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Exploring the Relationship Between Sleep Quality and Academic Performance among Students in Imo State University, Owerri

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Abstract

The study conducted an investigation into the Relationship Between Sleep Quality and Academic Performance. Imo State University, Owerri. The study adopted a cross-sectional descriptive study design with a population of 8,500 undergraduate students in the faculty of Heath Sciences, Imo State University, Owerri. A multistage sampling method by means of probability proportionate to size was used to recruit the study participants. And the Taro Yamen estimates was used to estimate a sample of 400 students. The instrument for data collection was a semi-structured questionnaire. The Chronbach alpha test was used to test the reliability of the questionnaire. The research questions were answered using percentages, frequencies, tables and charts. The findings from the study revealed that poor sleep quality is significantly associated with lower academic performance among undergraduate students at Imo State university, even after accounting for gender and psychological health. The study recommended that that the university healthcare service providers should attempt to enhance students' awareness of sleep health and promote individuals' willingness by highlighting behaviours associated with enhancing sleep hygiene.

Keywords: *sleep quality, academic performance, psychological well-being, affective well-being*

Introduction

The time when the waking state is interrupted, leading to a drop-in metabolic activity, a tensing of muscles, and a lowering of sensory activities, is known as sleep, which is crucial for life maintenance.[1] It is well-recognized that pubertal alterations in circadian timing and homeostatic sleep mechanisms throughout the second decade of life cause sleep/wake timing to shift later. Because of this, teenagers and young adults may struggle to balance their innate delayed schedule

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with the demands of regular societal schedules like work and school hours, which may result in sleep deprivation and excessive daytime drowsiness.[2]

Over the past decade, much research has been conducted on the interaction between subjective sleep and students' academic performance. Ahrberg *et al*. [3] reported a positive relationship between sleep quality and academic performance. Furthermore, Datta e*t al.* [4] reported a significantly higher proportion of students with sleep disorders among students with average exam grades compared to students with good exam grades.

The overall goal of this study is to comprehensively examine the relationship between sleep quality and the academic performance of college students to improve academic performance and well-being of students.

Materials and Methods

Research Design

A cross-sectional descriptive design was adopted for the study.

Study Area

The study area for this research will be Imo State University, Owerri, it is situated in the south-eastern region of Nigeria.

Study Population

The target population was undergraduate students of Imo State University, Owerri who are resident within the school environment. 2,400 number of students will be considered the total population for this study.

Inclusion Criterion

This study includes:

i. Undergraduate students of Imo State University, Owerri who are resident within the school environment
ii. Students whose age ranges from 18 years and above

Exclusion Criterion

This study excludes:

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i. Students who are acutely ill and those with sensory deficits will be excluded from the study.
ii. Students with severe cognitive deficits were excluded.

Sample Size Estimation

The sample size was calculated using the Taro Yamane scientific formula which is given as:

$$n = \frac{N}{1 + N(e)^2}$$

Where:

N = Population size
1 = constant
e = degree of error expected
n = sample size

$$n = \frac{8500}{1 + 8500(0.05)^2}$$

$$= \frac{8500}{1 + 8500(0.0025)}$$

$$= \frac{8500}{1 + 21.25}$$

$$= \frac{8500}{22.25}$$

n = 382

The minimum sample size of 382 shall be required for the study. However, 400 questionnaires were distributed to increase the strength and applicability of the findings

Sampling Technique

A multistage sampling method by means of probability proportionate to size was used to recruit the study participants. Participants were recruited via the places of residence within the school premises and lecture areas. Lecture rooms and hostels were selected randomly, and the number of participants per lecture room and hostel was determined by proportional sampling from the odd-numbered blocks in the lodges. Participants were then recruited until the sample from each place of residence is complete.

Method of Data Collection

Data will be obtained using an interviewer administered semi-structured questionnaire. This was done with the aid of two (2) field assistants who were trained to aid the researcher in the data collection process. The Data instrument would be administered face-to-face to the respondents.

Method of Data Analysis

The Statistical Package for the Social Sciences (SPSS) version 21.0 was used in the analysis of the data. Results will be expressed in percentages, frequencies, tables and charts.

Ethical Consideration

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A letter of introduction and ethical clearance was obtained from the Department of Public Health Ethical clearance committee before the research was conducted. The purpose of the research was explained to each respondent and verbal informed consent obtained from them before inclusion into the study. Also, anonymity of the respondents was assured and ensured. The confidentiality of the information they gave was maintained.

Results

The percent distribution of the demographic variables is presented in table 2. The results indicated that approximately 60 percent of the respondents were men and an almost equal number of students were selected from the second, third, and fourth year. From the five Departments, an equal number of observations were collected. However, from the Nursing Science, only 15 percent of the respondents were selected.

Table 1: Frequency distribution of the demographic variables of the respondents

Variable Sex	n (%)	Variable Health status (self-reported)	n (%)
Boys	125 (62.45)	Good	290 (72.5)
Girls	75 (37.5)	Moderate	80 (20.0)
Total	200 (100)	Sick	30 (7.5)
Academic Year		Total	400 (100)
First	72 (18.0)	Family Type	
Second	96 (24.0)	Nuclear	376 (94.0)
Third	98 (24.5)	Joint	24 (6.0)
Fourth	134 (33.5)	Total	400 (100)
		Type of Accommodation	
Total	400 (100)	School Hostel	128 (32.0)
Faculty of Health Sciences,		External Lodges	272 (68.0)
Public Health	200 (40.0)	Total	400 (100)
Nursing Sciences	50 (25.0)	Having Relation with Opposite Sex	
Nutrition and Dietetics	50 (25.0)	No	230 (57.5)
Medical Laboratory Science	50 (25.0)	Yes	170 (42.5)
Optometry	50 (25.0)		
Total	**400 (100)**	**Total**	**400 (100)**

The results also depicted that approximately 94 percent of students had a nuclear family. Now, this tendency is increasing day by day in Nigerian University. However, due to inadequate

provision of accommodation, it is not possible to accommodate all students at a university residential hall. Also, some students' homes far away from the school which is about 30 km far from the university campus and their parents preferred to live external hostels around the school. That's why about 68 percent of the selected students lived in external hostels. Approximately, 42.5 percent of students said that they had a relationship with their opposite sex (Table 2).

Table 2: Frequency Distribution of the variables Related to Sleep

Variable	n (%)	Variable	n (%)
Smoking		Going to Bed with an Empty Stomach	
No	368 (92.0)	No	259 (64.75)
Yes	32 (8.0)	Yes	141 (35.25)
Total	400 (100)	Total	400 (100)
Using energy drinks		Going to bed immediately after Eating	
No	238 (71.3)	No	296 (74.0)
Yes	162 (40.5)	Yes	104 (26.0)
Total	400 (100)	Total	400 (100)
Doing Exercise Regularly		Sleeping in a Quiet and Dark Room	
No	183 (45.75)	No	203 (50.75)
Yes	217 (55.25)	Yes	197(49.25)
Total	400 (100)	Total	400 (100)
Drinking Coffee or other Substances with Caffeine after Dinner		Using the Bed for Eating, Calling on the Phone, Studying, or other Non-Sleeping Activities	
No	299 (74.75)	No	153(38.25)
Yes	101 (25.25)	Yes	247 (62.75)
Total	400 (100)	Total	400 (100)
Having Academic Pressure		Watching TV long time before Sleeping	
Total			
No	112 (28.0)	No	267 (66.75)
Yes	288 (72.0)	Yes	133 (33.25)
Total	400 (100)	Total	400 (100)

Being Active in Social-Media Long Time before Sleeping.			
No	107 (31.75)		
Yes	277 (69.25)		
Total	400 (100)		

The frequency distribution of the variables related to sleep is presented in table 3. About 92 percent of the students reported no smoking habit; however, approximately71 percent of the students reported using energy drinks or taking coffee or other substances with caffeine after dinner regularly. Only 55 percent of students said that they performed physical exercise regularly. About two-third of the students reported that they had academic pressure. Just above 35 percent of the respondents indicated going to bed with an empty stomach at night. However, one-third of the respondents reported that they went to bed immediately after taking dinner. Approximately, 51 percent of the students did not use a dark room for sleeping at night. About two out of three of the respondents were using bed for eating, calling on the phone, studying, or other non-sleeping activities. Results depicted that about one-third of the students watched TV a long time before the time of sleeping. However, about 69 percent of the respondents were active in social media like Facebook, Twitter, YouTube, etc. long time before sleeping (Table 3).

Table 3: Descriptive statistics of selected variables

Variable	Mini	Maxi	Mean ± SD	Skewness	Kurtosis
Age (year)	18.00	28.00	21.35 ± 1.52	0.281	-0.117
200 L Result (GPA)	3.24	5.00	4.92 ± 0.21	-4.499	23.910
300 L Result (GPA)	3.75	5.00	4.80 ± 0.27	-1.486	1.612
400 L Result (GPA)	2.60	3.88	3.69 ± 0.20	-1.851	4.126
Daytime sleepiness	0	3.30	1.48 ± 0.75	-0.445	-0.029
Weekly time spent for studying (hour)	0	48.00	9.29 ± 8.51	1.583	3.077
Weekly time spent for work (hour)	0	25.00	7.62 ± 7.12	0.752	-0.247
During the past month, how many hours of actual sleep did you get at night?	3.00	10.00	6.32 ± 1.39	0.090	0.014

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During the past month, how many hours were you in bed?	5.00	12.00	7.73 ± 1.36	0.569	0.575

The average age of the respondents was just above 23 years with a minimum of 18 and a maximum of 26 years. The mean of grade point average (GPA) of the students in both 200 levels and 300 levels were above 4.5 on a scale of 5. However, in the case of 400 levels, the average cumulative GPA (CGPA) was about 3.7 on a scale of 4 with a minimum of 2.6 and a maximum of 3.8. The results depicted that the average daytime sleeping time was approximately one and a half hours with a maximum of three and a half hours. Interestingly, it can be seen from the results that students spent just above 9 hours for their study in a week on an average. The researchers think that it is quite below the average. During the past month of the survey, the students spent an average of more than 6 hours for actual sleep; however, they spent approximately 8 hours in bed in a day (Table 4).

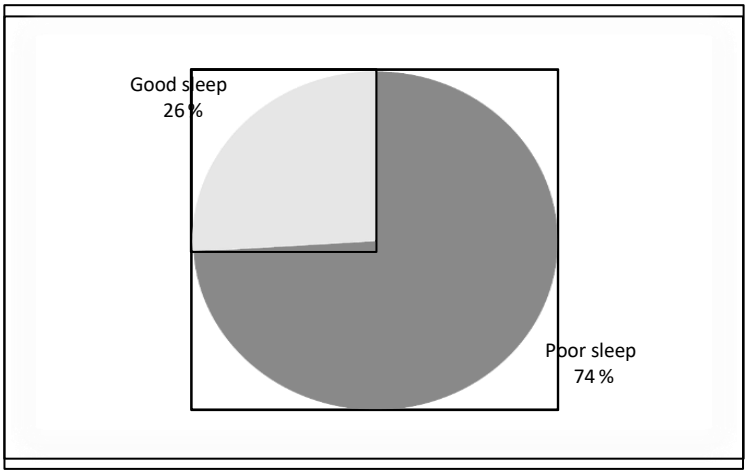

Figure 1. Sleeping Status of the Students

Figure 1 depicts that only the sleep quality of one-fourth of the students was good. It is alarming that approximately three out of four students have poor sleep quality. Generally, it is believed that sleep quality is related to the physical as well as the mental condition of a student. Also, poor sleep quality disturbs the academic performance of a student. The results of regression analysis are presented in table 4 and illustrate that the estimated regression model fits well and about 60 percent

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of variation of the dependent variable, i.e., the variation among CGPA of the university students, can be explained by the seven variables considered in this study which are related to sleep.

Table 4: Results of Regression Model

Components of SQI	Coefficients	S.E	t	P-value	Model summary
Constant	3.476	0.214	16.228	< 0.001	
Subjective sleep quality Sleep latency Sleep duration Habitual sleep efficiency	0.336 -0.077 0.112 -0.066	0.102 0.096 0.047 0.082	3.277 -0.800 2.383 -0.807	0.001 0.424 0.021 0.420	R^2 = 0.782, adjusted R^2 = 0.604
Sleep disturbances	-0.261	0.122	-2.141	0.033	
Use of sleeping medications	-0.160	0.086	-1.869	0.063	
Daytime dysfunction	0.035	0.097	0.358	0.721	

SQI: Sleep Quality Index; SE: Standard error

The independent variables of the regression model were selected by the stepwise method, i.e., the insignificant variables like age, sex, etc. were not included in the final model. From the results, it is seen that some of the variables have positive and some have negative impact on the academic performance of the university students, i.e., sleep duration, subjective sleep quality, and daytime dysfunction are positively related to the academic performance; however, sleep latency, habitual sleep efficiency, sleep disturbances, and use of sleeping medications were negatively associated with the academic performance of the students. Among the independent variables, subjective sleep quality, sleep disturbances, and use of sleeping medications were statistically significant at the significance level of 0.05 (Table 5).

Discussion

The data analyzed in table 3 provided answers for research question one and it showed that about 92 percent of the students reported no smoking habit; however, approximately 71 percent of the students reported using energy drinks or taking coffee or other substances with caffeine after dinner regularly. Only 55 percent of students said that they performed physical exercise regularly. About two-third of the students reported that they had academic pressure. Just above 35 percent of the respondents indicated going to bed with an empty stomach at night. About two out of three of the respondents were using bed for eating, calling on the phone, studying, or other non-sleeping activities. Results depicted that about one-third of the

students watched TV a long time before the time of sleeping. However, about 69 percent of the respondents were active in social media like Facebook, Twitter, YouTube, etc. long time before sleeping. From the results, it can be seen that subjective sleep quality, sleep disturbances, and use of sleeping medications were statistically significant[5-6] at significance level of 0.05. Subjective sleep quality, sleep duration, and daytime dysfunction were positively related to academic performance; however, sleep latency, habitual sleep efficiency, sleep disturbances, and use of sleeping medications were negatively associated with the academic performance of the students. However, further research is required in order to draw concrete conclusions and future studies may lead to researchers to develop programs that may boost school performance by improving the sleep pattern of the university students. To this effect we concluded that the data analyzed in table 4 provided answers for research question two and it showed that the average age of the respondents was just above 23 years with a minimum of 18 and a maximum of 26 years. The mean of grade point average (GPA) of the students in both 200 levels and 300 levels were above 4.5 on a scale of 5. However, in the case of 400 levels, the average cumulative GPA (CGPA) was about 3.7 on a scale of 4 with a minimum of 2.6 and a maximum of 3.8. The results depicted that the average daytime sleeping time was approximately one and a half hours with a maximum of three and a half hours. Interestingly, it can be seen from the results that students spent just above 9 hours for their study in a week on an average. The researchers think that it is quite below the average. During the past month of the survey, the students spent an average of more than 6 hours for actual sleep; however, they spent approximately 8 hours in bed in a day. Furthermore, negative linear correlations have been observed between GPA and sleep onset time, wake time, and mid-sleep time In Sudanese medical students, there were significant differences in the overall sleep quality, subjective sleep rating, bedtime later than midnight, sleep latency, and daytime dysfunction between students who scored an “A” in the exams and those who scored a “C.” Their “A” scoring group had a higher mean sleep duration than the “C” scoring group.[7] In Iran, 85% of the medical students who scored a GPA of 2.99 or less were poor sleepers on PSQI. If looked together, the results suggest a strong negative relationship between sleep quality and academic performance of the medical students.

Conclusion

In summary, this study shows that poor sleep quality is significantly associated with lower academic performance among undergraduate students at Imo State university, even after accounting for gender and psychological health. Students having poor academic performance suffer from the problems related to sleep quality and require medical advice for maintaining a healthier lifestyle including adequate rest time. Understanding the modifiable predictors of poor academic performance can assist the university in developing appropriate interventions and support services for students.

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