



RESEARCH ARTICLE

## Sleep quality and the factors affecting the fatigue severity and academic performance of students at AJA university of medical sciences

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### Abstract

**Introduction:** Evidence shows that the majority of medical students experience some kind of sleep quality disorder, which can affect their academic performance. Increasing exposure of students to environmental and academic stresses may result in the incidence of sleep disorders and fatigue, which can consequently influence their academic efficacy. This study was conducted to determine the factors affecting sleep quality and its correlation with students' fatigue severity and academic performance at AJA University of Medical Sciences, during 2012-2013.

**Materials and Methods:** This descriptive, analytical study was performed on 658 students studying at all levels at AJA University of Medical Sciences. Having taken informed consent from the participants, they were selected through census sampling. The instruments for data collection comprised of demographic and academic performance questionnaires, Pittsburgh Sleep Quality Index and Fatigue Severity Scale, which were completed by the participants during the first semester, 2012-2013. The obtained data were analyzed by SPSS-17 software using chi-square test and Spearman and Pearson correlation coefficients.

**Results:** Sleep quality was reported to be poor in 49.2% of students. A total of 19.8% and 67.2% of students suffered from severe and moderate fatigue, respectively. The mean grade point average (GPA) of students was 16.75. The results of chi-square (for qualitative variables) and Pearson correlation coefficient (for quantitative variables) indicated a statistically significant correlation between sleep quality and age, number of units, ideological-security units, entry year, semester, academic level, major, gender, residence, living status, daily caffeine consumption, history of depression, history of stressful events and fatigue among the study participants ( $P = 0.001$ ). Further, no significant relationship was found between sleep quality and weight, military drill hours, daily and nightly working hours, marital status, cigarette smoking, workout, caffeine consumption at night, different physical-psychological diseases and different kinds of anxiety ( $P > 0.05$ ).

**Conclusion:** Prevalence of poor sleep quality and fatigue is high among students of AJA University of Medical Science. Given the importance of sleep quality and quantity and their effect on academic and non-academic performance of students, favorable conditions are required to be created to provide a good sleep hygiene.

**Keywords:** Fatigue, student, sleep quality, academic performance.

### Introduction

Sleep is a basic need of human being [1] which reduces anxiety and stress and helps individuals to recover the energy required for better concentration and adjustment and to enjoy the daily activities [2]. The significance of sleep for health and disease has been taken into account since the time of Hippocrates, and disturbed sleep has been considered the main cause of human disease at any age [3]. Sleep disorder is a state characterized by disturbed sleep pattern and behavior [4], accompanied by such symptoms as negative mood, poor social performance, depression, anxiety, panic disorder,

confusion during the day, fatigue, physical and mental diseases, reduced quality of life, organic diseases, cutaneous lesions, weight loss and daily sleepiness [5].

Chronic sleep disorders are associated with numerous risk factors like gastrointestinal disorders and cardiovascular diseases [6]. Inadequate sleep is directly related to increased concern about health, poor health, susceptibility, depression, fatigue, concentration and attention problems and poor academic performance [7].

On the other hand, fatigue can be proposed as an important and natural response to intense physical activities,

long-term psychological stress and sleep deprivation [5, 8]. Fatigue greatly affects many aspects of the people's life. It negatively influences the life of people by exerting its effect on their ability in performing activities and precious living roles [9]. Studies have shown that sleep disorders are a common phenomenon in university environments [10]. Several qualitative and quantitative studies have estimated the students' sleep quality to be lower than that of the general population [7], possibly due to their higher levels of stresses and concerns, or academic stress and more study [11].

Medical students are exposed to sleep disorders because of the need to work at night in some occasions, higher levels of stress and work pressure. Also, living at dormitory, attending a new social environment, academic assignments and change of sleep location may cause a reduction in sleep quality in this group of people [12, 13, 14]. Moreover, sleep deprivation can affect the students' academic status and daily classroom performance [15, 16]. Hence, based on the importance of sleep quality and quantity and their effect on the academic performance of medical students, who have heavy responsibilities owing to their future career, the present study was aimed to evaluate the factors affecting the sleep quality and its correlation with fatigue severity and academic performance of students at AJA University of Medical Sciences.

## Methods

This descriptive, analytical study was carried out on the students studying in the second semester at AJA University of Medical Sciences in the academic year 2012-2013. All students were selected through census method. Taking the ethical considerations into account, obtaining permission from the concerned authorities and explaining the research objectives, taking informed consent from the students and promising to keep the data confidential, the researchers embarked on data collection.

For data collection, in addition to the researcher-made questionnaire on demographic information, including age, gender, marital status, major, academic level, number of units, etc., Pittsburgh Sleep Quality Index, revised and designed by Carol Smith in 2007 [17], was used to measure sleep quality and patterns. This questionnaire has 9 general questions and 7 components, including mental sleep quality, sleep delay (the time it takes a person to sleep), sleep duration, sleep sufficiency (ratio of real sleep to the time a person spends in bed), disturbed sleep, use of sleep medications and drowsiness while doing daily activities. Most of the questions were short and understandable multiple-choice, scored from

0 to 3. The higher the scores of the questionnaire were, the lower the sleep quality was, and vice versa. The reliability of this scale was 0.83 and its validity, according to various studies, has been reported to be 86.5-89.6 [18].

Another tool for data collection was Krapp's fatigue severity scale (1998), which is a standard tool with high reliability and capable of differentiating depression and sleep disorders from fatigue [19]. It consists of 9 questions that are rated according to Likert scale from 1 to 7. The total score is indicative of the fatigue severity from 1 to 7. Score 7 shows the highest level of fatigue and score 1 indicates lack of fatigue. The reliability and face and content validity of this scale have been confirmed by various domestic and international studies [9, 19, 20, 21, 22].

After preparing the data collection tool and making the required arrangements with the education authorities, the researchers visited the student dormitories and asked the participants to complete the questionnaires. The collected data were analyzed by SPSS-17 software using chi-square test, Fisher's exact test, and Pearson and Spearman correlation coefficients.

## Results

The results showed that 45.2% of units were studying at faculty of paramedical sciences, 8% at faculty of dentistry, 21.9% at faculty of nursing and 24.6% at faculty of medicine.

The majority of research units (63.2%) had been accepted to university in the first semester. Most of the units (58.4%) were undergraduate, 86% were male, 77.8% were single and 70.2% lived in dormitory. A total of 67.4% consumed caffeine daily, 53.8% did not consume caffeine at night, 92.4% were non-smoker, 96% had no history of mental diseases, 74.4% had no history of physical diseases, 54.3% lacked a second job and 88.6% had no experience of critical and stressful events. Also, the majority of units (66%) reported morning fatigue, 73.7% sleepiness, 63.5% delayed class attendance over the past week. 35.4% class absence and 76.9% satisfaction with academic achievement. A total of 324 (49.2%) students were reported to have poor sleep score and 442 (67.2%) of them were found to have moderate fatigue.

[Table 1] shows that the students' total sleep score is significantly correlated with age, number of units, ideological-security units and total fatigue of the study samples, according to the results of Pearson correlation coefficient ( $P=0.001$ ).

**Table 1.** Correlation of total score of sleep with demographic characteristics of the study participants.

Total sleep score Demographic variables	Correlation coefficient	
	†r	p
Age	-481.0	0.000
Weight	720.0	0.597
Height	970.0	0.126
GPA	940.0	0.128
Unit	*722.0	0.000
Ideological-security units	*791.0	0.001
March	480.0	0.171
Daily working hours	100.0	0.984
Nightly working hours	340.0	0.398
Total fatigue	*244.0	0.000

The findings of Pearson correlation coefficient presented in [Table 2] demonstrates a significant correlation between sleep quality and sleepiness in classroom, delayed class attendance and satisfaction with academic achievement ( $P=0.000$ ). Moreover, Pearson correlation coefficient indicated a significant correlation between fatigue severity and components of academic performance (sleepiness in classroom, delayed class attendance and satisfaction with academic achievement) ( $P=0.001$ ).

**Table 2.** Correlation of sleep quality with academic performance of the study participants.

Sleep quality Academic performance	Correlation coefficient	
	†r	p
GPA	0.094	0.126
Sleepiness in classroom	0.498	0.000
Delayed class attendance	0.379	0.000
Satisfaction with academic achievement	0.368	0.000

## Discussion

This study evaluated the sleep quality, factors affecting sleep quality and its relationship with fatigue severity and academic performance of students at AJA University of Medical Sciences in 2012.

The results showed half of the units reported poor sleep quality, which could be attributed to residence at dormitory and encountering such problems as noise, inconsistent sleep patterns, being away from family, and cooling, heating and welfare problems. The results of the studies by Ghanei, Ghoreishi, Aghajanloo, Eslami, Eller, Rezaei, Bawo and Pey-Peng indicated 32-88% of medical students had poor sleep quality [11, 23, 14, 24, 26, 25, 27, 28].

As for the fatigue severity of students of AJA University of Medical Sciences, only 13.1% of units were reported to have no fatigue and others reported degrees of moderate and severe fatigue. The study of Nojomi, Amaducci and Pey-

Peng showed more than half of students reported moderate to severe fatigue [28, 30, 29], which is in line with the results of above studies. The research conducted by Eslami revealed that half of the students were feeling fatigue; however, Pittsburg Sleep Quality Index had not been used to gather data in this study [14]. Moreover, in the study of Eller, fatigue was reported as a common finding among the students with poor sleep quality [23].

The analysis of the correlation of sleep quality and fatigue severity with academic performance of students of AJA University of Medical Sciences showed a significantly direct correlation between fatigue severity and sleep quality and sleepiness, delayed class attendance and satisfaction with academic achievement. However, no correlation was reported for grade point average (GPA).

The study of Eslami showed fatigue and lack of freshness during the day to be the common consequences of sleep disorders among the students. Also, sleepiness in classroom (45.5%), delayed class attendance (23%) and class absence (20.6%) were the other consequences (14). In the study of Ghoreishi, 47.5% of students with a GPA less than 16 and 32% with A GPA more than 16 were reported to have poor sleep quality [11]. Moreover, Eller et al analyzed the sleep quality of 413 medical students in Estonia in 2006 and reported a high frequency for disturbed sleep, disturbed sleep continuity, morning fatigue, sleepiness during the day, nightmare and waking up earlier than usual in the morning [23].

In addition, Pallos et al carried out a study to evaluate the incidence of sleep disorders and the following consequences among the students of Kyoto University, Japan. They reported such consequences of sleep disorders as fatigue, disturbed health, drowsiness and class absence [31]. Further, Pagal reported 69.7% of students had a low level of energy and suffered from sleep disorder and 27.7% of students with sleep disorder suffered from concentration and attention problems [32]. In the present study, the majority of units reported morning fatigue, sleepiness and delayed class attendance during the past week, which is in line with the results of abovementioned studies.

Furthermore, the findings of the study by Lowry indicated a significant relationship between students' scores and their sleep quality [33]. However, in the current study a statistically significant correlation was found between fatigue and sleep quality and delayed class attendance and satisfaction with academic achievement, but not between fatigue and sleep quality and GPA. This difference can be due to the difference in the study population and academic environment. It should be pointed out that the criteria for accepting students to AJA University of Medical Sciences, in addition to the score of nationwide university entrance examination, involve

complete physical and mental health. Also, owing to their career nature in the future, these students pass special courses concerning professional empowerment, in addition to the usual courses the same as other universities, which seems to enhance their adaptability to difficult conditions. Since the workplace of these students after graduation is selected according to their academic performance, it encourages them to study more efficiently and continuously during the semester, which can result in a higher GPA.

The limitations of this study include the physical and psychological states of the research units during the past few weeks before the study was initiated, which was out of the control of the researchers. Moreover, the sleep quality and fatigue severity of students were measured based on their own remarks; hence, future studies are recommended to employ other evaluation methods to measure these variables.

### Conclusion

Poor sleep quality and fatigue are prevalent among the students of AJA University of Medical Sciences. Given the significance of sleep quality and quantity and their effect on academic and non-academic performance of students, appropriate conditions for a desirable sleep hygiene are suggested to be created and facilities of dormitory are required to be taken more into consideration.

### Conflicts of Interest

There are no conflicts to declare.

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