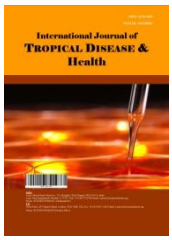

International Journal of TROPICAL DISEASE & Health

43(16): 29-36, 2022; Article no.IJTDH.89947
ISSN: 2278–1005, NLM ID: 101632866

Self-reported Sleep Quality and Associated Factors among Undergraduate Students in a Nigerian Tertiary Institution

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Authors' contributions

This work was carried out in collaboration among all authors. Author OSO designed the study, collected data and managed the literature searches. Author AAA conceptualized the topic and wrote the first draft of the manuscript. Author EOO designed the study protocol and managed analysis of the study. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/IJTDH/2022/v43i1630651

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://www.sdiarticle5.com/review-history/89947

Original Research Article

Received 17 May 2022
Accepted 29 July 2022
Published 16 August 2022

ABSTRACT

Background: The quality and quantity of sleep is strongly related to physiological and physical health and other measures of wellbeing. Undergraduates are particularly susceptible to increasing academic and social demands that can cause sleep quality.
Aim: This study aims to determine the prevalence and distribution of self-reported sleep quality among undergraduates and the association between certain academic and non-academic related factors and quality of sleep.
Material and Method: A cross-sectional study among three hundred and twenty-seven undergraduates of the College of Health Sciences, faculty of law and faculty of art of Obafemi Awolowo University Ile-Ife who registered for the 2018/2019 academic session**.** A self-administered questionnaire was used to obtain sociodemographic and academic information (including the number of courses per semester, Cumulative grade point average (CGPA) and carried over course(s)). Pittsburgh Sleep Quality Index (PSQI) was used to assess sleep quality.
Results: The mean age of participants was 22 years. The prevalence of self- reported sleep quality among the participants was 35.8%. Female students (66.3%) had better sleep quality when compared with their male counterparts (61.7%). Bivariate analysis shows a statistically significant

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association between the course of study and the quality of sleep (p=0.003). Total average sleep hour per day (p=0.002) and known environmental factors affecting bedtime or sleep pattern (p=0.01) also showed statistically significant association with sleep quality.
Conclusion: There was a high prevalence of self-reported impaired sleep quality among the undergraduate population in which this study was conducted. The course being studied, total average sleep hours in a day and environmental factors were associated with the quality of sleep.

Keywords: Sleep quality; undergraduates; academic performance.

1. INTRODUCTION

The rising proportions of young adults and adolescents with sleep disturbances call for urgent attention. The reported negative effects which produce a grim picture among this active group of the population are impaired overall well-being, mood, and academic performance [1]. According to the National Sleep foundation (NSF), sleep is as essential as diet and exercise. Its quality is strongly related to physiological and physical health and other measures of wellbeing [2]. Sleep can be defined as a natural reversible periodic state of rest for the mind and body, in which the eyes are usually closed and consciousness is completely or partially lost so that there is a decrease in bodily movement and responsiveness to external stimuli [3].The quality of sleep is measured along quantitative and qualitative dimensions. The quantitative component includes the duration of 7-9 hours considered appropriate for young adults and adults by the national sleep foundation, while the qualitative component, regarded as a superior index for assessing sleep is a subjective measure of the depth and feeling of restfulness upon awakening [4]. On the other hand, sleep disorder is defined as irregular sleep with abnormal quality and quantity, leading to daily activity dysfunction [5] Sleep disorder can also be described as early or late insomnia, extreme sleepiness, sleep and waking schedule problems and parasomnia [5].

A larger percentage of the population, and in particular university students, are unaware of sleep hygiene practices and hence do not have a better quality of sleep [2]. Researchers have identified undergraduates as particularly susceptible to increasing academic and social demands in terms of late night internet surfing, night parties and others that can cause sleep disorders [6]. This can be attributed to reduced adult supervision in universities, new social opportunities and commitments, academic challenges and other extra-curricular activities resulting in irregular sleep schedule and higher risk of sleep deprivation [7].

In a previous study among Nigerian undergraduates, it was observed that one out of every two students (49.5%), had poor sleep quality [8]. Studies from other countries reported a prevalence of between 13.5%-86.4% among Iranian students and 19.2%-57.5% among students in some other countries [9]. In a global literature review of the medical students' sleep experience, it was found out that poor sleep is not only common among medical students, but its prevalence is also higher than in other students and the general population [10]. The most commonly reported sleep related complaints among students are difficulty falling asleep, difficulty maintaining sleep, early morning awakenings, poor sleep quality, early morning fatigue/sleepiness, and daytime napping [11].

Numerous factors have been documented in research articles to be responsible for sleep disorders among students; sleep problems are associated with both intrinsic and environmental factors. Stressful events such as examinations and relationships have also been found to be factors[10]. Other factors identified in some groups of students are longer study times, studying just prior to sleep, and associated anxiety about studies and results. It was also observed that these behaviors were not as successfully balanced with leisure time [10].

The effects of sleep quality are a major health concern due to the rising proportions of young adult and adolescents with sleep disorder and hence should be closely studied and examined across categories of students. This study was designed to contribute to the body of knowledge on the prevalence of self-reported sleep quality among undergraduate students. In addition, this study aims to determine the relationship between certain academic and non-academic related factors and the quality of sleep. Findings from this study could highlight the burden of sleep impairment among students of Obafemi Awolowo

University and, by extension, interventions like sleep education and sleep medicine can be advocated to improve the overall well-being of students.

2. METHODOLOGY

2.1 Study Design

A cross-sectional descriptive study conducted among undergraduate students of Obafemi Awolowo University, Ile – Ife.

2.2 Study Population/Participants

The study population was undergraduate students of the College of Health Sciences, Faculty of Law and Faculty of Art (Department of English), Obafemi Awolowo University, Ile-Ife.

2.3 Sample Size Determination

The sample size was estimated using the Kish formula as follows, (this was derived from a previous study as the best estimate of poor sleep quality among medical students at a Nigerian University

$n= z^2 p (1 - p) \div d^2$,

n = required sample size,
z = confidence level at 95% (standard value of 1.96)
p = estimated prevalence rate (Using 32.5% from a previous study as the best estimate of poor sleep quality among medical students at a Nigerian University)
d = margin of error at 5% (standard value of 0.05)
$n = (1.96)^2 \times 0.325 (1 – 0.325) \div 0.05^2$
n = 337

2.4 Data Collection

Data was collected through an electronic questionnaire. The questionnaire was designed using Google Forms and was typed in English language. It was organized into sections with questions enquiring about age, sex, ethnicity, academic level, total sleep time per 24 hours, naps during day, total study hours per day, any medical conditions, and likely environmental factors affecting bedtime or sleep pattern. Students of the College of Health Sciences, Faculty of Law, and Faculty of Arts (Department of English) of Obafemi Awolowo University Ile-Ife, registered for the 2018/2019 academic session, were included in this study.

The class list and the phone numbers of students were collected from their class representatives via e-mail. The questionnaire was sent to each of the students through WhatsApp.

The Pittsburgh Sleep Quality Index (PSQI) was used to measure sleep quality over one month [12]. Global PSQI score grade greater than or equal to 5 was adjudged as poor sleep quality. Academic performance was assessed by asking participants about their Cumulative Grade Point Average (CGPA). Participants provided their CGPA for the last semester prior to the study period.

2.5 Statistical Analysis

Data analysis was carried out using IBM Statistical Package of Social Sciences (SPSS) Version 26. The data for the study was summarized using appropriate descriptive and inferential statistical techniques. Descriptive statistical tool of frequency, counts and percentages were used to report the sociodemographic characteristics of the respondents and in describing the distribution of the key variables of the study. Inferential analysis was done using Chi-square test of association to assess the relationship between respondents' characteristics and their sleep quality. A *p*-value of <0.05 was considered statistically significant.

3. RESULTS

Table 1 shows the sociodemographic characteristics of the respondents. A total of 337 aged 18 – 30 were recruited in this study, 327 responded and 10 dropped out. A total of 327 students with age range 18 – 30 years participated in this study. Majority of the respondents were between 20 – 24 years (66.7%). The female respondents were178 (54.4%) while 149(45.6%) were male.

Forty-four (13.5%) respondents were Dental students, 79(24.2%) were studying English Language, 63(19.3%) Law, while 134 (41.0%) were medical students. Concerning the year of study, 6(1.8%) were in their first year, 46(14.1%) were in second year, 56(17.1%) were in their third year, 84(25.7%) in fourth year, 74(22.6%) in fifth year and 61(18.7%) were in the sixth year. For non–medical students, 37(11.3%) of the respondent had CPGA score of first-class category, 91(27.8%) had second class upper, 29(8.9%) had second class lower, 4(1.2%) had third class, and 3(9%) had pass grades. For

medical students, 129(39.4%) had pass grades, 17(5.2%) had distinctions while 17(5.2%) declined to indicate. Twenty-four (7.3%) respondents were carrying over course(s) from previous academic sessions. (Table 2).

Two hundred and forty-eight (75.8%) were not involved in part-time jobs. About half of the respondents 148(45.3%) had between 4.1 – 8.0 hours of sleep every day. Most of the respondents, 291(89.0%) read between 4.0 – 8.0 hours every day. (Table 3).

Table 1. Sociodemographics characteritics of respondents

Variables		Frequency (N)	Percentage (%)
Age (years)	< 20	64	19.5
	20 – 24	218	66.7
	>24	45	13.8
Sex	Female	178	54.4
	Male	149	45.6
Marital Status	Married	3	0.9
	Single	324	99.1

Table 2. Academic information of respondents

Academic information	Variables	Frequency (N)	Percentage (%)
Course of Study	Dentistry	44	13.5
	English Language	79	24.2
	Law	63	19.3
	Medicine and Surgery	134	41.0
	Not indicated	7	2.1
Year of Study	Fifth year	74	22.6
	First year	6	1.8
	Fourth year	84	25.7
	Second year	46	14.1
	Sixth year	61	18.7
	Third year	56	17.1
CGPA (last Semester)	Pass (≤1.49)	3	0.9
	Third Class (1.50 - 2.49)	4	1.2
	Second Class Lower (2.50 - 3.49)	29	8.9
	Second Class Upper (3.50 - 4.49)	91	27.8
	First Class (4.50+)	37	11.3
	Pass (Medical and Dental Student)	129	39.4
	Distinction (Medical and Dental Student)	17	5.2
	Declined to indicate	17	5.2
Are you carrying over any course(s)?	No	303	92.7
	Yes	24	7.3

Table 3. Sleep quality related factors

Indicators	Variables	Frequency (N)	Percentage (%)
Are you engaged in any part-time employment?	No	248	75.8
	Yes	79	24.2
Total average hours spent studying per 24 hours	≤ 4.0	144	44.0
	4.1 - 8.0	148	45.3
	>8.0	35	10.7
Total average sleep hours per 24 hours	≤4.0	25	7.6
	4.1 - 8.0	291	89.0
	>8.0	11	3.4

Table 4. Relationship between sleep quality and academic factors

	Good sleep Frequency in percentage (N %)	Poor sleep Frequency in percentage (N %)	*P* value
Course of study			
Other Courses	81 (55.5)	65 (44.5)	
Medical	129 (71.3)	52 (28.7)	0.003*
Year of Study			
First year	5 (83.3)	1 (16.7)	
Second year	28 (60.9)	18 (39.1)	
Third year	34 (60.7)	22 (39.3)	
Fourth year	53 (63.1)	31 (36.9)	
Fifth year	43 (58.1)	31 (41.9)	
Sixth year	47 (77)	14 (23)	0.21
Last Semester Grade (medical and dental students)			
Pass	122 (72.6)	46 (27.4)	
Distinction	7 (53.8)	6 (46.2)	0.15
Last Semester CGPA (other students)			
First Class (4.50+)	24 (64.9)	13 (35.1)	
Second Class Upper (3.50 - 4.49)	53 (58.2)	38 (41.8)	
Second Class Lower (2.50 - 3.49)	18 (62.1)	11 (37.9)	
Third Class (1.50 - 2.49)	2 (50)	2 (50)	
Pass (.50 - 1.49)	4 (30.8)	9 (69.2)	0.29
Total average hours spent studying in 24 hours			
≤ 4.0	93 (64.6)	51 (35.4)	
4.1 - 8.0	95 (64.2)	53 (35.8)	
8.1+	22 (62.9)	13 (37.1)	0.98
Are you carrying over any course?			
Yes	14 (58.3)	10 (41.7)	
No	196 (64.7)	107 (35.3)	0.53

** Statistically significant value (p<0.05)*

Table 5. Relationship between sleep quality and non-academic factors

	Good sleep Frequency in percentage (N %)	Poor sleep Frequency in percentage (N %)	*P* value
Are you engaged in any part-time employment?			
Yes	50 (63.3)	29 (36.7)	
No	160 (64.5)	88 (35.5)	0.84
Total average sleep hours in 24 hours			
≤4.0	8 (32)	17 (68)	
4.1 - 8.0	195 (67)	96 (33)	
8.1+	7 (63.6)	4 (36.4)	0.002*
Do you take naps (short sleep) during the day?			
Yes	140 (65.7)	73 (34.3)	
No	70 (61.4)	44 (38.6)	0.44
Do you have any medical condition(s)?			
Yes	18 (51.4)	17 (48.6)	
No	192 (65.8)	100 (34.2)	0.95
Are there any known environmental factors affecting your bedtime or sleep pattern?			
Yes	85 (56.7)	65 (43.3)	
No	125 (70.6)	52 (29.4)	0.01*

** Statistically significant value (p<0.05)*

Overall, it was observed that 210(64.2%) students had good sleep quality while 117(35.8%) had poor sleep quality.

Table 4 shows 65 (44.5%) students studying other courses and 52(28.7%) medical students had poor sleep quality. The bivariate analysis shows a statistically significant association between the course of study and the quality of sleep (*p*=0.003). The year of study, CGPA at last semester, total average hours spent studying in 24 hours and carry over course did not show any statistically significant relationship with sleep quality.

Table 5 shows the relationship between quality of sleep and some non-academic related factors. Total average sleep hour per day (*p*=0.002) and known environmental factors affecting bedtime or sleep pattern (*p*=0.01) showed a statistically significant relationship with sleep quality. Other factors such as part-time employment, taking of naps during the day and known underlying medical conditions did not have a statistically significant relationship with sleep quality.

4. DISCUSSION

This study observed that the prevalence of poor sleep quality among respondents was 35.8%. Course of study and average sleep hours per hour were found to be associated with poor sleep quality.

The observed prevalence of poor sleep quality in this study is lower than 50.1% and 55.8% reported in previous studies among undergraduates in Nigeria [8] and Ethiopia [13], respectively. The lower prevalence in this study may be because this study was carried out when school was not in session. Some recall bias may have influenced responses, especially regarding quality of sleep. Nonetheless, the prevalence observed in this study is high enough to raise concerns about the negative effect of poor sleep quality.

In this study, other students had a significantly poorer sleep quality than the medical students. This is inconsistent with the result reported in previous studies documented in a global literature review of the medical students' sleep

experience, where medical students were observed to have poorer sleep quality. This may be because of the understanding of medical students about the importance of sleep in the consolidation of memory and impact on cognitive processes. Also, medical students in the population studied may have been able to adapt to academic stressful condition over the years in school and hence could achieve better sleep quality even with the limited sleep hours they get daily.

From this study, it was observed that both medical and other students with good sleep quality had a better academic performance than those with poor sleep quality. This is consistent with observations reported in previous studies [14,15]. This may be because adequate sleep is important for the consolidation of memory, which is important for academic performance [16,17]. In addition, poor sleep might affect a certain part of the brain, especially the frontal, parietal regions, including subcortical structures such as basal ganglia and thalamus [18,19]. These structures regulate arithmetic calculations, logical reasoning, and attention, decision making, and planning emotional processing, inhibition controls which are very important for good academic performance. This observation might have public health significance because it shows that interventions which can improve sleep quality among undergraduate student population are likely to improve their academic performance [8].

It was also observed from this study that the number of hours of sleep per 24hrs and presence of known environmental factors affecting bed time/sleep pattern both have a significant association with sleep quality. Students who sleep less than 4 hours in a day have poor sleep quality than students who sleep above 4 hours in a day. This is similar to a previous study conducted among undergraduate students where mean sleep duration was found to have significant association with sleep quality[20]. Also, students who reported known environmental factors affecting their sleep pattern had poor sleep quality. This may be because the students could not achieve good sleep quality within the limited hours of sleep due to some environmental factors such as noise, ambient temperature, room illumination and bed comfort.

Students who engaged in part-time jobs were more likely to have a poor sleep quality than students without part-time jobs. This may be because adding a part-time job to an academic workload might further increase perceived psychological stress [21], which may influence sleep pattern and sleep quality [22].

5. CONCLUSION

There was a high prevalence of self-reported sleep impairment among the undergraduate population in which this study was conducted. The course being studied, total average sleep hours in a day and environmental factors were associated with the quality of sleep. Other factors such as part-time employment, average hours of study per day, taking of naps during the day and known underlying medical conditions were not associated with sleep quality.

6. LIMITATIONS

This study was cross-sectional. Thus, it is difficult to ascertain cause and effects among the various factors studied. Despite this, our findings add to the existing evidences that ensuring good sleep quality could enhance academic performance among undergraduate.

This study was also carried out when the school was on end of semester break, and this may have influenced the result.

CONSENT

As per international standard or university standard, Participants' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

The study protocol was approved by Health Research Ethics Committee, Institute of Public Health, Obafemi Awolowo University, Ile-Ife.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
https://www.sdiarticle5.com/review-history/89947