ejpmr, 2021,8(5), 01-06

SJIF Impact Factor 6.222

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Research Article

ISSN 2394-3211

EJPMR

SLEEP AND ACADEMIC PERFORMANCE AMONG UNDERGRADUATES OF THE UNIVERSITY OF PORT HARCOURT, NIGERIA

[1]*Dr. Foluke O. Adeniji, [2]Dr. Israel S. Osaat, [2]Dr. Chikodi U. Ihenacho and [2]Dr. Princess I.A. Obi

[1]Department of Preventive and Social Medicine, Faculty of Clinical Sciences, University of Port Harcourt, Rivers State, Nigeria.

[2]Department of Preventive and Social Medicine, Faculty of Clinical Sciences, University of Port Harcourt, Rivers State, Nigeria.

***Corresponding Author: Dr. Foluke O. Adeniji**

Department of Preventive and Social Medicine, Faculty of Clinical Sciences, University of Port Harcourt, Rivers State, Nigeria.

Article Received on 21/02/2021 **Article Revised on 11/03/2021** **Article Accepted on 01/04/2021**

ABSTRACT

Background: Sleep is one of our basic needs and plays a very important role in maintaining our physical, intellectual and emotional health .The aim of this study was to find out the average duration of sleep and its effect on academic performance among undergraduate of the University of Port Harcourt. **Design and methods:** A cross-sectional study using a semi-structured interviewer administered questionnaire was used to obtain information from respondents. Data was collated and analysed with SPSS vs 20. Results: A total of 270 undergraduates were involved in the study, 156 (57.8%) and 114 (42.2%) were females and males respectively. Results revealed that respondents slept for about 377±79.66 minutes (6hrs17mins±1.33hours) They slept for 7hours on normal days and 1hr35mins significantly less during examinations *($p<0.05$)*. There was no significant relationship between sleep duration and overall GPA of the students, however, there was, a negative moderate correlation between sleep duration and lower grades (3rd class) during examinations *($r=-0.60$, $r^2=0.36$, $p=0.01$)*. **Conclusions:** The finding, showed that having high grades in school may be the result of a combination of some other factors, that, adequate sleep duration only serves as a prerequisite to attaining good academic fit and may not predict high academic performance. Therefore, undergraduate students need to strike a balance between sleep and other activities that promote academic performance, ensuring they have only adequate sleep for optimal cognitive function.

KEYWORDS: Sleep; undergraduates; performance.

INTRODUCTION

Undisputedly, sleep is very vital to our day-to-day optimal functioning.[1] Research has also shown that individuals with sleep loss, sleep disorders or both are less productive, have increased health care utilization and an increased likelihood of accidents.[1]

Sleep is an active, recurring and reversible behaviour which serves various different functions such as repair and growth, learning or memory consolidation, and restorative processes occurring throughout the brain and body.[2,3] It is critical for memory consolidation, learning, decision making and critical thinking.[4] Sleep is thus essential for the optimal operation of key cognitive functions related to academic and possibly social success in higher education. When the individual is asleep, the brain integrates new information and forms new association.[5] Recent findings have indicated that lack of sleep may result in impairment of speech, as well as psychological and cognitive functioning.[6] Most sleep specialists indicated that adult humans require approximately 8 hours of sleep per day.[7]

Sleep can be divided into the Rapid Eye Movements (REM) Sleep (dream stage) and the Non-REM sleep (slow wave sleep). One quarter of the total sleep is made up of REM sleep while the remaining three quarter is made up of Non-REM sleep.[8,9]

Aim of the study

The aim of this study was to find out the average duration of sleep and its effect on academic performance among undergraduate of the University of Port Harcourt.

DESIGN AND METHODS

A semi-structured self-administered questionnaire was administered to 270 randomly selected students from all the 9 faculties in the University of Port Harcourt. This public institution has an average enrollment rate of 23,300 undergraduate students.[10] First year students who had not yet written any exams were exempted from the study since they did not have a GPA (Grade Point Average). This study was carried out between January and April 2016.

The questionnaire was divided into 4-section. The first section was the "demographic section" The second section was the "Usual Sleep-Wake Recall section" that assessed "Early Semester Sleep Duration (ESSD)" by measuring 7 days sleep length within the first month of the semester. The third section was the "Examination-Prone Sleep-Wake Recall section" that assessed "Late Semester Sleep Duration (LSSD)" by measuring 7 days sleep length within 2 weeks into commencement of examinations. The fourth section was the "Academic Assessment section" that assessed student self-reported Grade Point Average (GPA) for any completed semester. The Course code, credit unit, letter grades and Grade point average was obtained in this section. The GPA of students was used to access their academic performance. For those who could not remember or were unable to calculate their GPA, the credit units and letter grades were used to calculate their GPA. A pre-test was carried out to check the students' understanding of the questions and necessary adjustment made thereafter. The questionnaires were distributed to the eligible students for the study, and they were asked to fill the questionnaires immediately and return it the same day. At point of collection, the questionnaires were checked for completeness and missing information were requested and added by the interviewer. A total of 270 questionnaires were administered within a period of 9 weekdays, with 30 questionnaires (a department) being filled each day. Data was analyzed using Statistical Programme for Social Science (SPSS Version 21).

RESULTS

Table I: Socio-demographic characteristics of respondents

ITEMS	FREQUENCY (n=270)	PERCENTAGE (%)
Age (years)		
16-19	42	15.56
20-23	165	61.11
24-27	50	18.52
28-31	13	4.81
Mean age	*21.78±2.75*	
Sex		
Female	156	57.80
Male	114	42.20
Marital Status		
Single	252	93.33
Married	18	6.67
Religion		
Christianity	266	98.52
Islam	4	1.48

A total of 270 questionnaires were retrieved giving a response rate of 100%, Table I shows the socio-demographic characteristics of respondents. Most of the participants 165 (61.11%) were between the ages of 20 and 23 years. Most of the respondents, 156 (57.8%) were females while 114 (42.2%) were males. A majority 252 (93.33%) were single while 18 (6.67%) were married Most of the respondents, 266 (98.52%) were Christians whereas only 4 (1.48%) were Moslems.

Table II: Mean sleep duration among respondents

DURATION	DAYS	MEAN (MINUTES)	SD
Early Semester Sleep Duration (ESSD)	Weekdays	409	97.32
	Weekends	445	101.05
	All days	420	89.82
Late Semester Sleep Duration (LSSD)	Weekdays	314	93.57
	Weekends	388	117.09
	All days	335	90.19
Mean Semester Sleep Duration (MSSD)	Weekdays	362	82.09
	Weekends	417	96.00
	All days	377	79.66

Table II shows the mean sleep duration among respondents The table shows that students slept more on weekends than weekdays and during early semester than late semester. Mean Early Semester Sleep Duration (ESSD) was 409±97.32 minutes (6hrs49mins) on weekdays and 445±101.05 minutes (7hrs25mins) on weekends. Mean Late Semester Sleep Duration (LSSD) was 314±93.57 minutes (5hrs14mins) on weekdays and 388±117.09 minutes (6hrs28mins) on weekends. Mean Sleep for all days during the Early Semester, (ESSD) was 420±89.82 minutes (7hours), during the Late Semester (LSSD) was 335±90.19 minutes (5hrs35mins).

The Mean Semester Sleep Duration (MSSD) was 362±82.09 minutes (6hrs2minutes) on weekdays and 417±96.00 minutes (6hrs57mins) on weekends. Overall, Mean Semester Sleep Duration (MSSD for all days) was 377±79.66 minutes (6hrs17mins±1.33).

Table III: Grade distribution of respondents

Class of Degree	Cumulative Grade Point Average	Number of students
1st Class	4.50 – 5.00	15 (5.6)
2nd Class Upper	3.50 – 4.49	150 (55.6)
2nd Class Lower	2.40 – 3.49	89 (33.0)
3rd Class	1.50 – 2.39	16 (5.9)
Pass	1.00 – 1.49	0 (0.0)
Total		**270 (100)**

Table III shows that a majority 150 (55.6%) of the respondents are in the second class upper grade. this was followed by 89(33.0%) in the second class lower grade. Only 15(5.6%) of respondents were in the first class grade.

Table IV: Sleep Duration based on GPA among respondents for all days

PERIOD	GRADE	SLEEP DURATION (MINUTES)		
		MEAN	SD	SEM
Early Semester (All days)	1st class	392	111.08	28.68
	2nd upper	416	89.55	7.31
	2nd lower	436	88.05	9.33
	3rd class	389	67.26	16.81
Late Semester (All day)	1st class	305	97.27	25.12
	2nd upper	334	89.71	7.33
	2nd lower	345	86.88	9.21
	3rd class	329	106.19	26.55

Table IV shows that during the early semester, 1st class students slept for 392±111.08 minutes (6hrs32mins), 2nd class upper for 416±89.55 minutes (6hrs56mins), second class lower for 436±88.05 minutes (7hrs16mins) and 3rd class for 389±67.26 minutes (6hrs29mins). During the late semester, 1st class students slept for 305±97.27 minutes (5hrs5mins), 2nd class 334±89.71 minutes (5hrs34mins), 2nd class lower, 345±86.88 minutes (5hrs45mins) and 3rd class 329±106.19 minutes (5hrs29mins).

Table V: Relationship between sleep quantity and academic performance among respondents (all days)

PERIOD	GRADE	r	r^2	P
Early Semester (All days)	1st class	0.205	0.042	0.463
	2nd upper	-0.038	0.001	0.647
	2nd lower	-0.370	0.137	0.000
	3rd class	-0.215	0.046	0.424
	All	-0.103	0.011	0.092
Late Semester (All day)	1st class	0.494	0.244	0.061
	2nd upper	-0.082	0.007	0.320
	2nd lower	-0.006	0.000	0.958
	3rd class	-0.600	0.360	0.014
	All	-0.074	0.005	0.225

r^2= Coefficient of determination, p = probability of r at 0.05 alpha level

Table V shows the strength of the linear association between GPA and sleep duration of respondents. In the early semester period, there was a weak positive correlation between GPA and quantity of sleep among first class students. As the quantity of sleep increases, so also does the GPA. There was a weak negative correlation among the other classes, implying that as the quantity of sleep increases so does the GPA decreases. These differences were only statistically significant for respondents with second class lower (2^2). The correlation of 1st, 2^1 (second class upper), 3rd and their duration of sleep were not significant.

In the late semester among first class students there was a moderate positive correlation while for 3rd class students there was moderate negative correlation between their GPA and sleep duration. The other categories of students showed very weak negative correlation between their GPA and sleep duration. Similarly, the coefficient of determination, r^2, which

measures the strength of association, for them were negligible (<1.8%). The proportion of variation in GPA that is explained or accounted for by sleep was 4.2% and 24.4% (1st class) and 4.6% and 36.0% (3rd class) during early semester and late semester respectively. That is, 95.8% and 75.4% (1st class) and 95.4% and 64.0% (3rd class) variability during early semester and late semester respectively cannot be accounted for by sleep. For the other classes, as well as overall GPA r^2 was zero.

DISCUSSION

This study looked at sleep and academic performance among undergraduates of the University of Port Harcourt. The average sleep duration in this study was similar to that of a study among medical students in Enugu, Nigeria which was 6 hours.[11] It is however less than that of the findings among Pakistani medical students, which was 7.30hrs±1.66hours.[12]

Other Asian studies, among medical and other college students reported an average sleep duration of 6hrs24mins,[13] 6hrs42mins,[14] and 5hrs54mins.[15] These findings were similar to our finding though the 5hrs 54mins was actually lower. This may be due that our study population comprised of all students while some of these studies looked only at medical students. Our study's average sleep duration is much lower than what is recommended by the American National Sleep Foundation 2015 (NSF) as 7-9 hours in American Population.[16] This could be due to the fact that the NSF value does not strictly apply to students alone but the general population at large. Results from this study was also lower than the 7hrs21mins reported among USA college students.[17] The higher sleep duration observed in the US may be due to improved technological advancements when compared to the developing countries which allows students to finish their work on time. It may also be attributed to variations in the educational systems of these countries.

In this study, the usual weekdays sleep observed during the early semester was lower than different values gotten from about various studies in the USA with values ranging from 7hrs48mins to 8hrs2mins.[18-20] The current study reported 36 minutes increased sleep duration on weekends than weekdays. This is much lower than American population duration ranging between 84 to 97 minutes more.[18,,21,23] but higher than Asian value of 28 minutes increase.[13] Even though this study did not look into socio-cultural, intercontinental or inter-racial difference in sleep, again, these may explain variation in sleep duration.

Researchers have showed that the duration of weekend sleep can accurately define satisfaction of night sleep.[24,25,26] The increase in weekend sleep was reported by Raphael et al in 2014 in a research work among students in Kenya, who opined that "as teens lose more sleep during the weekday, they tend to pay for it during weekends when they don't do any school activity".[25] This is agreeable since the body has a need to maintain a neurophysiological balance between wakefulness and sleep quantity. Lee et al and National Sleep Foundation 2015 also explained that sleep adequacy is not only a subjective feeling of sleep satisfaction, that adequacy can also be accurately accessed objectively by the level of 'sleep debt' (which is sleep extension during weekends).[24,26] In the current study first class students slept the least on weekends, followed by 2^1, 2^2 and most by 3rd class. It is possible Anderson, Lee et al and the NSF are right in their observations, and that 1st class students seem to get the most satisfied sleep during weekend, is a possible reason why they did well. Also, that third class students slept the most on weekends, is a possible reason why they did the poorest on performance. This is consistent with the findings of Davidson in his study on predictors of sleep quantity and quality among Illinois-USA college students in 2012, whose result showed that grade point average does not predict good or poor weekday sleep length rather on weekends.[17]

Sleep duration in the current study was more at the beginning of the semester (ESSD of 7hours) than during examinations (LSSD of 5hrs35mins). There was significant difference between the sleep quantity of undergraduates of university of Port Harcourt during the early semester and during examinations. This is similar to the finding of Hawkins and Shaw (in a longitudinal study among American college students in which three sets of data collected showed a progressive decline over the semester, that is, from 8hrs2mins in first data to 7hrs49mins in third data.[19] This may be because the consciousness of having to achieve academic fits continue to increase as the semester examinations draw closer.

Several researchers have found significant relationship between sleep and grade point average,[27,28] a few did not.[29,30] However, the current study did not completely rule out that students grade is not affected by sleep duration. Sleep duration was found to be negatively, moderately and significantly correlated with lower grades (3rd class). The association between lower university grades and sleep duration was also widely reported in literatures.[29,31,32,33,34] This relationship is understandable judging from the view that sleep deprivation has negative effect on cognitive and executive brain functions.[34,35] There was, however, no significant relationship between sleep and overall GPA of the students, also, between sleep and GPA of 1st & 2nd class students. It is not out of place to deduce that an optimal cognitive function does not mean one should do well academically if he neglects other academic activities such as attending classes and studying. The finding between sleep duration and academic performance, therefore, showed that having high grades in school may be the result of a combination of some other factors, and that, adequate sleep duration only serves as a prerequisite

to attaining good academic fit even though it may not predict high academic performance.

REFERENCES

1. Colten HR, Altevogt BM. Sleep Disorders and Sleep Deprivation: An Unmet Public Health Problem. N Engl J Med, 2006; 356: 199-200.
2. Neinstein LS, Gordon CM, Katzaman DK, Rosen DS, Woods ER. Adolescent Health care: A practical Guide. Fifth Edition. USA; Lippincott Williams & Wilkins, 2008; 783-795.
3. Slat D, Classen J, Verbeek M, Overeem S. Reciprocal Interaction between sleep, circadian rhythms and Alzheimers' disease: focus on the role hypocretin and melatonin. Ageing Research Reviews, 2013; 12: 188-200.
4. Stijnbert EO, Deifer V, Amelie V. Misfer Sandman, Bring me Good Marks! On the Relationship between sleep quality and Academic Achievement. IZA Discussion Paper, 2014; 8232.
5. Luca I, Mark RO. How (and why) the immune system makes us sleep. Nat Rev Neurosci, 2009; 10(3): 199-210.
6. Curcio G, Ferrara M, Dennaro LD. Sleep loss, learning capacity and academic performance. Sleep Medicine, 2006; 10: 323-337.
7. Carskadon MA. Adolescent sleep patterns: Biological, social and psychological influences-Cambridge. UK Cambridge University Press, 2002.
8. Sembulingam K, Prema S. Essentials of Medical Physiology. Fifth Edition. New Delhi; Jaypee, 2010; 891-894.
9. Sinan C. Physiology of sleep. Retrieved from www.ybu.edu.tr/sinancanan/contents /files/605Sleep.pdf. Accessed on 01 November, 2015.
10. Nwoko AR. Impact of Social Media on Academic Achievement of University of Port Harcourt Students. B.Sc.Ed Dissertation. University of Port Harcourt. Accessed on 01 April, 2015.
11. Chinawa JM, Chukwu BF, Obu HA. Sleep Practices among Medical Students in Paediatrics Department of University of Nigeria Teaching Hospital, Ituku/Ozalla, Enugu, Nigeria. Nigerian Journal of Clinical Review, 2014; 17(2): 232-236.
12. Kazim M, Abrar A. Sleep patterns and academic performance in students of a medical college in Pakistan. KUST Med J, 2011; 3(2): 57-60.
13. Yang CM, Wu CW, Hsieh MH, Liu MH, Lu FH. Coping with sleep disturbances among young adults: A survey of first-year college students in Taiwan. Behavioral Medicine, 2003; 29(3): 133-138.
14. Ban DJ, Lee TJ. Sleep duration, subjective sleep disturbances and associated factors among university students in Korea. Journal of Korean Medical Science, 2001; 16(4): 475-480.
15. Yeung WF, Chung KF, Chan TC. Sleep-wake habits, excessive daytime sleepiness and academic performance among medical students in Hong Kong. Biological Rhythm Research, 2008; 39(4): 369-377.
16. National Sleep Foundation. How Much Sleep Do We Really Need? 2015. Available at: https://sleepfoundation.org /excessivesleepiness/how-sleep-works/how-much-sleep-do-we-really-need. Accessed on 21October, 2015.
17. Davidson ES. Predictors of Sleep Quantity and Quality in College Students. PhD Dissertation. Southern Illinois University, May 2012.
18. Buboltz WC, Brown FC, Soper, B. Sleep habits and patterns of college students: A preliminary study. Journal of American College Health, 2001; 50(3): 131-135.
19. Hawkins J, Shaw P. Self-reported sleep quality in college students: A repeated measures approach. SLEEP, 1992; 15(6): 545-549.
20. Oginska H, Pokorski J. Fatigue and mood correlates of sleep length in three age-social groups: School children, students and employees. Chronobiology International, 2006; 26(6): 1317-1328.
21. Lack LC. Delayed sleep and sleep loss in university students. Journal of American College Health, 1986; 35: 105-110.
22. Buboltz WC, Brown FC, Soper, B. Sleep habits and patterns of college students: A preliminary study. Journal of American College Health, 2001; 50(3): 131-135.
23. Forquer LM, Camden AE, Gabriau KM, Johnson CM. Sleep patterns of college students at a public university. Journal of American College Health, 2008; 56(5): 563-565.
24. Lee J, Dingus T, Mollenhauer M, Brown T, Neale V. Development of human factors guidelines for advanced traveler information systems and commercial vehicle operations (CVO): CVO driver fatigue and complex in-vehicle systems. US Department of Transport, FHWA-RD, 1996; 96-151: 395-403.
25. Raphael MG, Gilbert OA, Lucy K, Joyline MM. The Effect of Sleep Quantity on Performance of Students in Public Universities, Kenya. Merit Research Journals of Education and Review, 2014; 2(6): 113-118.
26. National Sleep Foundation. Sleep-Wake Cycle: Its Physiology and Impact on Health. National Sleep Foundation, 2006.
27. Kelly WE, Kelly KE, Clanton RC. The relationship between sleep length and grade-point average among college students. College Student Journal, 2001; 35(1): 84-87.
28. Thacher PV. University students and "The All Nighter": Correlates and patterns of students' engagement in a single night of total sleep deprivation. Behavioral Sleep Medicine, 2008; 6(1): 16-31.
29. Aabid A, Muhammad BM, Kanwal S, Amanda B, Mulazim HB. Effects of Different Sleeping Patterns on Academic Performance in Medical School Students. Natural Science, 2013; 5(11): 1193-1198.

30. Kazim M, Abrar A. Sleep patterns and academic performance in students of a medical college in Pakistan. KUST Med J, 2011; 3(2): 57-60.
31. Louca M, Short MA. The effect of one night's sleep deprivation on adolescent neurobehavioral performance. SLEEP, 2014; 37(11): 1799-1807.
32. Chiang Y. The effects of sleep on performance of undergraduate students working in the hospitality industry as compared to those who are not working in the industry. Graduate Theses and Dissertations. Iowa State University. January, 2013.
33. Daniel JT, Karlyn EV, Adam DB, Camilo R, Brandy R. The Role of Sleep in Predicting College Academic Performance: Is it a Unique Predictor? Behavioural Sleep Medicine, 2014; 11(3): 159-172.
34. Alya AG. Sleep Deprivation and Academic Performance of Students in the College of Nursing of King Saud University. World Applied Sciences Journal, 2013; 27(3): 155-167.
35. Pilcher JJ, Walters AS. How sleep deprivation affects psychological variables related to college students' cognitive performance. Journal of American College Health, 1997; 46: 121-126.