Daytime Sleepiness and Academic Performance among Medical Students

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Abstract

The study aimed to examine the prevalence of daytime sleepiness among medical students and to explore its relationship with academic performance. A total of 161 consenting Saudi male medical students aged 18 and above participated in this cross-sectional survey done in Prince Sattam Bin Abdulaziz University in Alkharj, Saudi Arabia. All subjects answered a generalized questionnaire that was piloted and included information on demographics and Epworth-sleepiness scale (ESS). Excessive daytime sleepiness was observed in 37.8% of the subjects. Only 22 (13.7%) of the subjects had less than 4 hours of sleep while majority (70.8%) fell within 4-8 hours. Comparison between subjects with normal sleep versus those with excessive daytime sleepiness revealed no significant differences, including GPA scores. Excessive daytime sleepiness is common among Saudi male medical students and this does not seem to influence GPA scores. Prospective studies are needed to validate the present findings.

Keywords: Daytime sleepiness; Epworth scale; Academic performance

Introduction

Sleep is considered an essential factor for good memory, enhanced learning process and mood stability [1]. It has been observed that sleep deprivation among students can lead to psychological dysfunction and adversely affect their academic performance [1-4]. Furthermore, insufficient sleep hours at night can substantially influence general health and quality of life [5]. In particular, insufficient sleep and daytime sleepiness among medical staff are associated with increased risk of road traffic and workplace accidents as well as medical errors [6-8]. Daytime sleepiness among medical students were attributed to irregular bedtime, early waking up and excessive intake of caffeine products and stimulants [9].

Obesity was also significantly factor related to excessive daytime sleepiness [10]. Most students reported insufficient sleep at night, and almost 70% of them reported sleeping less than 8 hours [11]. Students more often than not neglect that poor sleeping habits may affect their educational performance [12]. Daniel et al. observed that reduced family supervision, exposure to new environment and difficulties encountered during study can lead to irregular sleep patterns and hence, sleep deprivation [13].

Studies done in the Kingdom of Saudi Arabia found that the prevalence of stress among medical students, regardless of the academic level, was 63.8%. This high levels of stress may have a negative effect on cognitive functioning and learning of students in a medical school [14]. To cope with stress, most medical students compensate by excessive daytime sleepiness, with most of them having moderate to high level of sleepiness [15]. This rate of daytime sleepiness worsens as medical students progress through their academic life, translating to poor academic performance during examinations [16].

While it is known that many factors can negatively affect the academic performance of medical students like decreased nocturnal sleep time, late bedtimes during weekdays and week-end and increased daytime sleepiness [17]. Furthermore, these factors remain underinvestigated in KSA and there are limited studies which failed to find significant associations between daytime sleepiness, psychological stress and academic performance among medical students. This study aims to fill this gap.

Materials and Methods

Patients and questionnaire

This cross-sectional survey was conducted at Prince Sattam Bin Abdulaziz University Main Campus in Al-Kharj, KSA. The study was conducted during November 2013. All medical students from the second to the sixth year were invited in this study. A total of 161 students agreed to take part. Ethical approval was obtained from the College of Medicine Ethics Committee of the University. Group leaders from all levels facilitated in the data collection. The questionnaire was generated to measure daytime sleepiness. It included items based on previously published survey and international validated scales. It consists of three parts. The first part consists of demographics, academic performance (GPA score), sleep pattern, caffeine intake, smoking habits and time allocated for daily activities and habits. In the second part; adapted validated scales were used with permission which includes the Epworth-sleepiness scale (ESS) to assess daytime

sleepiness [18]. This scale targets the students' tendency to fall asleep in 8 different situations and was scored accordingly (0 = never doze, 1 = slight chance of dozing, 2 = moderate chance of dozing, 3 = high chance of dozing). A cumulative number of all items produces a score between 0-24, and respondents scoring > 10 were considered to have excessive daytime sleepiness. A validated Arabic copy for ESS was also used in order to make the scale easier to understand for the students. Those whose scores were > 3 were considered high scorers (have psychological distress) [19]. A pilot study of 15 students were randomly selected to test the study questionnaire, estimate time needed for study and to identify difficulties in comprehending the questionnaire before conducting the main study.

Data analysis

Data were analyzed using SPSS version 20.0 (SPSS Inc., Chicago, IL, USA). Categorical variables were expressed as frequencies and percentages. Continuous variables were expressed as the mean ± standard deviation (SD). Chi-square test was used to compare frequencies between groups. Significance was set at p-value < 0.05.

Results

The general characteristics were presented in Table 1. The total sample size was N=161 and the response rate was 98%. All participants were males. More than half (52.8%) of the participants were in pre-clinical years (second and third years), majority are single and around 57.5% of them are in Al-Kharj during week days. Approximately 52% of the participants have a GPA score of ≥ 4.5. Only 16.8% of the participants were smokers. Regular caffeine consumption was 95.7%. Most common beverages consumed were tea and coffee (57.1% and 70.2% respectively). Most of study participants were doing regular exercise less than 3 times during week days, while only 7.5% have part time job after college. Table 2 showed the different variables in relation to ESS status. Around 45% in the pre-clinical years and 38.8% of clinical years had excessive daytime sleepiness. No significant differences were elicited in all variables compared.

Table 1 Demographic Characteristics of Subjects.

Parameter	N (%)
Age (years)	
18-20	42 (26.1)
≥ 21	119 (73.9)
Academic Year	
2nd	55 (34.2)
3rd	30 (18.6)
4th	24 (14.9)
5th	31 (19.3)
6th	21 (13.0)

Marital Status	
Single	155 (96.3)
Married	5 (3.1)
Divorced	1 (0.6)
Academic Score (GPA)	
≥ 4.5	81 (51.9)
< 4.5	75 (48.1)
Residency	
Riyadh	68 (42.2)
Alkharj	92 (57.2)
Others	1 (0.6)
Smoker	27 (16.8)
Tea Consumption	92 (57.1)
Coffee Consumption	113 (70.2)
Chocolate Consumption	42 (26.1)
Energy Drink Consumption	25 (15.5)
Regular Exercise	
< 3 times	135 (83.9)
≥ 3 times	25 (15.5)
Does part time work	12 (7.5)
Night Sleep Hours	
<4	22 (13.7)
4-8	114 (70.8)
>8	25 (15.5)
Sleep Quality	
Good	24 (14.9)
Average	83 (51.6)
Bad	54 (33.5)
ESS	
Normal	97 (62.2)
Excessive Daytime Sleepiness	59 (37.8)

Note: Total N = 161

Table 2 Demographic Comparisons between Subjects with Normal versus Excessive Sleepiness.

Parameter	ESS		P-Value
	Normal	Excessive Sleepiness	
Age (years)			
18-20	55	45	0.22
≥ 21	65.2	38.8	

Academic Year			
2nd	56.6	43.4	0.23
3rd	55.2	44.8	
4th	89.2	20.8	
5th	58.1	41.9	
6th	73.7	26.3	
GPA Score			
≥ 4.5	62	38	0.8
3.75 - 4.49	60.3	39.7	
< 3.75	75	25	
Smoker	63	37	0.55
Tea Consumption	61.4	38.6	0.47
Coffee Consumption	63.6	36.4	0.34
Chocolate Consumption	70.7	29.3	0.12
Energy Drink Consumption	52	48	0.17
Regular Exercise			
< 3 times	63.1	36.9	0.5
≥ 3 times	56	44	
Does part time work	41.7	58.3	0.1
Night Sleep Hours			
< 4	70	30	0.7
4-8	60.4	39.6	
> 8	64	36	

Most medical students (70.8%) had night sleeping between 4-8 hours during the study days. Using the Epworth Sleepiness Scale (ESS) in this study showed that 59 out of 161 participants had excessive daytime sleepiness while 97 were normal (Figures 1 and 2). Figure 3 shows the distribution of subjects with normal and excessive daytime sleepiness according to year level.
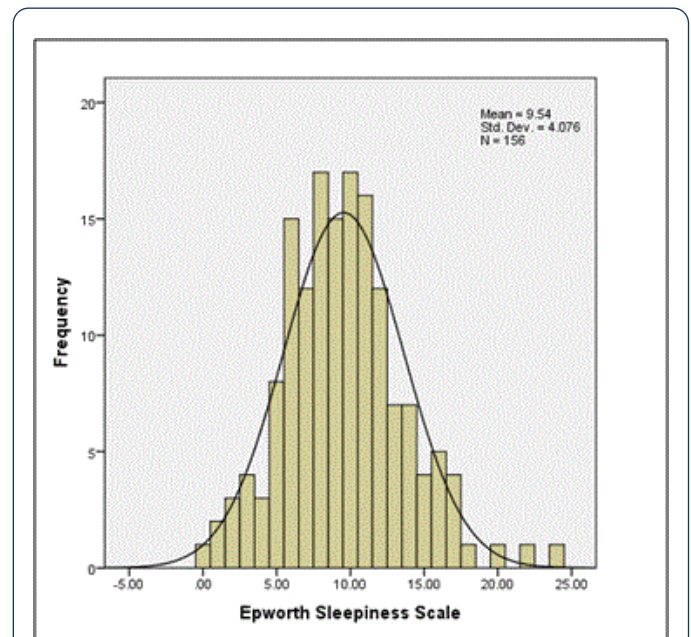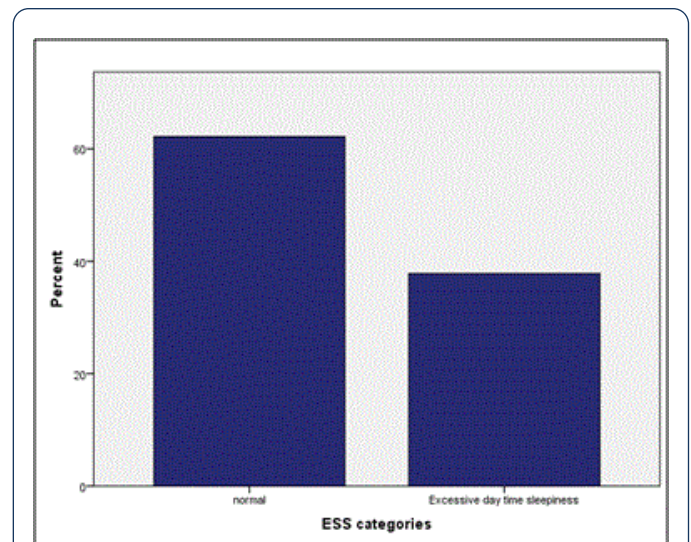

Figure 1 Histogram plot of EPS scores in all subjects.

Figure 2 Percentage comparison of subjects with normal and excessive day time sleepiness.
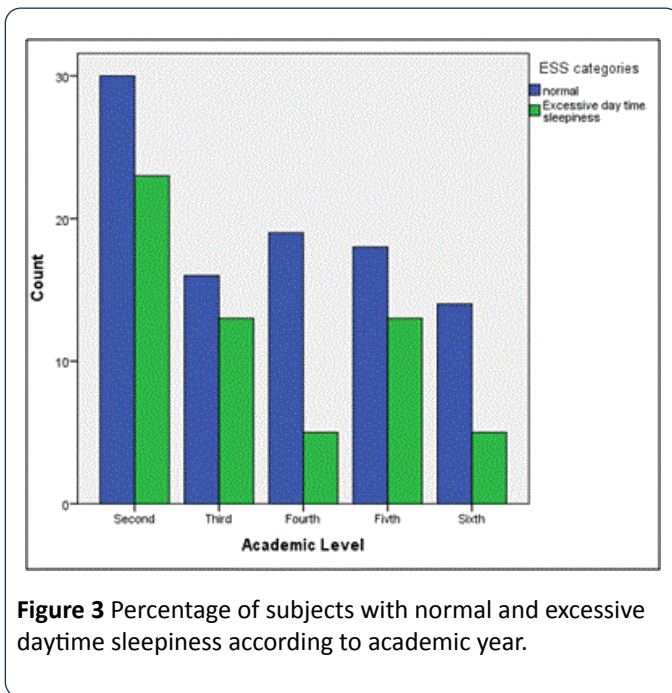
Figure 3 Percentage of subjects with normal and excessive daytime sleepiness according to academic year.

Discussion

The present study aimed to examine the prevalence of daytime sleepiness among medical students and to explore the relationship between daytime sleepiness and academic performance. The prevalence of excessive daytime sleepiness was 37.8% and this does not seem to affect the academic performance of the cohort. The reported prevalence is in comparison with studies done in Pakistan (39.5%) and Malaysia (35.5%) [20,21], but well below the medical students in Brazil (63%) [22].

While no significant difference was elicited in the academic performance of those having normal sleep versus those with excessive daytime sleepiness, it is worthy to note that medical students in KSA, and students in general, are already exposed to academic stress during their earlier school years. This early exposure to stress has been documented in several local studies, indicating high levels of perceived stress among Saudi students entering universities [23,24]. Furthermore, excessive daytime sleepiness and extreme sleep schedules among young Saudis are highly prevalent [25]. In fact, these local observations have been tied more to cardiometabolic disturbances [24]. Given that chronic stress may affect sleeping patterns, most recent studies more concretely associate disturbed sleep patterns with depression and neurobehavioral disorders, rather than academic performance [26,27].

The authors acknowledge several limitations. While ESS questionnaires have been used to assess sleep quality and ESS in most studies, its value in terms of multi-dimensionality casted doubts on its clinical usefulness [28]. Furthermore, the sample size may not be large enough for the findings to be generalized. At best, the present findings are suggestive and further studies are needed to confirm whether or not excessive daytime sleepiness affect academic performance among Saudi medical students.

In conclusion, there is a high prevalence of excessive day time sleepiness among medical students in Alkharj, Saudi Arabia. This disturbed sleep pattern is not associated with academic performance. Longitudinal investigations are warranted to determine whether prolonged sleep disturbances eventually influence the academic performance of this cohort.

Declaration of interest

The authors have no competing interests to declare. The authors have no financial and non-financial conflicts of interest.

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