International Journal of Community Medicine and Public Health
Subhaprada SC et al. Int J Community Med Public Health. 2017 Feb;4(2):352-356
http://www.ijcmph.com
pISSN 2394-6032 | eISSN 2394-6040

DOI: http://dx.doi.org/10.18203/2394-6040.ijcmph20170254

Original Research Article

An interventional study on sleep hygiene among medical students

Cynthia Subhaprada S.*, Vijayakumari S., Rajasekhar T., Venkateswarlu U.

Department of Community Medicine, Kurnool Medical College, Kurnool-518002, Andhra Pradesh, India

Received: 19 November 2016
Revised: 20 November 2016
Accepted: 23 December 2016

***Correspondence:**
Dr. Cynthia Subhaprada S.,
E-mail: drcynthiasubhaprada@gmail.com

ABSTRACT

Background: Sleep deprivation, a common problem among undergraduate students, leads to daytime sleepiness and poor academic performance. The purpose of this study is to describe sleep hygiene among medical students and to measure effect of sleep hygiene educational intervention.
Methods: An interventional cross-sectional study was carried out from September to October, 2015 among II MBBS students, Kurnool Medical College, Kurnool, Andhra Pradesh, India. Excessive daytime sleepiness was assessed by the Epworth sleepiness scale. Predesigned questionnaire was administered as pretest followed by health educational intervention session to 100 subjects selected by simple random sampling, and a post test two weeks later. Data entered in MS Excel 2007, was analyzed using IBM SPSS 20. Difference in means tested by paired t test and Chisquare test was used to test association between variables, with p value <0.05 considered significant.
Results: 100 study subjects, 48 of 7 semester and 52 of 5 semester, had a mean (+SD) age in years, 20.2±0.58 and19.71±0.61 respectively. 57% were females. A statistically significant association between daytime sleepiness prevalence by semester was found. (Pretest X^2 = 7.83, post test X^2 = 7.19, p value <0.01). Weekend sleep schedules showed 2 hours increase than weekdays, in 40% (5 semester) and 30% (7 semester). 20% of study subjects had Epworth score 10-24, so expert medical advice is needed. A statistically significant difference was observed in sleep hygiene post intervention (t=2.010, p= 0.05).
Conclusions: Daytime sleepiness was the most common problem encountered in this study. Sleep hygiene education promotes healthy sleeping habits.

Keywords: Daytime sleepiness, Medical students, Sleep hygiene

INTRODUCTION

Physiologically sleep is a complex process of homeostatic restoration, thermoregulation, tissue repair, immune control and memory processing. Sleep has been a subject of scientific studies for the past 30 plus years because it is a time for the body to regenerate vital parts, especially neurons. Unfortunately, with lack of sleep come many unwanted side effects, including impaired thinking, memory, and the depression of some vital signs. Indeed, the paramount role of sleep in human physiology and health is exemplified by the fact that sleep deprivation has been shown to have a negative impact on metabolic parameters such as glucose tolerance and insulin sensitivity.[1] It places individuals at a greater risk of serious disease, such as diabetes.[2] In addition, even a few nights of poor sleep can impact alertness, memory, mood, and cognitive function.[3]

Individuals may have differences in their optimal sleep requirements. Most sleep experts agree that the adult sleep requirement is typically between 6 and 10 hours of sleep per 24-hour period, with the majority of individuals requiring approximately 8 hours of sleep per day. The psychological profile of the short and long sleepers is also interesting: there are ambitious, active, energetic

workaholics, for whom sleep means a waste of time, and the sorrowful, depressive introverts who seek escape from life hardships into sleep.[4] The tolerated minimum sleep time is approximately 6 hours.[5]

Managers, doctors and military commanders are confronted with prolonged working hours without sleep during crises and emergencies. Irritability, impatience, childish humor, lack of regard for normal social conventions, and inappropriate interpersonal behaviors have all been described anecdotally in experimental settings of sleep deprivation (SD).[6] Qualitative differences in speech articulation have been observed after just 1 night of SD.[7] In the last decade an increasing number of reports continue to support a bidirectional and symbiotic relationship between sleep and memory. These observations are of particular ecologic importance from a professional and educational perspective when considering that sleep time continues to decrease across all age ranges throughout industrialized nations. Interesting results from a study examining learning efficiency and sleep have shown that learning can affect the structure of sleep. In addition, many studies have demonstrated that sleep after learning improves memory performance. In a computerized sequential finger-tapping task, sleep after learning resulted in consolidated and enhanced motor skill memories.[8] In a study by De Koninck and colleagues, polysomnographic analysis before and after an intensive language course indicated that changes in sleep structure take place during learning and that these changes are correlated with knowledge acquisition.[9]

Empirical data from both survey and clinical outcome studies strongly suggest that, in general, physician education regarding basic sleep and circadian biology as well as the recognition, diagnosis, management, and prevention of clinical sleep disorders is inadequate. Substantial knowledge deficits exist at the medical school level, as well as at the post-graduate training and continuing medical education levels.[10,11] The presence of large gaps between scientific knowledge and clinical teaching and practice has important public health implications. Most programs do not recognize and address the problem of resident sleepiness. The "culture" of medicine often equates the number of hours on the job and without sleep, with professionalism and dedication to patient care.[12]

Sleep is considered to be adequate when there is no daytime sleepiness or dysfunction. Sleepiness is defined as the inability or difficulty in maintaining alertness during the major wake period of the day, resulting in unintended lapses into drowsiness or sleep.[13] While sleep deprivation, irregular sleep schedules and sleepiness are highly prevalent among medical students, little information is available on effective ways for medical schools to successfully disseminate information on the importance of sleep and to potentially improve their sleep hygiene. Research specifically on sleep hygiene among adolescents and young adults in health care system, is relatively new and limited.

The consequences of sleep deprivation and daytime sleepiness are especially problematic to college students and can result in lower grade point averages, increased risk of academic failure, compromised learning, impaired mood, and increased risk of motor vehicle accidents. Sleep hygiene encourages habits conducive to restorative sleep and avoidance of substances or behaviors that are not. This study aims to describe the prevalence of daytime sleepiness among medical students and to measure the effect of health education intervention regarding sleep hygiene on their sleep habits.

METHODS

This descriptive cross-sectional study was carried out from September to October, 2015, among II MBBS students, Kurnool Medical College, Kurnool, Andhra Pradesh. Institutional ethical committee clearance was obtained. Assuming a prevalence of daytime sleepiness of 50% (p), with an allowable error of 20% of p (l), and Z=1.96 (95% level of confidence) a sample size of 100 was arrived at, using the formula $4pq/l^2$. All those willing to participate were assembled in the lecture gallery and using the table of random numbers, 100 students from 5 and 7 semesters were selected by simple random sampling. The class representatives were intimated beforehand about the time and place of conducting the pretest so that all the participants could assemble. After obtaining informed consent, predesigned questionnaire was administered as pretest.

Description of the study tool

Part 1 - Personal identification details

Part 11 - Sleep habits

Part 111- Excessive daytime sleepiness.

Sleep habits were assessed based on the duration and quality of sleep, sleep environment, weekday and weekend schedule, pre-bedtime routine and perception of the required sleep duration. In the third section, excessive daytime sleepiness assessed by chance of dozing was rated by Epworth sleepiness scale (ESS).

ESS was introduced in 1991 by Dr Murray Johns of Epworth Hospital, Melbourne, Australia, as a scale intended to measure excessive daytime sleepiness**,** which can often be a symptom of many sleep disorders**.** The questionnaire asks the subject to rate his or her probability of falling asleep on a scale of increasing probability from 0 to 3 for eight different situations that most people engage in during their daily lives, though not necessarily every day. Sitting and reading, watching TV, sitting, inactive in a public place (e.g. a theatre or a meeting), as a passenger in a car for an hour without a

break, lying down to rest in the afternoon when circumstances permit, sitting and talking to someone, sitting quietly after a lunch without alcohol, in a car while stopped for a few minutes in the traffic are the eight situations in the questionnaire. The scores for the eight questions are added together to obtain a single number. A number in the 0–9 range is considered to be normal while a number in the 10–24 range indicates that expert medical advice should be sought.[14]

This was followed by a health educational intervention session lasting for one hour. A power-point presentation was used to impart knowledge on sleep hygiene. Two weeks later, a post test was held using the same questionnaire among the same study subjects. After checking for completeness of data, the responses were entered in MS Excel 2007 and subjected to descriptive and inferential statistical analysis using IBM SPSS 20. Difference in means was tested using paired t test. Chisquare test was applied to test association between variables. p value<0.05 was considered statistically significant.

RESULTS

Among 100 study subjects, there were 48 from 7 semester and 52 from 5 semester. The mean (±SD) age in years was 20.2±0.58 and19.71±0.61 among 7 and 5 semester students respectively. Majority were female participants (57 [57%]) and mostly fifth semester medical students (32[61.54%]) (Table 1).

Association between prevalence of daytime sleepiness among study subjects by semester, tested by chisquare test of association was found to be statistically significant. (Pretest X^2 = 7.83, p value <0.01, Table 2, Post test X^2 = 7.19, p value <0.01, Table 3]. The mean pretest Epworth score was 6.51 and 7.08 while in the posttest, it was 6.40 and 7.29 among 5 and 7 semester respectively. Though an apparent change in the mean Epworth score was seen after health education intervention, on comparison of means of pretest and posttest Epworth score between the two semesters, no statistically significant difference was found (Table 4). Nearly 20% had sleep deprivation to an extent that expert medical advice should be sought.

Table 1: Distribution of study subjects.

Batch / Gender	7 Semester	5 Semester	Total
Males	23 (47.92%)	20 (38.46%)	43(43%)
Females	25(52.08%)	32 (61.54%)	57(57%)
Total (N=100)	48 (100%)	52 (100%)	100 (100%)

Table 2: Association between prevalence of daytime sleepiness and study subjects in the pretest.

Daytime sleepiness	7 Semester	5 Semester	Total
Present	37	26	63
Absent	11	26	37
Total	48	52	100

Chi square test of association, X^2 = 7.83, with Degree of Freedom (df) =1, p value <0.01.

Table 3: Association between daytime sleepiness and study subjects in the posttest.

Daytime sleepiness	7 Semester	5 Semester	Total
Present	34	23	57
Absent	14	29	43
Total	48	52	100

Chi square test of association, X^2 = 7.19, with Degree of Freedom (df) =1, p value <0.01.

Table 4: Difference in mean Epworth scores.

Epworth score	7 Semester		5 Semester	
	Pre-test	Post-test	Pre-test	Post-test
0-9(normal)	37 (77.08%)	33 (68.75%)	40 (76.92%)	43(82.69%)
10-24 (expert medical advice needed)	11 (22.91%)	15(31.25%)	12(23.08%)	9(17.31%)
Total (N=100)	48 (100%)	48 (100%)	52 (100%)	52 (100%)
Mean scores	6.51	6.40	7.08	7.29
Paired 't' test	t=0.308, df=47, p value>0.05		t=0.291, df=51, p value>0.05	

The ability to function affected by lack of sleep showed a considerable change in the post test in both the semesters. In the pretest, 88% of 7 semester students and 100% of 5 semester felt that their sleeping environment was safe. The prevalence of daytime sleepiness was found to be 77.1% in the pretest among 7 semester students and 50% among 5 semester. Both batches showed a decrease in the prevalence of daytime sleepiness in the post test (70.8% and 44.2%) respectively [Table 5].

50% of the study subjects reported normal sleep duration in the pretest while in the post test, it increased to 63%. There was a statistically significant increase in the perception of required hours of sleep among 5 semester

students [Table 6]. The observed increase in the duration of sleep (in hours) in the post test as compared to pretest was statistically significant among 7 semester students (Table 7). Their weekend sleep schedules were much different from their weekday schedules, with an increase of 2 hours on an average among 40% of 5 semester and 30% of 7 semester students. Majority were of the habit of watching television, handling mobile and/or computer as their pre-bedtime routine.

Table 5: Sleep hygiene among the study subjects.

Factors	7 Semester				5 Semester			
	Pre-test		Post-test		Pre-test		Post-test	
	Yes	No	Yes	No	Yes	No	Yes	No
Trouble in getting back to sleep	14 (29.2%)	34 (70.8%)	13 (27.1%)	35 (72.9%)	7 (13.5%)	45 (86.5%)	6 (11.5%)	46 (88.5%)
Ability to function affected by lack of sleep	32 (66.7%)	16 (33.3%)	26 (54.2%)	22 (45.8%)	22 (42.3%)	30 (57.7%)	19 (36.5%)	33 (63.5%)
Safe sleep environment	42 (87.5%)	6 (12.5%)	45 (93.7%)	3 (6.3%)	52 (100%)	0	52 (100%)	0
Daytime Sleepiness	37 (77.1%)	11 (22.9%)	34 (70.8%)	14 (29.2%)	26 (50%)	26 (50%)	23 (44.2%)	29 (55.8%)

Table 6: Perception on required number of hours of sleep.

Batch	Pre-test (Mean±SD)	Post-test (Mean± SD)	t value	df	p value
5 Semester	7.17±0.90	7.58±0.72	3.765	51	0.001
7 Semester	7.62±0.93	7.85±0.92	1.075	47	0.288

There was a statistically significant increase in the perception of required hours of sleep among 5 semester students.

Table 7: Duration of sleep (in hours) among study subjects.

Batch	Pre-test (Mean±SD)	Post-test (Mean±SD)	t value	df	p value
5 Semester	6.88±0.85	6.96±0.86	1.428	51	0.15
7 Semester	6.96±1.03	7.35±0.93	2.01	47	0.05

DISCUSSION

It was found that 50% of the study subjects reported normal sleeping hours in the pretest while in the post test, it increased to 63%. Most college students are sleep deprived, as 70.6% of students report obtaining less than 8 hours of sleep.[7]The ability to function affected by lack of sleep showed a considerable change in the post test, in both the semesters. Nearly 20% had sleep deprivation to an extent that expert medical advice was indicated. The weekend sleep schedules were much different from weekday schedules, with an increase of 2 hours on an average among 40% of 5 semester and 30% of 7 semester students. It might be due to their need to increase study hours to improve their academic performance and to compensate their sleep deprivation during weekdays. One study found that 11.6% of students used alcohol as a sleep aid while in this study, no use of sleep aid was reported.[15,16]

Knowledge on sleep hygiene does not necessarily translate into practice. A study evaluating sleep hygiene awareness and sleep hygiene practice found only a weak association between knowledge and practice.[17]In the present study, statistically significant increase in the perception regarding the required number of hours of sleep among 5 semester students in the post test and mean duration of sleep among 7 semester students was observed. Chen et al, in their study to investigate the efficiency of a short term sleep hygiene education program on working women with poor sleep quality, found that sleep hygiene education improved participants' sleep quality significantly ($p < 0.01$), similar to the present study.[18]

Health education programs regarding sleep hygiene should be emphasized in medical colleges, to increase the awareness of the importance of healthy sleep.

The strength of this study was that the sample included different semesters of medical students, male and female,

selected randomly in an appropriate sample size; and data obtained were subjected to appropriate statistical analysis. Although this intervention did not affect a large percentage of the student population, it was relatively inexpensive and did produce a measurable benefit. This study had limitations such as the students' subjective account of their sleep habits.

CONCLUSION

Undergraduate medical students are the doctors of tomorrow. They are exposed to a significant level of pressure due to academic demands. Further research is needed not only to determine how best to educate students about the importance of sleep hygiene, but also how to translate this knowledge into practice.

ACKNOWLEDGEMENTS

The authors take this opportunity to thank Dr. A. Sreedevi, Professor and HOD of Community Medicine, Kurnool Medical College, Kurnool, the interns posted in the department during September-October, 2015 and the undergraduate students of 5 and 7 semesters, for their co-operation and active participation in the study.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Spiegel K, Leproult R, Van Cauter E. Impact of sleep debt on metabolic and endocrine function. Lancet. 1999;354(9188):1435-9.
2. Palmer ND, Langefeld CD, Campbell JK, Williams AH, Saad M, Norris JM, et al. Genetic mapping of disposition index and acute insulin response loci on chromosome 11q. The Insulin Resistance Atherosclerosis Study (IRAS) Family Study. Diabetes. 2006;55(4):911-8.
3. Maquet, P. The role of sleep in learning and memory. Science.2001;294(5544):1048-51.
4. Youngstedt SD, Daniel F, Kripke DF. Long sleep and mortality: rationale for sleep restriction. Sleep Med Rev. 2004;8:159-74.
5. Ferrara M, De Gennaro L. How much sleep do we need? Sleep Med Rev. 2001;5:155-79.
6. Home JA. Human sleep, sleep deprivation and behaviour: Implications for the prefrontal cortex and psychiatric disorder. British Journal of Psychiatry. 1993;162:413-9.
7. Harrison Y, Home JA. Sleep deprivation affects speech. Sleep. 1997;20:871-8.
8. Walker MP, Stickgold R. Sleep, memory, and plasticity. Annu Rev Psychol. 2006;57:139-66.
9. De Koninck J, Lorrain D, Christ G, Proulx G, Coulombe D. Intensive language learning and increases in rapid eye movement sleep: evidence of a performance factor. Int J Psychophysiol. 1989;8(1):43-7.
10. Sateia MJ, Owens J, Dube C, Goldberg R. Advancement in sleep medicine education. Sleep. 2000;23;1021-3.
11. Rosen R, Zozula R. Education and training in the field of sleep medicine. Current Opinions in Pulmonary Med. 2000;6:512-8.
12. Buysse DJ, Barzansky B, Dinges D, Hogan E, Hunt C, Owens J, Rosekind M, Rosen R, Simon F, Veasey S, Wiest F. Sleep, fatigue, and medical training: setting an agenda for optimal learning and patient care. A report from the conference "Sleep, Fatigue, and Medical training: Optimizing Learning and the Patient Care Environment". Sleep. 2003;26(2).
13. International Classification of Sleep Disorders, Diagnostic and Coding Manual 2nd ed: Westchester, IL: American Academy of Sleep Medicine; 2005.
14. Johns MW. A new method for measuring daytime sleepiness: the Epworth sleepiness scale". Sleep. 1991;14(6):540-5.
15. 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(2):124-32.
16. Taylor DJ, Bramoweth AD. Patterns and consequences of inadequate sleep in college students: substance use and motor vehicle accidents. J Adolesc Health. 2010;46(6):610-2.
17. Brown FC, Buboltz WC Jr, Soper B. Relationship of sleep hygiene awareness, sleep hygiene practices, and sleep quality in university students. Behav Med. 2002;28(1):33-8.
18. Chen PH, Kuo HY, Cheuh KH. Sleep hygiene education: efficacy on sleep quality in working women. J Nurs Res. 2010;18(4):283-9.

Cite this article as: Subhaprada SC, Vijayakumari S, Rajasekhar T, Venkateswarlu U. An interventional study on sleep hygiene among medical students. Int J Community Med Public Health 2017;4:352-6.