Quality of sleep in a sample of Egyptian medical students

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Background
In the last few years, there has been a growing attention to sleep and related disorders. Numerous studies conducted within the past decade have analyzed the deleterious effects of poor sleep quality on university students and medical staff in various specialties, but only few studies have been conducted in the Middle East.

Aim
The aim of the study was to investigate the prevalence of poor sleep quality among (a sample of) Egyptian medical students.

Participants and methods
This cross-sectional, questionnaire-based, observational study was conducted during the period from April to June 2015 on 1182 undergraduate medical students from Assiut and Mansoura Universities in Egypt.
The data were gathered using a sociodemographic questionnaire and Pittsburgh Sleep Quality Index (PSQI), and were analyzed using the SPSS software.

Results
Mean PSQI score was 6.01 (SD ± 2.73). According to the PSQI, 46.7% of the subjects had good sleep quality and 53.3% had poor sleep quality. Poor sleep quality was mostly prevalent among those in the early years of medical education, caffeine consumers, cigarette smokers, those with fairly bad and very bad subjective sleep quality, those with sleep latency above 30 min, sleep duration less than 7 h, fairly bad and very bad daytime functioning, those taking sleep medications, and those with sleep disturbance, and sleep efficiency below 85%.

Conclusion
Poor sleep quality is highly prevalent among medical students in Egypt.

Keywords:
medical students, Pittsburgh Sleep Quality Index, sleep quality

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Introduction

Sleep is essential for physical and psychological well-being. Sufficient good quality sleep can help promote physical and mental health, quality of life, and reduce proneness to accidents [1].

Good sleep is also required for proper functioning of the immune system and it promotes normal growth in children because the growth hormone is secreted in deep sleep [1]. Prolonged sleep deficiency is linked to an increased risk of cardiac disease, renal disease, stroke, diabetes, obesity, and hypertension [2].

Sleep has an essential role in thinking, attention, learning, memory, decision-making, problem-solving, coping with stress, controlling emotions, and risk-taking behavior [3]. Medical students are more prone to the risk for poor sleep quality due to their special educational conditions, including high levels of stress, work pressures, and night-time duties at some stages [4,5].

Numerous studies have established the deleterious effects of poor sleep quality on resident physicians in various medical as well as surgical specialties [4–6], but studies exploring the quality of sleep among medical students in Egypt are insufficient.

There is no sufficient awareness or proper education provided to medical students about the importance of sleep and the factors affecting sleep quality. Hence, this study intended to explore the quality of sleep of medical undergraduate students in different years of education in Assiut and Mansoura Universities in Egypt.

Hypothesis

We hypothesize that poor sleep quality is highly prevalent among Egyptian medical students.

Aim

The aim of the study was to investigate the prevalence of poor sleep quality among Egyptian medical students. We also aimed to investigate different sociodemographic variables that may influence the quality of sleep among Egyptian medical students.

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Participants and methods

Study design and site of the study

This cross-sectional, questionnaire-based, descriptive study was conducted during the period from April to June 2015 on undergraduate medical students at Assiut and Mansoura Universities in Egypt.

There are 18 public medical schools and two private medical schools in Egypt. Mansoura University was founded in 1972 in Mansoura city. It is located at the north-east of the Nile Delta in Egypt. Assiut University, established in October 1957, is located in Assiut, in Upper Egypt.

Sample size was calculated using the G*power program (Heinrich Heine University Düsseldorf, North Rhine-Westphalia, Germany). A previous study reported that 55.7% of the university students had one or more sleep problems [7]. With α error = 5%, study power 80%, and effect size of 4%, the sample size was calculated to be 1064. We added another 164 (10%) to the sample to compensate for nonresponders: therefore, the final sample size was 1228, which was distributed as 409 Assiut and 819 Mansoura medical students (with a ratio of 1:2 according to the number of students in both faculties); 23 of them were not interested in participating and 23 did not complete the questionnaire and/or were excluded as they were using sedative medications due to a general medical condition.

Inclusion criteria

The study population consisted of 1182 medical undergraduate students including 801 undergraduate students from Mansoura University and 381 from Assiut University. We used a systematic random sampling technique by skipping every third name on the class list. Recruitment and collection of data continued for 7 weeks. Participants were from the first grade to the internship year. The students were evenly recruited from each educational year in each university as follows: from Assiut University we recruited 55 students from each of first, second, and third year, and 54 students from each of fourth, fifth, sixth, and internship year; from Mansoura University we recruited 115 students from each of first, second, and third year, and 114 students from each of fourth, fifth, sixth, and internship year.

Exclusion criteria

Students who were using sedative medications and/or narcotics for any acute or chronic medical condition were excluded from the study.

The students were asked to fill in a self-administered questionnaire that was developed after a literature review and discussions with all the coauthors so as to come up with a suitable data collection tool. The questionnaire was designed in Arabic language, containing questions enquiring about candidates' sociodemographic data and sleep patterns.

Information collected included age, sex, year of education, height, weight, substance use, physical exercise, consumption of caffeinated beverages, working during the study, marital status, studying hours per day, health problem, use of psychotropic drugs, and student's residence during the study.

Ethical consideration

This study was approved by the Research and Ethics Committees of both Universities. Confidentiality was assured to all students who volunteered and none were reimbursed. Students who were willing to participate were given a brief description about the study and its objectives. All participants signed written informed consent.

Instrumental tools used in the study

Pittsburg Quality of Sleep Index

Quality of sleep was measured using the Pittsburgh Sleep Quality Index (PSQI). This self-administered questionnaire assesses the quality of sleep during the previous month and contains 19 self-rated questions yielding seven components: subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbances, use of sleep medications, and daytime dysfunction. Each component is scored from 0 to 3, yielding a global PSQI score between 0 and 21, with higher scores indicating lower quality of sleep. The PSQI is useful in identifying good and poor sleepers. A global PSQI score more than 5 indicates that a person is a poor sleeper, having severe difficulties in at least two areas or moderate difficulties in more than three areas [8].

The Arabic version of the questionnaire used in this study, which was translated and validated through previous research [9].

Statistical analysis

Data were collected, coded, revised, and fed into the Statistical Package for Social Science (SPSS), version 20 (SPSS Inc., Chicago, Illinois, USA). Qualitative data were presented as number and percentages; quantitative data with parametric distribution were presented as mean, SDs and ranges. The χ^2-test was used to compare between two groups with qualitative data. The comparisons between two independent groups with quantitative data and parametric distribution were carried out by using the Independent *t*-test. Logistic regression analysis was used to assess the predictors of poor sleep. The confidence interval was set to 95% and the margin of error accepted was set to 5%. A statistical level of significance was set at less than 0.05.

Results

Sociodemographic and clinical characteristics of participants

As shown in Table 1, a total of 1182 medical students participated in this survey. There was a female predominance (female 67.7%), with participants' mean age being 21.4 years (range 18–24 years old): 98.1% were single and 1.9% were married; 17.2% took medications for

Table 1 Socio demographic and clinical characteristics of the study sample

	n (%)
Sociodemographic characteristics of the study sample	
Gender	
Male	382 (32.3)
Female	800 (67.7)
Cigarette smoking	
No	1142 (96.6)
Yes	40 (3.4)
Substance use	
No	1157 (97.9)
Yes	25 (2.1)
BMI	
<25	662 (56.0)
25–29.9	390 (33.0)
>30	130 (11.0)
Physical exercise	
No	739 (62.6)
Yes	442 (37.4)
Caffeine consumption	
No	172 (14.6)
Yes	1010 (85.4)
Year of education	
First year	119 (10.1)
Second year	170 (14.4)
Third year	168 (14.2)
Fourth year	226 (19.1)
Fifth year	144 (12.2)
Sixth year	253 (21.4)
Internship	102 (8.6)
Work during the study	
No	959 (81.2)
Sometimes	186 (15.7)
Part time	24 (2.0)
Full time	12 (1.0)
Marital status	
Single	1160 (98.1)
Married	22 (1.9)
Studying hours/day (h)	
Less than 2	210 (17.8)
>2–4	355 (30.0)
>4–6	428 (36.2)
>6	189 (16.0)
Health problem	
No	920 (77.8)
Yes	262 (22.2)
Medication for medical condition	
No	979 (82.8)
Yes	203 (17.2)
Student's residence during study	
With family	723 (61.2)
University campus	301 (25.5)
Outside campus	158 (13.4)
Clinical characteristics of the study sample	
Subjective sleep quality	
Very good	302 (25.5)
Fairly good	658 (55.7)
Fairly bad	121 (10.2)
Very bad	101 (8.5)
Sleep latency (min)	
>0 and <15	293 (24.8)
>15 and <30	450 (38.1)
>30 and <60	291 (24.6)
>60	148 (12.5)
Sleep duration (h)	
>7	610 (51.7)
6–7	332 (28.1)
5–6	150 (12.7)
<5	89 (7.5)
Sleep efficiency (%)	
>85	1102 (93.3)
75–85	56 (4.7)
65–74	15 (1.3)
<65	8 (0.7)
Sleep disturbance	
None	85 (7.2)
Mild	782 (66.2)
Moderate	297 (25.1)
Severe	18 (1.5)
Sleep medications	
None	1078 (91.2)
Less than once a week	53 (4.5)
Once a twice a week	29 (2.5)
Three or more times a week	22 (1.9)
Daytime dysfunction	
Very good	88 (7.4)
Fairly good	518 (43.8)
Fairly bad	423 (35.8)
Very bad	153 (12.9)
PSQI interpretation	
Good sleeper	552 (46.7)
Poor sleeper	630 (53.3)

PSQI, Pittsburgh Sleep Quality Index.

a general medical condition; 3.4% reported smoking cigarettes; 2.1% reported psychoactive substance use; 61.2% lived with their families, 25.5% lived in university campus, and 13.4% lived in outside campus.

Mean BMI was 24.9 (SD ± 4). BMI was less than 25 in 56% of the participants, in the range 25–29.9 in 33% and greater than 30 in 11%. In our sample, 62.6% reported regular physical exercise, and 85.4% reported daily consumption of caffeinated beverages. During the study, 15.7% worked sometimes, 2% worked part time, and 1% worked full time.

Of the participants, 51.7% reported sleeping more than 7 h/day, 28.1% reported sleeping 6–7 h/day, 12.7% reported sleeping 5–6 h, and 7.5% reported sleeping less than 5 h/day. Of the studied sample, 8.9% of the participants had used sleep medication in the past 1 month.

With regard to the self-rated sleep quality, 25.5% of the participants reported very good sleep quality, 55.7% reported fairly good sleep quality, 10.2% reported fairly bad sleep quality, and 8.5% reported very bad sleep quality.

Of the students, 93.3% reported sleep efficiency of above 85%, 4.7% reported sleep efficiency of 75–85%, 1.3% reported sleep efficiency of 65–74%, and 0.7% reported sleep efficiency of less than 65%.

The sleep latency was reported to be less than 15 min in 24.8% of the students, greater than 15 and less than 30 min in 38.1%, greater than 30 and less than 60 min in 24.6%, and greater than 60 min in 12.5% of the students. Sleep disturbance was reported to be mild in 66.2%, moderate in 25.1% of the students, and severe in 1.5%. Daytime dysfunction was reported to be fairly bad to very bad in 48.7% of the students.

The mean PSQI score was 6.01 (SD ± 2.73). According to PSQI interpretation, 46.7% of the participants had good sleep quality and 53.3% had poor sleep quality.

Table 2 Comparison between socio demographic and clinical variables in terms of gender

	n (%)		χ^2-test	
	Male	Female	χ^2	*P*-value
Comparison between sociodemographic variables in terms of gender				
Cigarette smoking				
No	345 (90.3)	797 (99.6)	68.553	0.000
Yes	37 (9.7)	3 (0.4)		
Substance use				
No	361 (94.5)	796 (99.5)	31.188	0.000
Yes	21 (5.5)	4 (0.5)		
BMI				
<25	181 (47.4)	481 (60.1)	20.629	0.000
25–29.9	142 (37.2)	248 (31.0)		
>30	59 (15.4)	71 (8.9)		
Physical exercise				
No	147 (38.5)	592 (74.1)	139.946	0.000
Yes	235 (61.5)	207 (25.9)		
Daily caffeine intake				
No	42 (11.0)	130 (16.2)	5.743	0.017
Yes	340 (89.0)	670 (83.8)		
Year of education				
First year	37 (9.7)	82 (10.2)	33.242	0.000
Second year	54 (14.1)	116 (14.5)		
Third year	53 (13.9)	115 (14.4)		
Fourth year	61 (16.0)	165 (20.6)		
Fifth year	61 (16.0)	83 (10.4)		
Sixth year	102 (26.7)	151 (18.9)		
Internship	14 (3.7)	88 (11.0)		
Work during the study				
No	283 (74.1)	676 (84.6)	23.022	0.000
Sometimes	78 (20.4)	108 (13.5)		
Part time	15 (3.9)	9 (1.1)		
Full time	6 (1.6)	6 (0.8)		
Marital status				
Single	380 (99.5)	780 (97.5)	5.529	0.019
Married	2 (0.5)	20 (2.5)		
Studying hours (h)				
Less than 2	99 (25.9)	111 (13.9)	33.389	0.000
>2–4	121 (31.7)	234 (29.2)		
>4–6	106 (27.7)	322 (40.2)		
>6	56 (14.7)	133 (16.6)		
Health problem				
No	312 (81.7)	608 (76.0)	4.827	0.028
Yes	70 (18.3)	192 (24.0)		
Medication for medical condition				
No	323 (84.6)	656 (82.0)	1.186	0.276
Yes	59 (15.4)	144 (18.0)		
Student residence during study				
With family	226 (59.2)	497 (62.1)	11.285	0.004
University campus	87 (22.8)	214 (26.8)		
Outside campus	69 (18.1)	89 (11.1)		
Comparison between clinical variables in terms of gender				
Subjective sleep quality				
Very good	102 (26.7)	200 (25.0)	3.887	0.274
Fairly good	200 (52.4)	458 (57.2)		
Fairly bad	40 (10.5)	81 (10.1)		
Very bad	40 (10.5)	61 (7.6)		
Sleep latency (min)				
>0 and <15	84 (22.0)	209 (26.1)	6.080	0.108
>15 and <30	160 (41.9)	290 (36.2)		
>30 and< 60	98 (25.7)	193 (24.1)		
>60	40 (10.5)	108 (13.5)		
Sleep duration (h)				
>7	185 (48.6)	425 (53.1)	5.047	0.168
6–7	113 (29.7)	219 (27.4)		
5–6	58 (15.2)	92 (11.5)		
<5	25 (6.6)	64 (8.0)		
Sleep efficiency (%)				
>85	356 (93.2)	746 (93.4)	3.908	0.272
75–85	15 (3.9)	41 (5.1)		
65–74	8 (2.1)	7 (0.9)		
<65	3 (0.8)	5 (0.6)		
Sleep disturbance				
None	18 (4.71)	60 (7.5)	30.333	0.000
Mild	224 (58.64)	558 (69.8)		
Moderate	122 (31.94)	170 (21.3)		
Severe	18 (4.71)	12 (1.5)		

Table 2 (*continued*)

Sleep medications				
None	341 (89.3)	737 (92.1)	5.720	0.126
Less than once a week	22 (5.8)	31 (3.9)		
Once a twice a week	8 (2.1)	21 (2.6)		
Three or more times a week	11 (2.9)	11 (1.4)		
Daytime dysfunction				
Very good	35 (9.2)	53 (6.6)	14.583	0.002
Fairly good	171 (44.8)	347 (43.4)		
Fairly bad	146 (38.2)	277 (34.6)		
Very bad	30 (7.9)	123 (15.4)		
PSQI interpretation				
Good sleeper	185 (48.4)	367 (45.9)	0.678	0.410
Poor sleeper	197 (51.6)	433 (54.1)		

PSQI, Pittsburgh Sleep Quality Index.

Gender differences in sociodemographic and clinical variables

There was a significant difference in terms of gender with more prevalence in males regarding cigarette smoking, substance use, physical exercise, work during the study, and living outside the campus ($P = 0.000$, 0.000, 0.000, 0.000 and 0.004, respectively). There was a significant difference in terms of gender in marital status, with more married females ($P = 0.019$) and more females living with family or in the university campus ($P = 0.004$).

There was a significant difference in subjective daytime dysfunction with respect to gender, with more dysfunction and more sleep disturbance in males ($P = 0.002$ and 0.000, respectively).

However, there was no significant difference with respect to gender in subjective sleep quality ($P = 0.274$), sleep latency ($P = 0.108$), sleep duration ($P = 0.168$), sleep efficiency ($P = 0.272$), and taking sleep medications ($P = 0.126$). This is shown in Table 2.

Relation between quality of sleep and different variables

There was a significant difference in the PSQI interpretation with year of education ($P = 0.004$), caffeine intake ($P = 0.000$), cigarette smoking ($P = 0.031$), subjective sleep quality ($P = 0.000$), sleep latency ($P = 0.000$), sleep duration ($P = 0.000$), sleep efficiency ($P = 0.000$), daytime dysfunction ($P = 0.000$), sleep medications ($P = 0.000$), and sleep disturbance ($P = 0.000$) (Table 3).

By applying logistic regression analysis, we found a significant relation between poor sleep quality and each of the following: year of education, caffeine consumption, and cigarette smoking (Table 4).

Poor sleep quality was mostly prevalent among those in the early years of medical education; caffeine consumers; cigarette smokers; those with fairly bad and very bad subjective sleep quality; those with sleep latency above 30 min, sleep duration less than 7 h, and fairly bad and very bad daytime functioning; those taking sleep medications; and those with sleep disturbance and sleep efficiency below 85%.

There was no statistically significant relation between sleep quality as indicated by PSQI and either sex ($P = 0.410$), age ($P = 0.180$), marital status ($P = 0.754$), BMI ($P = 0.990$), physical exercise ($P = 0.372$), work while studying ($P = 0.488$), studying hours ($P = 0.948$), and residence during the study ($P = 0.223$) (Table 3).

Discussion

To our knowledge, the present study was the first large-scale study to assess sleep quality and habits among Egyptian medical students in a culture-specific context. PSQI global scores indicated that poor sleep was common in this group. While poor sleep appears to be quite common among medical students, the reported variations between different studies may be influenced by different socioeconomic demands and cultural habits among the different population group.

In this study, 53.3% of the medical students had poor sleep quality. A study conducted on the medical students of Zahedan University in Iran showed that poor sleep quality was prevalent among medicine students and about 62.4% of the participants suffered from poor sleep [2]. This prevalence was higher than that of our study, and this could be attributed to geographical or cultural factors.

The prevalence of poor sleep in our study was higher than that reported in other universities (about 12–40%), and this could be attributed to poor living conditions, especially in campuses, or to cultural reasons or harder educational conditions in our universities [3–5,10]. In an Egyptian study by Ibrahim and Abouelezz [11] on nonmedical students, 62% of university students suffered from significant sleep disturbance, which was comparable to our results on account of similar cultural and geographical conditions.

Preisegolaviciute *et al.* [12] conducted a study in Lithuania in 2010 comparing sleep quality in medical students and law students. They found that poor sleep quality was more prevalent among medical students. They explained that this could be due to long studying hours and reading before bedtime.

Regarding the subjective sleep quality, 18.7% of the students in our study reported fairly bad to bad subjective sleep quality. This is higher than what was found in medical students in a university in Estonia, where 7% of the medical students had poor to very poor sleep quality [5]. This could be explained by more stressful educational system, higher burden on the students or different sociodemographic variables in Egypt.

Table 3 Relation between PSQI and different variables

	n (%)		χ^2-test	
PSQI interpretation	Good sleeper	Poor sleeper	χ^2	*P*-value
Gender				
Male	185 (48.4)	197 (51.6)	0.678	0.410
Female	367 (45.9)	433 (54.1)		
Age				
Mean ± SD	21.66 ± 1.60	21.35 ± 1.66	1.345	0.180
Range	18–27	18–29		
Student residence during study				
With family	352 (48.6)	372 (51.4)	2.801	0.246
University campus	130 (43.3)	170 (56.7)		
Outside campus	70 (44.3)	88 (55.7)		
Year of education				
First year	44 (36.7)	76 (63.3)	18.982	0.004
Second year	69 (40.8)	100 (59.2)		
Third year	74 (44.0)	94 (56.0)		
Fourth year	102 (45.1)	124 (54.9)		
Fifth year	66 (45.8)	78 (54.2)		
Sixth year	141 (55.7)	112 (44.3)		
Internship	56 (54.9)	46 (45.1)		
Caffeine consumption				
No	105 (61.4)	66 (38.6)	17.363	0.000
Yes	447 (44.2)	564 (55.8)		
Cigarette smoking				
No	540 (47.3)	602 (52.7)	4.639	0.031
Yes	12 (30.0)	28 (70.0)		
Physical exercise				
No	338 (45.7)	401 (54.3)	0.797	0.372
Yes	214 (48.4)	228 (51.6)		
Marital status				
Single	541 (46.6)	619 (53.4)	0.098	0.754
Married	11 (50.0)	11 (50.0)		
BMI				
Mean ± SD	24.84 ± 3.95	25.03 ± 4.05	−0.810	0.418[a]
Range	15.57–47	15.57–46.82		
Work during the study				
No	451 (47.0)	508 (53.0)	2.432	0.488
Sometimes	86 (46.2)	100 (53.8)		
Part time	8 (33.3)	16 (66.7)		
Full time	7 (58.3)	5 (41.7)		
studying hours/day (h)				
Less than 2	100 (47.6)	110 (52.4)	0.363	0.948
2–4	169 (47.6)	186 (52.4)		
>4–6	196 (45.8)	232 (54.2)		
>6	87 (46.0)	102 (54.0)		

PSQI, Pittsburgh Sleep Quality Index.
[a]Independent *t*-test.

Table 4 Logistic regression analysis for the predictors of poor sleep

				95% CI for OR	
	B	Significance	Odds ratio	Lower	Upper
Year of education	−0.132	0.000	0.876	0.823	0.933
Caffeine consumption	0.697	0.000	2.007	1.44	2.798
Cigarette Smoking	−0.739	0.035	0.478	0.241	0.949

CI, confidence interval; OR, odds ratio.

This study demonstrates that medical students sleep less than the amount of sleep recommended by the National Sleep Foundation. In our sample, 48.3% of the participants slept 7 h or less daily, and 20.2% slept less than 6 h. According to the National Sleep Foundation, young adults between the ages of 18 and 25 need 7–9 h of sleep daily [13]. Medical students probably accept sleep deprivation as a requirement for their educational needs.

This finding is in keeping with many other studies in which sleep deprivation has been shown to be prevalent among medical students and associated with daytime dysfunction and medical errors [14,15].

In terms of gender, we did not find a significant relation to sleep quality as indicated by the PSQI. This finding is in agreement with what Feng *et al.* [10] found in China, but in contrast to that found by Lashkaripour *et al.* [2] in Iran, who

found that poor sleep quality was more prevalent among female medical students than among male medical students. Our findings are also in contrast to what was found by Nojomi *et al.* [3], where poor sleep quality was shown to be more prevalent among male medical students.

Some researchers found gender-related differences, such as Eller *et al.* [16] who found that sleep disturbances, nightmares, and daytime fatigue are more prevalent in females, whereas sleep latency is more prevalent in males.

We could not establish a statistically significant difference in PSQI interpretation in relation to residence during the study. This is different from what was found in many studies, where the majority of medical students with sleep problems lived in campuses. These studies concluded that the noisy conditions and harsh living conditions in campuses could be a reason for this finding [6,17]. Our results may be different due to the differences between dormitory conditions.

In this study, sleep quality did not differ with different marital status. This result was in keeping with the findings of Ohayon and Smirne [18]. Moreover, results from Zanjan University were in contrast to our findings, where poor sleep quality was more prevalent among married individuals than among bachelors. They explained that this might be because of economic problems or concerns associated with being away from family [4].

In our study, poor sleep was more prevalent among those in earlier class years than those in later class years. It is possible that later-year students may have developed better coping strategies for their educational stress and requirements. This is in agreement with the findings of some studies [5], but in contrast to those of others where poor sleep quality was reported to be more prevalent among older students. They attributed this to harder curriculum, financial or family-related stresses in older students [3].

The American Sleep Disorders Association considers physical exercise to be a modality of nonpharmacological treatment for some sleep disorders [19]. In our study, we did not find a significant difference in sleep quality between students who exercised and those who did not. Diverse results were found in studies on the effect of exercise on sleep, because of different confounding variables such as type and intensity of the exercise, and the time of the day at which the exercise is performed.

Our study demonstrated that the workload of participants was not associated with poor sleep. This was different from what was found by Nojomi and colleagues in 2009, who established that students who worked full-time had poorer sleep quality. They explained that workload on students can be associated with later bedtime, late caffeine consumption, or higher level of stress [3]. Our results could be different because of the small percentage of participants who worked during their education.

Although 53.3% of the participants had poor sleep quality according to PSQI impression, only 18.7% rated themselves as having fairly bad to very bad subjective sleep quality, which shows that they underestimated the problem and thought their sleep was good.

Strengths and limitations

(1) This was one of the few studies to explore the quality of sleep in different academic classes of medical undergraduate students in Egypt, with students recruited from two large Egyptian Universities representing different classes and systems of education.
(2) To our knowledge, this is the largest study among medical students not just in Egypt but in the Middle East.
(3) This study was conducted at two public medical Universities. We suggest multicenter study involving both private and public universities to improve generalizability and comparison.
(4) The self-reporting of sleep/wake habits used in the study relies on the students, which raises the possibility of recall bias.
(5) We did not use a tool to diagnose sleep disorders.

Conclusion

Poor sleep quality is highly prevalent among medical students in Egypt. Our data demonstrate that poor sleep quality is a considerable issue among medical students. Poor sleep quality was associated with early years of medical education, caffeine consumers, cigarette smokers, those with fairly bad and very bad subjective sleep quality, sleep latency above 30 min, sleep duration less than 7 h, fairly bad and very bad daytime functioning, those taking sleep medications, those with sleep disturbance and sleep efficiency below 85%.

Recommendations

(1) The use of objective actigraphy measurements to avoid recall bias, and the use of a diagnostic tool to diagnose different sleep disorders.
(2) Conducting polysomnography to rule out primary sleep disorder such as sleep apnea or periodic limb movements.
(3) Further studies are needed on how to improve the quality of sleep of this special group of population.

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Conflicts of interest

There are no conflicts of interest.

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