

Original article

Healthy sleep keeps troubles away- A Study on the Effects of Sleep deprivation on Stress in in undergraduate students of RAKMHSU

Sreya Varanasi¹, Christina Tom¹, Mariyam Syed¹, Syeda Sana Sultana¹, B K Manjunatha Goud²,
Joan Bryant Kumar³

- 1 Medical graduates, RAKCOMS, RAK Medical and Health Sciences University, Ras Al Khamiah, UAE.
- 2 Associate Professor, Department of Biochemistry, RAKCOMS, RAK Medical and Health Sciences University, UAE.
- 3 Associate Professor, Department of Physiology, RAKCOMS, RAK Medical and Health Sciences University, UAE.

Corresponding author: Dr B K Manjunatha Goud , Associate Professor, Department of Biochemistry, RAK Medical and Health Sciences University, RAKCOMS, UAE.

Abstract:

Introduction: Modern day education requires students to spend long working hours and have dedication to perform well in their studies. Often this and several other factors put excessive stress on students to achieve their goals.

Materials and methods: This study was conducted to know the habits of students in relation to stress and sleeping patterns. The study was conducted in RAKMHSU and students from medical and paramedical courses were involved as study subjects. A pre designed pre validated questionnaire was used along with Epworth Daytime Sleepiness Scale.

Results: The study showed 84% of medical and 78% of paramedical students had lack of sleep. Students did not consume any medications or adopt other measures to improve the situation. Early morning tiredness was common amongst the students. Caffeine consumption before examinations was found to be increased. On Epworth Daytime Sleepiness Scale more that 50% students in both the groups had scores which require medical attention. Many students agreed that lack of sleep has impacted their behavior in their daily activities.

Discussion and conclusion: According to our research majority of our students had lack of sleep. They also consume caffeine. They have <7 hours sleep on weekdays due to increased stress. It has been found that people sleep better and feel more alert during the day if they get at least 150 minutes of moderate to vigorous exercise a week. The marked effects of caffeine on sleep include prolonged sleep latency, shorter total sleep time and increase in light sleep. Hence sleep is the best meditation.

Key words: Stress, Caffeine, Students, Sleep.

Introduction:

Sleep is an important component of human homeostasis. ^[1] It is a state of altered consciousness characterized by a reduced ability to react to stimuli as opposed to being awake. ^[2] Sleep is a requirement for the normal motor and cognitive functioning of human beings. It puts the body in an anabolic state, building up the immune system and strengthening memories and brain function. Thus, sleep is crucial for the rejuvenation of the various systems that contribute to the normal functioning as well as healthy maintenance of the body. ^[3]

Mammalian sleep consists of two distinct types of sleep called Rapid Eye Movement sleep and non-Rapid Eye Movement Sleep. In human beings, the REM sleep is the phase more accredited for dreaming to occur within. ^[4] A

complete sleep cycle involves both REM as well non-REM sleep and can range from 90 to 110 minutes. Any disruption or awakenings in the middle of a sleep cycle will cause irritability and grogginess.^[5]

According to various credible sources of research and surveys, it has been found that chronic sleep restriction is an epidemic that is on the rise in many countries.^[6, 7, 8] When such a situation is at hand, it is vital to question the effects of not achieving the prescribed amounts of sleep on the body's stress systems and their ability to adapt to a continuously changing and challenging environment.^[9]

Increasingly, research indicates strong links between sleep and stress and this implies that a very imminent effect of sleep deprivation is stress.^[10, 11] It is a well-known fact that stress levels affect physical health and emotional well-being to a very high degree, such that it has been researched about extensively.⁹ This draws to light the potential for a vicious cycle. This can prove disastrous as people get caught up in an ongoing cycle of stress and exhaustion.^[12]

But it must be understood that stress is a normal physiological response of the body to a stressful situation, commonly termed as 'fight-or-flight response'. It prepares the body emotionally by making the mind alert and ready to flee or fight. Hence, stress is not inherently bad. On the contrary, the right amount of stress, termed 'eustress', is a positive driving force that enables the derivation and showcasing of one's best performance. However, when stress levels go higher than what is considered to be beneficial, it's termed as 'distress'. This is the kind of stress that is despised of since it makes the body tense, anxious, and promotes to its wear and tear. Adults with high distress levels are shown to feel sluggish and listless through most of the day, they are irritable and more prone to negative emotions as well as have difficulty concentrating as compared to adults with low distress levels.^[13]

It can be established with the help of ample evidence that sleeping habits can heavily influence stress levels.^{10, 11} A recent study was carried out to examine the effect of sleep on stress using a mildly stressful examination. It showed that those with sleep deprived condition had high levels of stress.^[14]

Other studies also similarly shown that a lack of sleep leads to stress and psychological strain.^[15] In addition to that, it must be inferred that the perception of the stress levels in one's life can dramatically increase or decrease the stress experienced. Thus, the appraisal of stress can make an impactful difference in the amounts of stress the experienter has been exposed.^[16, 17]

Sleep deprivation is linked to a lot of adverse reactions, some of which include depression, suicidal tendencies and even death (research on animals strongly suggests it) over a prolonged period of time.^[18]

It is universally known that students in universities are overloaded with work and studies, which forces them into evading sleep and hence they do have irregular sleep cycles.^[19] It also has the dire consequences which involve frequent illnesses due to weakened immune responses,^[20,21] decreased academic performances due to stress and lack of concentration,^[22,23] mental health issues^[24] and even a higher incidence of automobile accidents.^[25]

It is, therefore, imperative to assess the sleep and stress levels of university students in order to use the findings to bring about positive changes that will be beneficial for the students as well as their clients once the students begin their professional careers.

Thus, this research was done to find out the sleep habits of the students at Ras Al Khaimah Medical and Health Sciences University, and link it to stress and how it affects the students on a socio-psycho-educational background.

The trends of sleep and the performance of the students in terms of their sleep will be used to educate the students about sleep cycles, thereby bringing about a positive impact.

Material and methods

The study was conducted in RAK Medical and Health Sciences University (RAKMHSU), UAE, the students from medical and paramedical courses were involved as study subjects. A pre designed pre validated questionnaire consisting of 22 items related to sleep patterns and student lifestyle was used along with the Epworth Daytime Sleepiness Scale. These items were divided into 3 sections where each section contained items relating to a particular aspect of sleep. The quantity of sleep section assessed the number of hours' the students sleep on a weekday, their sleeping pattern, their nap habits and any reasons causing their lack of sleep. The quality of sleep section assesses the emotional state of the student and how it might be affecting their sleep. A sleep quality scale was designed where participants were asked to rate their sleep on a scale of 1 to 10 where 1 stands for very bad quality of sleep and 10 for excellent quality of sleep.

The total ESS score provides an estimate of a person's average level of sleepiness in daily life. Participants are asked to rate, on a 4-point scale (0 – 3), their usual chances of dozing off in 8 different activities that most people engage in as part of their daily lives.

The validation of questionnaire was done using a small sample and data analyzed using Cronbach's alpha. A value >0.8 were used to approve the question and any below value, questions with lower values were relooked and reframed.

A randomized sampling was used to select the study population. All the students of constituent colleges were approached by the investigator. 183 students satisfying the above criteria who willingly consented were randomly chosen to be a part of our questionnaire study. The data entered into excel sheet and using SPSS 18 version statistical analysis was done using percentage.

Results

The demographic details of the participants has been shown in Table 1.

The study showed that 81% of medical and 82% of paramedical had < 7 Hours sleep on weekdays, when compared to 16% and 24% on weekends. Majority agreed they need to have a nap during the working times and consumed < 6 cups of caffeine content drink during weekday. The overall rating of quality of sleep showed that 76% of medical had good quality sleep when compared to 54% in paramedical students as depicted in Table 2.

The Table 3 shows the responses of participants to various questions. This showed that 42% medical and 67% of paramedical student go to bed on time. We also found that majority in both groups were not thinking of any solution to improve their sleep, and not taking any sleep. Also the study showed that majority in both groups exhibited lack of regular exercise.

As shown in the Table 4 the major reason was lack of sleep in participants was the frequency of examination followed by others.

On Epworth sleepiness scale 33% medical and 41% of paramedical were in the category of need for medical advice as shown in table 5.

Table 1: Showing the demographic data of participants

Gender	Male	Female
	50	133
Course	Medical	Paramedical
	113	70
Nationality	Asian	Arab
	77	102
Residence/stay	Hostel	Day scholar
	41	111

Table 2: Participants responses to sleep and caffeine consumption

	Medical		Paramedical	
	Week day	Week end	Week day	Week end
Less than 7 hours of sleep	91 (81%)	18 (16%)	53 (82%)	15 (24%)
More than 7 hours of sleep	22 (19%)	94 (84%)	12 (18%)	48 (76%)
Do you take nap in the working times?	40	41	17	33
	< 6 cups	> 6 cups	< 6 cups	> 6 cups
How many cups of caffeine do you consume in a day?	100	6	60	2
	(1-5) Poor quality sleep	(6-10) Good quality sleep	(1-5) Poor quality sleep	(6-10) Good quality sleep
Rating for quality of sleep	27 (24%)	85 (76%)	32 (46%)	37 (54%)

Table 3: Responses of students to various questions

Nos	Questions	Medical		Paramedical	
		Yes	No	Yes	No
1.	Do you go to bed at the same time every night?	42(62%)	26 (38%)	67 (61%)	43 (39%)
2.	Have you ever thought of any solutions to improve your sleeping?	48 (45%)	59 (55%)	32 (45%)	39 (55%)
3.	Do you consume caffeine regularly? (tea/coffee)	63 (55%)	52 (45%)	38 (54%)	32 (46%)
4.	Do you take caffeine just before sleeping?	16	95	9 (13%)	60

		(14%)	(86%)		(87%)
5.	Does your consumption of caffeine increase during exams?	53 (47%)	60 (53%)	43 (61%)	27 (39%)
6.	Do you take medications to fall asleep?	8 (7%)	105 (93%)	5 (7%)	66 (93%)
7.	Do you exercise regularly?	29 (26%)	83 (74%)	22 (30%)	52 (70%)
8.	Do you find that your sleep improves upon exercising?	50 (46%)	58 (54%)	32(47%)	36 (53%)
9.	Do thoughts race through your mind making it difficult to sleep?	69 (61%)	44 (39%)	49 (70%)	21 (30%)
10.	Do you feel anxious/hyper tensed/stressed that prevents you from falling asleep?	59(52%)	54 (48%)	45 (65%)	24 (35%)
11.	Do you find that your sleeping pattern is disturbed before the day of a test/exam?	73 (65%)	39 (35%)	58 (82%)	13 (18%)
12.	Are your grades effected badly due to your lack of sleep?	27 (24%)	85 (76%)	49 (69%)	22 (31%)
13.	Do you worry and find it hard to calm down?	40 (36%)	70 (64%)	31 (43%)	41 (57%)
14.	Do you find any changes in your personality like mood swings, irritability or grumpiness due to lack of sleep?	61 (54%)	52 (46%)	47 (66%)	24 (34%)

Table 4: Participants reasons for lack of sleep

	Medical	Paramedical
Exam frequency	53	44
Improve academic performance	42	21
Type of curriculum	19	7
Lack of free time	40	35
Competition with peers	25	8

Table 5: Participants Epworth sleepiness scale data

	Medical	Paramedical
Enough sleep (1-6)	45 (42%)	28 (39%)
Average (7-8)	27 (25%)	14 (20%)
Need medical advice (>9)	36 (33%)	29 (41%)

Discussion

The students in health sciences will not consider sleep as their priority in the context of their academic requirement, course requirement, hectic schedule, and need for extra hours to complete the work. The quality of sleep among students has been studied in various fronts as it directly relates to academic performance and daily behavior. Our study showed that 81% of medical and 82% of paramedical students were having sleep problems sleeping less than 7 hours on weekdays, which is correlating with another study which showed findings of poor sleep quality in 61.5%^[26] and 61.9%,^[27] specifically among medical students.

One of the reason for this poor quality of sleep may be due to academic stress. Another study pointed out that, there was a correlation between poor sleep quality and first-year undergraduates, in whom poor sleep hygiene habits, such as Internet surfing at night, poor social life, and bad eating habits, are found to be aggravating factors.^[28]

Our study also showed that majority of students admit that they take a nap on a weekday, which coincided with the results of studies showing of medical students reporting daytime sleepiness: 31%^[27]; 42.1%^[26]; and 63% .^[29]

A study involving medical students in Saudi Arabia, which identified that 17% of medical students used drugs for sleep induction.^[30] But in our study a majority of students 55% of medical and paramedical students did not take any medication to overcome the problem but they used consume caffeine in various forms regularly.

Two studies, conducted in 1989 and 1997, concluded that sleep disturbance could be either a cause, symptom or comorbidity with stress or with a psychiatric disorder.^[31, 32] In our study also 52% of medical and 65% of paramedical students felt they were anxious and stressed due to lack of sleep. Another study indicated that stress causes many sleep difficulties, such as restless sleep, mid-sleep awakening and waking up too early,^[33] which was also seen in our study as waking up early morning associated with tiredness in 77% of students in both groups.

Conclusion

Exam frequency, lack of time and improving academic performance are the top rated reasons by students as to why they sleep less than 7 hours a day. Increased stress levels keep the students anxious all the while thus making thoughts race through their mind. Clearly from the above results it can be noted that sleep deprivation is common among students and stress has a role to play in poor sleep hygiene.

There is a need for health promotion measures, such as proposals of changes in adopting health behaviors specifically related to good sleep hygiene, among the population of higher education students.

References

1. The Drive to Sleep and Our Internal Clock | Healthy Sleep [Internet]. Healthysleep.med.harvard.edu. 2016 [cited 26 April 2016]. Available from: <http://healthysleep.med.harvard.edu/healthy/science/how/internal-clock>.
2. [Internet]. 2016 [cited 26 April 2016]. Available from: <http://apsychoserver.psych.arizona.edu/jjbareprints/psyc501a/readings/Carskadon%20Dement%202011.pdf>
3. Why Is Sleep Important? - NHLBI, NIH [Internet]. Nhlbi.nih.gov. 2016 [cited 26 April 2016]. Available from: <http://www.nhlbi.nih.gov/health/health-topics/topics/sdd/why>
4. Basics on Sleep [Internet]. WebMD. 2016 [cited 26 April 2016]. Available from: <http://www.webmd.com/sleep-disorders/guide/sleep-101>

5. [Internet]. 2016 [cited 26 April 2016]. Available from: http://www.ninds.nih.gov/disorders/brain_basics/understanding_sleep.htm
6. BBC NEWS | UK | Wales | 'Sleep deprivation' rise at work [Internet]. News.bbc.co.uk. 2016 [cited 26 April 2016]. Available from: http://news.bbc.co.uk/2/hi/uk_news/wales/4114876.stm
7. CDC Features - Insufficient Sleep Is a Public Health Epidemic [Internet]. Cdc.gov. 2016 [cited 26 April 2016]. Available from: <http://www.cdc.gov/features/dssleep/>
8. Neel DProfile A. A Reason to Count Sheep: Is Sleep Deprivation a Global Driver of Metabolic Disease? [Internet]. Harvard College Global Health Review. 2016 [cited 26 April 2016]. Available from: <http://www.hcs.harvard.edu/hghr/online/sleep-deprivation/>
9. Colten H, Altevogt B, Research I. Extent and Health Consequences of Chronic Sleep Loss and Sleep Disorders. National Academies Press (US) [Internet]. 2006 [cited 26 April 2016]; Available from: <http://www.ncbi.nlm.nih.gov/books/NBK19961/>
10. Sleep Deprivation and Stress [Internet]. Consumer.healthday.com. 2016 [cited 26 April 2016]. Available from: <http://consumer.healthday.com/encyclopedia/stress-management-37/stress-health-news-640/sleep-deprivation-and-stress-646063.html>
11. Psychosocial stress and impaired sleep on JSTOR [Internet]. Jstor.org. 2016 [cited 26 April 2016]. Available from: http://www.jstor.org/stable/40967601?seq=1#page_scan_tab_contents
12. The Vicious Cycle of High Stress and Little Sleep | WholeFoods Magazine [Internet]. Wholefoodsmagazine.com. 2016 [cited 26 April 2016]. Available from: <http://www.wholefoodsmagazine.com/supplements/features/vicious-cycle-high-stress-and-little-sleep>.
13. Eustress vs Distress | Brock University [Internet]. Brocku.ca. 2016 [cited 26 April 2016]. Available from: <https://brocku.ca/health-services/health-education/stress/eustress-distress>
14. Minkel J, Banks S, Htaik O, Moreta M, Jones C, McGlinchey E et al. Sleep deprivation and stressors: Evidence for elevated negative affect in response to mild stressors when sleep deprived. *Emotion* 2012; 12(5):1015-1020.
15. Barber LMunz D. Consistent-sufficient sleep predicts improvements in self-regulatory performance and psychological strain. *Stress and Health* 2010; 27(4):314-324.
16. [Internet]. The Huffington Post. 2013 [cited 26 April 2016]. Available from: http://www.huffingtonpost.com/christopher-m-barnes/sleep-and-stress_b_3415480.html
17. Keller A, Litzelman K, Wisk L, Maddox T, Cheng E, Creswell P et al. Does the perception that stress affects health matter? The association with health and mortality. *Health Psychology* 2012; 31(5):677-684.
18. [Internet]. 2016 [cited 26 April 2016]. Available from: <http://www.journalsleep.org/Articles/250104.pdf>
19. Hershner SChervin R. Causes and consequences of sleepiness among college students. *Nature and Science of Sleep* 2014;73.
20. Besedovsky L, Lange T, Born J. Sleep and immune function. *Pflügers Archiv - European Journal of Physiology* 2011; 463(1): 121-137.
21. The Affect of Sleep on the Immune System | Valley Sleep Center: Sleep Studies, Sleep Doctors, Phoenix, Arizona [Internet]. Valley Sleep Center: Sleep Studies, Sleep Doctors, Phoenix, Arizona. 2011 [cited 26 April 2016]. Available from: <http://valleysleepcenter.com/the-affect-of-sleep-on-the-immune-system/>
22. Sleep loss, learning capacity and academic performance [Internet]. Sciencedirect.com. 2016 [cited 26 April 2016]. Available from: <http://www.sciencedirect.com/science/article/pii/S1087079205001231>
23. A. N. Vgontzas, E. Zoumakis, E. O. Bixler, H.-M. Lin, H. Follett, A. Kales, G. P. Chrousos. Adverse Effects of Modest Sleep Restriction on Sleepiness, Performance, and Inflammatory Cytokines: *The Journal of Clinical Endocrinology & Metabolism* 2004; Volume 89, Issue 5: Pages 2119–2126, <https://doi.org/10.1210/jc.2003-031562>

24. ACCP 2008 Sleep Medicine Board Review Syllabus Book [Internet]. Google Books. 2016 [cited 26 April 2016]. Available from: https://books.google.ae/books?hl=en&lr=&id=kValrmJrl2kC&oi=fnd&pg=PA71&dq=sleep+deprivation+cause+mental+illness&ots=n-yp7Y5yV&sig=2WcvihEvbTv8RFGWSOWJHpEi1Ck&redir_esc=y#v=onepage&q&f=false
25. Drowsy Driving [Internet]. Centers for Disease Control and Prevention. 2015 [cited 26 April 2016]. Available from: <http://www.cdc.gov/features/dsdrowsydriving/>
26. Rique GL, Fernandes Filho GM, Ferreira AD, de Sousa-Muñoz RL. (2014). Relationship between chronotype and quality of sleep in medical students at the Federal University of Paraiba, Brazil. *Sleep Sci* 2014;7(2):96-102. <https://doi.org/10.1016/j.slsci.2014.09.004>
27. Ribeiro CR, Oliveira SM, Silva YM. The impact of sleep quality in medical education [Article in Portuguese]. *Rev Soc Bras Clin Med* 2014; 12(1):8-14.
28. Cheng SH, Shih CC, Lee IH, Hou YW, Chen KC, Chen KT, et al. A study on the sleep quality of incoming university students. *Psychiatry Res* 2012; 197(3): 270-4. <https://doi.org/10.1016/j.psychres.2011.08.011>
29. Pagnin D, de Queiroz V, Carvalho YT, Dutra AS, Amaral MB, Queiroz TT. The relation between burnout and sleep disorders in medical students. *Acad Psychiatry* 2014; 38(4):438-44. <https://doi.org/10.1007/s40596-014-0093-97>
30. Al-Sayed AA, Al-Rashoudi AH, Al-Eisa AA, Addar AM, Al-Hargan AH, Al-Jerian AA, et al. (2014). Sedative Drug Use among King Saud University Medical Students: A Cross-Sectional Sampling Study. *Depress Res Treat*, 378738. <https://doi.org/10.1155/2014/378738>
31. Ford DE, Kamerow DB. (1989). Epidemiologic study of sleep disturbances and psychiatric disorders. An opportunity for prevention? *JAMA* 1989; 262:1479–84.
32. Chang PP, Ford DE, Mead LA, Cooper-Patrick L, Klag MJ. Insomnia in young men and subsequent depression. The Johns Hopkins Precursors Study. *Am J Epidemiol* 1997;146: 105–14.
33. Falavigna A, de Souza Bezerra ML, Teles AR, Kleber FD, Velho MC, da Silva RC, et al. (2011). Consistency and reliability of the Brazilian Portuguese version of the Mini-Sleep Questionnaire in undergraduate students. *Sleep Breath* 2011; 15: 351–5. doi: <http://dx.doi.org/10.1007/s11325-010-0392-x>.

Date of Publishing: 05 June 2021

Author Declaration: Source of support: Nil, Conflict of interest: Nil

Ethics Committee Approval obtained for this study? YES

Was informed consent obtained from the subjects involved in the study? YES

For any images presented appropriate consent has been obtained from the subjects: NA

Plagiarism Checked: Urkund Software

Author work published under a Creative Commons Attribution 4.0 International License



DOI: 10.36848/IJBAMR/2020/29215.55587