Research Article

Prevalence of Sleep Pattern and its Effect on Health among Medical Students in Majmaah, Saudi Arabia

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Abstract

Background: Sleep is a physiological process essential to life. Its quality is strongly related to physical and psychological health. Good sleep pattern is important to increase our mental, functional health, memorizing and learning skill. The daily sleep hours required for normal people are seven hours. Insufficient sleep may lead to many problems like decrease in ability to learn, memorize, gathering information and cognitive impairment. **Methodology:** It is a cross sectional study among male and female students of Majmaah University. All the data will be entered in the SPSS software and statistical analysis will be done to find out the prevalence and association of the sleep pattern with academic performance among medical student. **Result:** A total of 49 (37.7%) students acknowledged having sleep disorder in their response. More number of male students (29.2%) complained of insomnia than female students (8.5%) which was statistically significant ($p<0.05$). More number of female students (28.1%) replied that they had no difficulty sleeping at night before the exams and were satisfied with their GPA scores than male students (11.2%). **Conclusion:** Regular and timely sleep is necessary for a health body and mind particularly for medical students who are stressed out already due to their academic demands.

Keywords: Sleep disorders; GPA scores; Smoking; Medical students; Saudi Arabia

Introduction

Studies have established firmly that there is a distinct association between insufficient sleep per day and worsening health related quality of life to the same extent as chronic diseases like heart failure or depression.[1] A chronic disturbance in the natural sleep cycle can lead to physical, mental and psychological problems that will continue to multiply leading to high morbidity and disability. In fact recent studies have indicated that more than the health related outcome there is also work related loss and impact on productivity leading to increasing economic burden.[2,3] Other studies have pointed out the increasing utilization of healthcare services by people affected with lack of sleep due to stress, responsibilities and overburden.[4,5] This health related problem is one of the significant topics continuously being researched round the world. In Saudi Arabia, sleep disorder studies are primarily done among obese population which reflects the principal risk factor associated with it.[6,7] Most of the studies concentrate on the adverse effect of reduced sleep duration and poor sleep quality. This leads to manifestation of poor health due to low immunity, opportunistic infections and overall morbidity among the affected people.[8,9]

Keeping in view the importance of sleep among all people young or old, it is duly emphasized that healthy sleeping habits are a must for everyone. It is so important particularly for people who are leading a stressful life like students pursuing higher education particularly in the field of medicine. Insufficient sleep is a precursor to a host of illnesses in the long term. As this kind of study has not been attempted before in Majmaah before, we have tried to find out the effect of insufficient sleep and its pattern that can affect the health of medical students.

Review of Literature

Worldwide, most of the literatures keep focusing on good quality sleep for better cognitive performance among medical students or students in general. In fact, there studies have emphasized that sleep disorders have a great impact on psychological profile of students apart from physical manifestations of associated stress.[10-12] Some studies have pointed out the distress that students face during daytime due to the problem in having adequate sleep at night.[13] Also, there are demographic variations in the population around the world but the problems associated with not having a good sleep remains quite similar. Prevalence studies done worldwide have shown that this is an endemic problem among medical students and one of the primary reasons for their low academic score.[14,15] The associated risk factors that lead to insomnia or sleep disorders are smoking, drinking tea or coffee, eating late in the night, snoring, playing video games or browsing the social media, and being outside the house late in

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the night. Studies have shown that they are major predictors of sleep disorders around the world, particularly among the college going students.[16,17] One study in Iran associated difficulty in sleeping with physical inactivity among the college going students.[18] Haile YG et al showed a statistically significant association between sleep disorder and headache among university students.[19] A study in Germany concluded that medical students should also be taught health promotion based on activity and relaxation during their undergraduate course. [20] All these stress factors that are associated with the medical student lead to unhealthy habits and that includes sleeping late and feeling drowsy during the day which becomes a vicious cycle.[21]

This study was aimed to achieve a baseline objective of finding out the health effects due to abnormal sleep pattern among medical students including the risk factors associated with it. Also, it would add valuable information about the demographic characteristics and lifestyle of medical students peculiar to Majmaah leading to health disorders at this juncture of life.

General objective

To study the prevalence of sleep pattern and its effect on health among medical student in Majmaah University in Majmaah, KSA

Specific objectives

• To determine the prevalence of sleep pattern disorders among medical students.

• To identify the possible risk factors associated with sleep patterns disorders.

• To compare the academic performance of the medical students in relation to their sleep patterns.

• To give recommendations on improving the sleep pattern to maintain good health.

Methodology

Study design:

This is a cross sectional study to find out the prevalence and risk factors associated with sleep pattern among medical students.

Study setting:

This study was conducted in the College of Medicine in Majmaah University, Majmaah city, KSA.

Target population:

This study was conducted among the male and female medical students in Majmaah University in Majmaah, KSA.

Sample size:

All the male and female students who are currently studying in the College of Medicine, Majmaah University were included in the study.

Duration of the study:

The total duration including data collection took around six months for completion of the study.

Sampling technique:

Study sample will be collected by complete enumeration method from the medical students enrolled in Majmaah University in Majmaah.

Data collection:

A pretested, preformed interviewee based, primarily a close ended questionnaire was used to collect data from the study participants in a time bound manner.

Data analysis:

All the data was entered in the SPSS software and statistical analysis done to find out the prevalence and association of the sleep pattern with academic performance among medical student. A 95% degree of freedom with P-value of <0.05 was considered as statistically significance.

Ethical considerations:

Participation consent from the medical students was taken. They were briefed about the aim and objective of the study and the advantage to them as well as to the community due to their participation. They were assured that all information would be kept purely confidential and will only be used for statistical analysis.

Limitations:

Participation of the study population is purely voluntary so there will be some attrition. Information and recall bias due to lack of time to participate needs to be taken into consideration.

Inclusion and exclusion criteria:

All the medical students of Saudi origin who are studying in the college of medicine of Majmaah university will be included in the study.

Any study participants who voluntarily refuse to participate in the study will be excluded.

Results

Table 1 shows the demographic profile of the study participants. Altogether, 130 students participated in the study from the 2nd to the 5th academic year. There were 98 (75.4%) male students and 32 (24.6%) females who responded to the questionnaire provided to them. Most of the participants were from the 5th academic year (33.9%).

Table 2 shows the prevalence of sleep disorder among the medical students. A total of 49 (37.7%) students acknowledged having sleep disorder in their response. More number of male students (29.2%) complained of insomnia than female students (8.5%) which was statistically significant (p<0.05).

Table 3 shows the distribution of health problems among medical students associated with sleep disorders. Frequent headaches were a common complaint among the students and 21.5% said it could be due to trouble sleeping at night. Very few students (2.3%) said that their fainting episodes were associated with sleep disorders while 10.8% complained of pain in the chest and/or tightness due to lack of sleep at night. 12.3% students gave a positive history of irregular or sudden fast heartbeat with

Table 1: Demographic profile of the participants according to the academic year.

	Academic year								
	2nd Year		3rd Year		4th Year		5th Year		Total
	M	F	M	F	M	F	M	F	
< 20 years	24 (61.5%)	9 (23.1%)	1 (2.6%)	4 (10.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (2.6%)	39 (30%)
21 - 25 years	7 (7.8%)	2 (2.2%)	15 (16.7%)	4 (4.4%)	15 (16.7%)	5 (5.6%)	35 (38.9%)	7 (7.8%)	90 (69.2%)
26 - 30 years	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (100.0%)	0 (0.0%)	1 (0.77%)
Total	31 (23.8%)	11 (8.5%)	16 (12.3%)	8 (6.2%)	15 (11.5%)	5 (3.9%)	36 (27.7%)	8 (6.2%)	130 (100%)

Table 2: Distribution of gender and difficulty in sleeping at night.

		Trouble sleeping at night			Total	
		No response	Yes	No		
Sex	Male	15 (11.5%)	38 (29.2%)	45 (34.6%)	98 (75.4%)	$\chi^2 = 6.867$ p = 0.03
	Female	0 (0.0%)	11 (8.5%)	21 (16.2%)	32 (24.6%)	
Total		15 (11.5%)	49 (37.7%)	66 (50.8%)	130 (100.0%)	

Table 3: Health problems associated with trouble in sleeping.

		Trouble sleeping at night			Total	p value
		No response	Yes	No		
Frequent headaches	Yes	5 (3.8%)	28 (21.5%)	35 (26.9%)	68 (52.3%)	$\chi^2 = 2.64$ p = 0.267
	No	10 (7.7%)	21 (16.2%)	31 (23.8%)	62 (47.7%)	
Total		15 (11.5%)	49 (37.7%)	66 (50.8%)	130 (100.0%)	
Fainting or passing out	Yes	2 (1.5%)	3 (2.3%)	6 (4.6%)	11 (8.5%)	$\chi^2 = 0.840$ p = 0.657
	No	13 (10.0%)	46 (35.4%)	60 (46.2%)	119 (91.5%)	
Total		15 (11.5%)	49 (37.7%)	66 (50.8%)	130 (100.0%)	
Chest pain, tightness or pressure	Yes	3 (2.3%)	14 (10.8%)	12 (9.2%)	29 (22.3%)	$\chi^2 = 1.804$ p = 0.806
	No	12 (9.2%)	35 (26.9%)	54 (41.5%)	101 (77.7%)	
Total		15 (11.5%)	49 (37.7%)	66 (50.8%)	130 (100.0%)	
Irregular or sudden fast heartbeat	Yes	4 (3.1%)	16 (12.3%)	16 (12.3%)	36 (27.7%)	$\chi^2 = 1.002$ p = 0.606
	No	11 (8.5%)	33 (25.4%)	50 (38.5%)	94 (72.3%)	
Total		15 (11.5%)	49 (37.7%)	66 (50.8%)	130 (100.0%)	
Frequent heartburn/ indigestion	Yes	7 (5.4%)	17 (13.1%)	16 (12.3%)	40 (30.8%)	$\chi^2 = 3.414$ p = 0.578
	No	8 (6.2%)	32 (24.6%)	50 (38.5%)	90 (69.2%)	
Total		15 (11.5%)	49 (37.7%)	66 (50.8%)	130 (100.0%)	
Frequent constipation	Yes	4 (3.1%)	20 (15.4%)	24 (18.5%)	48 (36.9%)	$\chi^2 = 1.005$ p = 0.605
	No	11 (8.5%)	29 (22.3%)	42 (32.3%)	82 (63.1%)	
Total		15 (11.5%)	49 (37.7%)	66 (50.8%)	130 (100.0%)	

Table 4: Effect of risk factors on difficulty in sleeping at night.

		Trouble sleeping at night			Total	p value
		No response	Yes	No		
Do you smoke	Yes	1 (0.8%)	8 (6.2%)	3 (2.3%)	12 (9.2%)	$\chi^2 = 4.791$ p = 0.091
	No	14 (10.8%)	41 (31.5%)	63 (48.5%)	118 (90.8%)	
Total		15 (11.5%)	49 (37.7%)	66 (50.8%)	130 (100.0%)	
Do you drink tea	Yes	9 (6.9%)	37 (28.5%)	52 (40.0%)	98 (75.4%)	$\chi^2 = 2.326$ p = 0.313
	No	6 (4.6%)	12 (9.2%)	14 (10.8%)	32 (24.6%)	
Total		15 (11.5%)	49 (37.7%)	66 (50.8%)	130 (100.0%)	
Do you drink coffee	Yes	12 (9.2%)	42 (32.3%)	51 (39.2%)	105 (80.8%)	$\chi^2 = 1.297$ p = 0.293
	No	3 (2.3%)	7 (5.4%)	15 (11.5%)	25 (19.2%)	
Total		15 (11.5%)	49 (37.7%)	66 (50.8%)	130 (100.0%)	
Urinating > twice/ night	Yes	3 (2.3%)	6 (4.6%)	8 (6.2%)	17 (13.1%)	$\chi^2 = 0.715$ p = 0.699
	No	12 (9.2%)	43 (33.1%)	58 (44.6%)	113 (86.9%)	
Total		15 (11.5%)	49 (37.7%)	66 (50.8%)	130 (100.0%)	

sleep disorders. A positive association of indigestion/heartburn with lack of sleep was found among 13.1% medical students. Frequent constipation was the second most common complaint (15.4%) by medical students due to lack of regular sleep.

Table 4 elaborates on the prevalence of risk factors leading to insomnia among medical students. Most common risk factor was drinking coffee (32.3%), then it was drinking tea (28.5%), smoking at night (6.2%) and lastly, it was the problem of getting up to urinate more than twice in the night (4.6%).

Table 5 shows the opinion of students based on their performance

Table 5: Distribution of grade satisfaction with lack of sleep before exams among students.

I performed poorly in exams because of sleepiness		Are you satisfied with your GPA			Total	
		No response	Yes	No		
Females	Yes	0 (0.0%)	0 (0.0%)	7 (21.9%)	7 (21.9%)	$\chi^2 = 6.969$ p = 0.031
	No	5 (15.6%)	9 (28.1%)	11 (34.4%)	25 (78.1%)	
	Total	5 (15.6%)	9 (28.1%)	18 (56.3%)	32 (100.0%)	
Males	Yes	12 (12.2%)	3 (3.1%)	15 (15.3%)	30 (30.6%)	$\chi^2 = 1.680$ p = 0.432
	No	32 (32.7%)	11 (11.2%)	25 (25.5%)	68 (69.4%)	
	Total	44 (44.9%)	14 (14.3%)	40 (40.8%)	98 (100.0%)	

Table 6: Distribution of GPA with sleep habits of the students.

		Are you satisfied with your GPA			Total	P value
		No response	Yes	No		
Trouble sleeping at night	No response	11 (8.5%)	1 (0.8%)	3 (2.3%)	15 (11.5%)	$\chi^2 = 10.747$ p = 0.03
	Yes	13 (10.0%)	10 (7.7%)	26 (20.0%)	49 (37.7%)	
	No	25 (19.2%)	12 (9.2%)	29 (22.3%)	66 (50.8%)	
	Total	49 (37.7%)	23 (17.7%)	58 (44.6%)	130 (100.0%)	
Being drowsy all day	No response	12 (9.2%)	0 (0.0%)	5 (3.8%)	17 (13.1%)	$\chi^2 = 11.786$ p = 0.019
	Yes	11 (8.5%)	5 (3.8%)	19 (14.6%)	35 (26.9%)	
	No	26 (20.0%)	18 (13.8%)	34 (26.2%)	78 (60.0%)	
	Total	49 (37.7%)	23 (17.7%)	58 (44.6%)	130 (100.0%)	
Typical Bedtime during weekdays	Don't know	1 (0.8%)	1 (0.8%)	1 (0.8%)	3 (2.3%)	$\chi^2 = 8.383$ p = 0.211
	Before 10 pm in weekdays	6 (4.6%)	4 (3.1%)	1 (0.8%)	11 (8.5%)	
	Between 10 pm - 12 am in weekdays	20 (15.4%)	6 (4.6%)	26 (20.0%)	52 (40.0%)	
	After 12 am in weekdays	22 (16.9%)	12 (9.2%)	30 (23.1%)	64 (49.2%)	
	Total	49 (37.7%)	23 (17.7%)	58 (44.6%)	130 (100.0%)	
I take daytime naps	Yes	31 (23.8%)	13 (10.0%)	29 (22.3%)	73 (56.2%)	$\chi^2 = 1.9$ p = 0.387
	No	18 (13.8%)	10 (7.7%)	29 (22.3%)	57 (43.8%)	
	Total	49 (37.7%)	23 (17.7%)	58 (44.6%)	130 (100.0%)	

in exams and their satisfaction with their GPA scores. More number of female students (28.1%) replied that they had no difficulty sleeping at night before the exams and were satisfied with their GPA scores than male students (11.2%). This difference was statistically significant ($p<0.05$).

Table 6 gives the distribution of sleep habits of students and satisfaction with the GPA scores. More number of students (20.0%) were not satisfied with their GPA score associated with trouble sleeping at night then those who were satisfied (7.7%) and this was statistically significant ($p<0.05$). On being compared with being drowsy all day 14.6% students were not satisfied with their GPA score compared to 3.8% which was statistically significant ($p<0.05$). Furthermore, 23.1% students reported sleeping after 12 am in the night on weekdays who were not satisfied with their GPA. While 22.3% agreed that they take daytime naps on a daily basis and not satisfied with their GPA scores.

Discussion

This study has strived to find out the prevalence of sleep disorders among medical students, the associated health disorders and the effect on the academic performance. It was found that more percentage of male students (29.2%) suffer from insomnia or sleep disorders than female students (8.5%). Similar studies among university students have shown this prevalence to range between 24% to 59.4% worldwide.[22-25] Students complained most commonly of frequent headaches (21.5%) due to less sleep in this study. Similar study in Turkey found out that 22.64% of university students have tension headache due to less sleep.[26] Other health problems associated with fewer hours of sleep among the students were episodes of indigestion/heartburn, pain in the chest, sudden onset of fast/irregular heartbeat. Other studies also showed similar effects in their findings which were common among medical students.[27-29] The association of risk factors with sleep disorders are significant in this study since it would give an idea about the provocative factors leading to wakefulness at night. Most common risk factor were drinking coffee (32.3%), tea (28.5%), smoking at night (6.2%) and lastly, it was the problem of getting up to urinate more than twice in the night (4.6%). Studies have shown that 2 – 4 cups of coffee taken at night can prolong sleeplessness,[30] statistically significant association of smoking and sleeplessness,[31] and an Egyptian study in 2014 showed a statistically significant association of drinking coffee and tea with insomnia.[32]

In this study only 11.2% of male students said that they were satisfied with their GPA scores and they slept soundly before the exam compared to 28.1% females. Similar study in Saudi Arabia found that there is a significant association between low GPA scores and lack of sleep the night before the examination.[33] Therefore, many studies have recommended that a proper sleep is one of the best method to achieving higher grades and a satisfactory performance in academics.[34-35] A comparison of daytime drowsiness with GPA scores showed that 14.6% students were not satisfied with their GPA score compared to 3.8%. Also 22.3% of the participants who regularly took daytime naps were not happy with their GPA scores. An article

published in Neuroscience Journal found that the prevalence of daytime napping was 83.3% and there was a significant impact on the GPA score.[36]

Conclusion

A well – researched study tends to provide a truthful account of the prevalent problems associated with risk factors. This study has attempted to explore the reasons behind lack of sleep or sleep disorders among medical students, its effect on health and the academic performance including the opinion of students about this avoidable lifestyle habit. There is a real problem associated with sleep disorders and most of it is due to the erratic lifestyle of the students. The academic performance which is affected due to sleep deprivation alone can be considered significant. Along with that there is the appearance of health problems like indigestion and headache at an early age due to insomnia which can be prevented.

Recommendation

Awareness program should be conducted on good sleep quality and associated benefits in both academics and improvement in the quality of life. Also, students should be educated about the risk factors associated with sleep disorders. Colleges and institutions should have mentoring programs that also deals with student's personal problems and support groups should be initiated among peers. Family members should be educated to be concerned about the progress of their children's academic career and provide continuous support at home and during stressful periods like exams.

Limitations

Since this is an observational, cross – sectional study, the findings need to be supported by a longitudinal study so that relative risks can be calculated. The small sample size can also lead to bias in generalization of the findings to the population. Interviewee bias cannot be ruled out and should be taken into consideration.

Competing Interests

The authors indicate no potential conflicts of interest.

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References

1. Katz DA, McHorney CA. The relationship between insomnia and health-related quality of life in patients with chronic illness. Fam Pract. 2002;51:229-234.
2. Daley M, Morin CM, LeBlanc M, Grégoire JP, Savard J. The economic burden of insomnia: direct and indirect costs for individuals with insomnia syndrome, insomnia symptoms, and good sleepers. Sleep. 2009;32:55-64.
3. Daley M, Morin CM, LeBlanc M, Gregoire JP, Savard J, Baillargeon L. Insomnia and its relationship to health-care utilization, work absenteeism, productivity and accidents. Sleep Med. 2009;10:427-438.
4. Bramoweth AD, Taylor DJ. Chronic insomnia and health care utilization in young adults. Behavioral Sleep Med. 2012;10:106-121.
5. Sandlund C, Westman J, Hetta J. Factors associated with self-reported need for treatment of sleeping difficulties: a survey of the general Swedish population. Sleep Med. 2016;22:65-74.
6. Bawazeer NM, Al-Daghri NM, Valsamakis G, Al-Rubeaan KA, Sabico SL, Huang TT, Mastorakos GP, Kumar S. Sleep duration and quality associated with obesity among Arab children. Obesity. 2009;17:2251-2253.
7. Al-Hazzaa HM, Musaiger AO, Abahussain NA, Al-Sobayel HI, Qahwaji DM. Prevalence of short sleep duration and its association with obesity among adolescents 15-to 19-year olds: A cross-sectional study from three major cities in Saudi Arabia. Annals of thoracic medicine. 2012;7:133.
8. Merdad RA, Merdad LA, Nassif RA, El-Derwi D, Wali SO. Sleep habits in adolescents of Saudi Arabia; distinct patterns and extreme sleep schedules. Sleep Med. 2014;15:1370-1378.
9. Assaad S, Costanian C, Haddad G, Tannous F. Sleep patterns and disorders among university students in Lebanon. J Res Health Sci. 2014;14:198-204.
10. Giri PA, Baviskar MP, Phalke DB. Study of sleep habits and sleep problems among medical students of Pravara Institute of Medical Sciences Loni, Western Maharashtra, India. Ann Med Health Sci. 2013;3:51-54.
11. Veldi M, Aluoja A, Vasar V. Sleep quality and more common sleep-related problems in medical students. Sleep Med. 2005;6:269-275.
12. Angelone AM, Mattei A, Sbarbati M, Di Orio F. Prevalence and correlates for self-reported sleep problems among nursing students. J Prev Med Hyg. 2011;52:201-208.
13. Ustinov Y, Lichstein KL, Wal GS, Taylor DJ, Riedel BW, Bush AJ. Association between report of insomnia and daytime functioning. Sleep Med. 2010;11:65-68.
14. Lund HG, Reider BD, Whiting AB, Prichard JR. Sleep patterns and predictors of disturbed sleep in a large population of college students. J Adolesc Health. 2010;46:124-132.
15. Abdulghani HM, Alrowais NA, Bin-Saad NS, Al-Subaie NM, Haji AM, Alhaqwi AI. Sleep disorder among medical students: relationship to their academic performance. Med Teach. 2012;34:S37-S41
16. Wang H, Hu R, Zhong J, Du H, Fiona B, Wang M, Yu M. Binge drinking and associated factors among school students: a cross-sectional study in Zhejiang Province, China. BMJ Open. 2018;8:e021077.
17. Miller JW, Naimi TS, Brewer RD, Jones SE. Binge drinking and associated health risk behaviors among high school students. Pediatrics. 2007;119:76-85.
18. Mozafarian N, Motlagh ME, Heshmat R, Karimi S, Mansourian M, Mohebpour F, et al. Factors Associated with Screen Time in Iranian Children and Adolescents: The CASPIAN-IV Study. Int J Prev Med. 2017;8:31.

19. Haile YG, Alemu SM, Habtewold TD. Common mental disorder and its association with academic performance among Debre Berhan University students, Ethiopia. Int J Ment Health Syst. 20173;11:34.

20. Riemenschneider H, Balázs P, Balogh E, Bartels A, Bergmann A, Cseh K, et al. Do socio-cultural factors influence medical students' health status and health-promoting behaviors? A cross-sectional multicenter study in Germany and Hungary. BMC Public Health. 2016;16:576.

21. Qamar K, Khan NS, Bashir Kiani MR. Factors associated with stress among medical students. J Pak Med Assoc. 2015;65:753-755.

22. Webb E, Ashton CH, Kelly P, Kamali F. Alcohol and drug use in UK university students. Lancet. 1996; 348:922-925.

23. Ban DJ, Lee TJ. Sleep duration, subjective sleep disturbances and associated factors among university students in Korea. J Korean Med Sci. 2001;16:475-480.

24. Tsai LL, Li SP. Sleep patterns in college students: gender and grade differences. J Psychosom Res. 2004;56:231-237.

25. Preišegolavičiūtė E, Leskauskas D, Adomaitienė V. Associations of quality of sleep with lifestyle factors and profile of studies among Lithuanian students. Medicina (Kaunas). 2010;46:482-489.

26. Kurt S, Kaplan Y. Epidemiological and clinical characteristics of headache in university students. Clin Neurol Neurosurg. 2008;110:46-50.

27. Veldi M, Aluoja A, Vasar V. Sleep quality and more common sleep-related problems in medical students. Sleep Med. 2005;6:269-275.

28. Zailinawati AH, Teng CL, Chung YC, Teow TL, Lee PN, Jagmohni KS. Daytime sleepiness and sleep quality among Malaysian medical students. Med J Malaysia. 2009;64:108-110.

29. Sweileh WM, Ali IA, Sawalha AF, Abu-Taha AS, Sa'ed HZ, Al-Jabi SW. Sleep habits and sleep problems among Palestinian students. Child Adolesc Psychiatry Ment. Health. 2011;5:25.

30. Walsh JK, Muehlbach MJ, Humm TM, Dickins QS, Sugerman JL, Schweitzer PK. Effect of caffeine on physiological sleep tendency and ability to sustain wakefulness at night. Psychopharmacology (Berl). 1990;101:271-273.

31. Heidari Mokarrar M, Afsharmanesh A, Afshari M. Mohammadi F. Prevalence of sleep disorder among medical students in an Eastern university in Iran. Iran J Med Sci. 2017;5:49-54

32. Abdallah AR, Gabr HM. Depression, anxiety and stress among first year medical students in an Egyptian public university. Int Res J Med Med Sci. 2014;2:11-19.

33. Abdulghani HM, Alrowais NA, Bin-Saad NS, Al-Subaie NM, Haji AMA, Alhaqwi AI. Sleep disorder among medical students: Relationship to their academic performance. Med Teach. 2012; 34:S37-S41.

34. Howell AJ, Jahrig JC, Powell RA. Sleep quality, sleep propensity and academic performance. Percept Mot Ski. 2004;99:525-535.

35. Aldabal L, Bahammam AS. Metabolic, endocrine, and immune consequences of sleep deprivation. Open Respir Med J. 2011;5:31-43.

36. Bahammam AS, Al-Khairy OK, Al-Taweel AA. Sleep habits and patterns among medical students. Neurosciences. 2005;10:159-162.