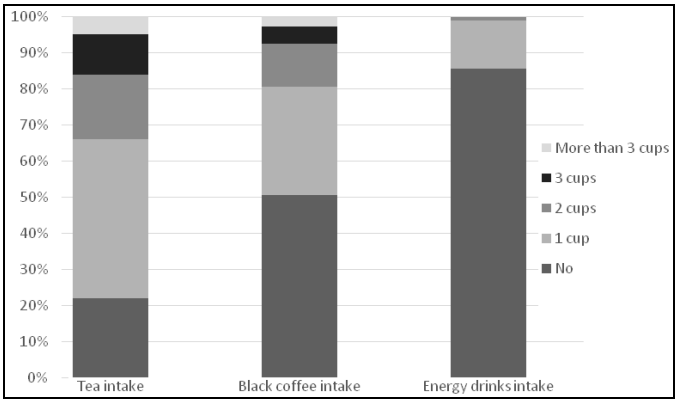


**Fig 1:** Caffeine daily intake

Table (2): a comparison of daytime and night-time sleeping between first year and third year medical students, the overall sleeping quality of the third year students is fairly better than first year students P=0.054. The total number of naps per day among the third year student is significantly higher compared to first year students (P=0.054). Third year students were also significantly more likely to have intermittent sleep pattern 35(57.4%) compared to first year students 23(25.8%), P=0.001. Third year students were also significantly more likely to fall asleep during lectures compared to first year students P=0.014. There is no significant difference in the total sleeping hours between the two groups and daily aerobic exercise.

**Table 2:** Daytime and Night-time sleep differences between first year and third year medical students

| Variables | | First year | Third year | p-value |
|---|---|---|---|---|
| Sleep latency | | 38.3 ± 54.56 | 45.2 ± 61.13 | 0.329 |
| Overall sleeping quality | Very good | 12 (13.5%) | 6 (9.8%) | 0.054 |
| | Fairly good | 32 (36%) | 35 (57.4%) | |
| | Fairly bad | 33 (37.1%) | 19 (31.1%) | |
| | Very bad | 12 (13.5%) | 1 (1.6%) | |
| | | 2.51 ± SD 0.89 | 2.25 ± SD 0.65 | |
| Total number of naps / day | None | 34 (38.2%) | 12 (19.7%) | 0.014 |
| | 1 nap | 52 (58.4%) | 45 (73.8%) | |
| | 2 naps | 2 (2.2%) | 2 (3.3%) | |
| | 3 naps | 1 (1.1%) | 1 (1.6%) | |
| | More than 3 naps | 0 | 1 (1.6%) | |
| | | 0.66 ± SD 0.58 | 092 ± SD 0.67 | |
| Duration of naps / day | | 58.58 ± 69.32 | 74.64 ± 75.21 | 0.434 |
| Total Sleeping hours | | 6.34 ± 1.84 | 6.38 ± 1.8 | 0.867 |
| Nighttime awakenings | Intermittent | 23 (25.8%) | 35 (57.4%) | 0.001 |
| | Continuous | 66 (74.2%) | 26 (42.6%) | |
| Daily aerobic exercise | | 53.8 ± 110.76 | 69.43 ± 96.92 | 0.577 |
| Falling asleep during lectures | Always | 2 (2.2%) | 3 (4.9%) | 0.014 |
| | Sometimes | 31 (34.8%) | 32 (52.5%) | |
| | Never | 56 (62.9%) | 26 (42.6%) | |
| | | 2.61 ± SD 0.54 | 2.38 ± SD 0.58 | |
| Feeling sleepy while drivin | Always | 0 | 1 (1.6%) | 0.156 |
| | Sometimes | 36 (40.4%) | 7 (11.5%) | |
| | Never | 17 (19.1%) | 17 (27.9%) | |
| | Not applicable | 36 (40.4%) | 36 (59%) | |
| | | 1.38 ± SD 1.20 | 1.08 ± SD 1.36 | |

Table (3): The association between sleep affecting habits with sleeping quality and pattern. Students who are consuming caffeinated drinks were more likely to have poor sleep quality than others (P= 0.075). Students who also used sleeping aids such as herbal medication or sleeping pills were significantly more likely to have poor sleeping quality than who didn't (P= 0.057). However, student who used these sleeping aids have significantly higher percentage of getting better sleeping pattern 18(31%) than those who didn't 40(69%), P=0.059. Females medical students has significantly higher percentage of intermittent sleep pattern than males medical students (P=0.029).

**Table 3:** Sleep quality and pattern association with factors affecting sleep habits

| Variable | | Sleep Quality 2.40 ± 0.811 | Sleep Pattern 58 (38.7%) |
|---|---|---|---|
| Gender | Males | 2.45 ± 0.83 | 24 (41.4%) |
| | Females | 2.35 ± 0.79 | 34 (58.6%) |
| | | P= 0.446 | P= 0.029 |
| Smoking | Yes | 2.75 ± 0.5 | 1 (1.7%) |
| | No | 2.39 ± 0.82 | 56 (96.6%) |
| | Ex-smokers | 2.5 ± 0.58 | 1 (1.7%) |
| | | P= 0.660 | P= 0.717 |

| | | | |
|---|---|---|---|
| Caffeine intake | Yes | 2.45 ± 0.798 | 53 (91.4%) |
| | No | 2.10 ± 0.85 | 5 (8.6%) |
| | | P= 0.075 | P= 0.135 |
| Sleeping aids intake | Yes | 2.63 ± 0.81 | 18 (31%) |
| | No | 2.33 ± 0.80 | 40 (69%) |
| | | P= 0.057 | P= 0.059 |
| Using electronics after 8pm | Yes | 2.4 ± 0.822 | 57 (98.3%) |
| | No | 2.33 ± 0.52 | 1 (1.7%) |
| | | P= 0.838 | P= 0.249 |
| Using a mobile phone before sleeping | Yes | 2.41 ± 0.80 | 57 (98.3%) |
| | No | 2.0 ± 1.00 | 1 (1.7%) |
| | | P= 0.263 | P= 0.357 |

**Discussion**

This study aimed to investigate and compare different parameters of sleep quality and habits between two different groups of medical students (first and third year). The outstanding result of this study was that although about 50.6% of first year and 32.7 % of third year medical students complains of poor sleep quality other parameters concerning poor sleep quality and insomnia namely (total number of naps per day, frequent nighttime awakenings and falling asleep during lectures) were poorest among third year than in first year.

This contradictory result of the measured poor quality of sleep along with the subjective self-perception of good sleep quality was also reported in other studies, including one study done King Khalid University (KKU) in Saudi Arabia [24] and other study in Ethiopia where the majority of students reported that the quality of sleep is good or very good, while a high percentage had high PSQI scores indicating poor sleep quality was reported [25].

The reason for these findings may be attributed to high level of stress encountered during the third year of medical study to many reasons; the role of confusion in the transition phase from basic years to clinical years and the high competition between Saudi medical students themselves is increasing to get a higher GPA, during the basic years of medical study in order to fulfil the Saudi Commission for Health Specialties (SCHS) requirements to get postgraduate training programs [26]. In addition the requirement for the Saudi Medical Licensing Examination (SMLE) and the students are also required to publish research and to present it at conferences or publish it in a medical journal, and also to participate in workshops and to organize social / community activities.

One recent study was done in Saudi Arabia after this new SCHS requirements announced report a poor sleep quality of 76% and a psychological stress of (53%) [27]. this is in contrast to other local studies done before this new SCHS admission requirements announcement where it seems to report a lower incident of poor sleep quality including a study done in King Abdul-Aziz University (30%) [28] and another study in King Saud University (37%) [29]. Another studies in different countries report a result of poor sleep quality of 50.9% in US [26] and 40% in Pakistan [30], also another study in Palestine 39, 9.8%(31).Keeping into account the different tools used to measure sleep quality. Our study showed that 58.4% of the first year and 73.8%of third year medical students take at least one nap during the day. Daytime nap is a common habit among Arabs in the Middle East [32]. In four European countries, 23% of young adults reported having daytime naps [33]. Such behavior maybe a sign of prolonged insomnia (inability to sleep within 30 minutes, frequent awakenings at night, or insufficient sleep sleeping less than 8 hours/night) as the students use it to compensate for the lost sleep. Significantly 57.4% of third year students and only 25.8% of first year students report having intermittent and frequent nighttime awaking and although not significant, but it took for both groups more than 30 minute to fall asleep. This is I agreement to another study in Palestine that showed that 36.3% of the participants took more than 30 minutes to fall asleep and 64.8% woke up more than once a nigh [31]. However in contrast to our result another local study in King Khalid University (KKU) that report that more than one-third of students have a sleep latency within 15 minutes [24] and also another study in Nigeria that report a sleep latency between10-30 min (34). the average duration of night sleep for both groups was 6.3 ± 1.8.Other local studies in King Abdulaziz University (KAU) and King Khalid University (KKU) report a sleep duration of 5.8 hours and 6 hours respectively taking into account that the first study was done in clinical years students (fourth, fifth, or sixth year) (24, 28). A similar to our study, other studies in Korean and Chinese college students were the average sleep duration reported to be 6.7 +/- 1.3 and 6.9 hours [35, 36]. This result of sleeping hours less than seven hours revealed that our students in general are sleep deficient as It has been reported that sleeping more than seven hours per day for adults is essential for optimum health and well-being [37]. Al though poor academic performance was associated with a higher frequency of insomnia symptoms and sleep disturbance a study in Malaysia on the students of the Faculty of Biomedical Medicine indicated that there is no significant relationship between total sleep hours and GPA [37]. As shown in our result falling asleep during lectures was a problem for 34.8% of first year and 52.5% of third year medical students. The inability to maintain an adequate level of wakefulness or DTS was found to be detrimental to the students' learning ability and was associated with mental disorders in medical students.

In general the results of this study indicate that the student's perception of the quality of their sleep is inconsistent with the objective measurements, which means that students usually do not realize the extent of their own problem. Sleeping problems affect all aspects of mental and physical health which brings us to the importance of this problem to be addressed and search further.

Comparison between different studies in different countries is

not accurate because there is much variability in curriculum and school system also in measurement tools.

**Limitations of the Study**

- The study timing was at the end of the academic year, not during the stress of study
- The questionnaire was translated to Arabic

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