ASSESSMENT OF THE SLEEP PATTERNS OF MEDICAL STUDENTS OF THE UNIVERSITY OF BENIN

BY

ODUNAYO EMMANUEL AWODU **MED1706185**

JOSHUA OISEOZEMEN UDUJIE **MED1807498**

DEPARTMENT OF PUBLIC HEALTH AND COMMUNITY MEDICINE,

SCHOOL OF MEDICINE,

COLLEGE OF MEDICAL SCIENCES,

UNIVERSITY OF BENIN, BENIN CITY, EDO STATE, NIGERIA.

SUPERVISOR

PROF. O.A. ADELEYE

MAY, 2026.

ASSESSMENT OF THE SLEEP PATTERNS OF MEDICAL STUDENTS OF THE UNIVERSITY OF BENIN

BY

ODUNAYO EMMANUEL AWODU **MED1706185**

JOSHUA OISEOZEMEN UDUJIE **MED1807498**

A ONE-YEAR PROJECT PRESENTED TO

DEPARTMENT OF PUBLIC HEALTH AND COMMUNITY MEDICINE, SCHOOL OF MEDICINE, COLLEGE OF MEDICAL SCIENCES, UNIVERSITY OF BENIN, BENIN CITY, EDO STATE, NIGERIA.

IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF BACHELOR OF MEDICINE AND BACHELOR OF SURGERY (MB.BS) DEGREE IN UNIVERSITY OF BENIN, BENIN CITY, EDO STATE, NIGERIA

SUPERVISOR

PROF. O.A. ADELEYE

MAY, 2025.

CERTIFICATION

This is to certify that this research work titled "**ASSESSMENT OF THE SLEEP PATTERNS OF MEDICAL STUDENTS OF THE UNIVERSITY OF BENIN**" was conducted by **ODUNAYO EMMANUEL AWODU** with matriculation number **MED1706185** and **JOSHUA OISEOZEMEN UDUJIE** with matriculation number **MED1807498** under the supervision of Prof. O.A. ADELEYE in the Department of Community Health, College of Medicine, University of Benin as part of the requirements for the award for Bachelor of Medicine, Bachelor of Surgery (MBBS) degree.

PROJECT SUPERVISOR

PROF. O.A. ADELEYE

MBBS; FWACP

Professor/Consultant

Department of Public Health

and Community Medicine,

School of Medicine,

College of Medical Sciences,

University of Benin/University

of Benin Teaching Hospital,

Benin City, Edo State, Nigeria.

HEAD OF DEPARTMENT

DR. O.E OBARISIAGBON

MBBS; MPH; FMCPH

Associate Professor/Consultant

Department of Public Health

and Community Medicine,

School of Medicine,

College of Medical Sciences,

University of Benin/University of Benin

Teaching Hospital,

Benin City, Edo State, Nigeria.

DECLARATION

We hereby declare that this project work titled "**ASSESSMENT OF THE SLEEP PATTERNS OF MEDICAL STUDENTS OF THE UNIVERSITY OF BENIN CITY, BENIN CITY, NIGERIA**" was conducted under supervision and has neither been presented nor published anywhere else in part or in full for any other purpose.

ODUNAYO EMMANUEL AWODU

MED1706185

07058451182

wodue42@gmail.com

JOSHUA OISEOZEMEN UDUJIE

MED1807498

08071206725

udujiejoshua@gmail.com

DEDICATION

We dedicate this project to Almighty God for his grace towards us which sustained us and enabled us to successfully complete this project.

We also dedicate this project to our respective families who relentlessly supported us spiritually, financially and morally. We extend a heartfelt gratitude to Prof. O.A. Adeleye, our teacher whose invaluable mentorship enabled us to complete this project.

ACKNOWLEDGEMENT

We sincerely thank Almighty God for His grace, strength, wisdom, and guidance throughout the course of this project. Without His blessings, the successful completion of this work would not have been possible.

We would like to express our profound gratitude to our supervisor, Prof.O.A. Adeleye, for his invaluable guidance, constructive criticism, encouragement, and continuous support throughout the duration of this research. His expertise and mentorship greatly contributed to the success of this work.

We acknowledge with gratitude all the medical students of the University of Benin who participated in this study. Their cooperation and honest responses made this work possible.

ODUNAYO EMMANUEL AWODU

I wish to express my heartfelt gratitude to my parents, Dr. Nicholas Babatunde Awodu and Prof. Omolade Awodu, for their love, prayers, and unwavering support, which sustained me during this academic journey. I am also deeply grateful to my siblings, Engineer Damilola Awodu, Dr. Olamide Awodu, and Engineer Ayomide Awodu, for their constant support and encouragement.

Special thanks also go to my partner, Joshua Oiseozemen Udujie, as well as my colleagues and friends who encouraged me and provided moral support throughout this process.

Finally, I extend my sincere gratitude to everyone who contributed in one way or another to the successful completion of this project, even if their names are not specifically mentioned here. Your support is deeply appreciated.

JOSHUA OISEOZEMEN UDUJIE

I am profoundly grateful to my parents Mr and Mrs Udujie for their immense love and encouragement. Yours prayers and unwavering support was the driving force behind this project.

My sincere gratitude also goes to by siblings: Testimony Udujie and Ohiole Udujie who have always encouraged and supported me throughout my academic sojourne. Thank you for your love and support.

I would like to also thank my friends: Divine Owobu, Samson Okwufulueze, Michael Maduka, Kennedy Odume and all the members of my project group. Thank you for your support and spirit of camaraderie.

Special thanks go to Faithful Kira Onyia, Israel Adamson, Joshua and Evidence, this project would not have been successful without your immense help.

Most importantly, my sincere gratitude goes to my project partner: Odunayo Emmanuel Awodu, thank you for your cooperation, immense contributions and commitment to the success of this project.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ABBREVIATION

BEVQ-15:	Beverage Intake Questionnaire-15
CDC:	Centre for Disease Control and Prevention
COVID-19:	Coronavirus Disease 2019
DASS:	Depression Anxiety Stress Scale
ESS:	Epworth Sleepiness Scale
LAUTECH:	Ladoke Akintola University of Technology
MBBS:	Bachelor of Medicine, Bachelor of Surgery
MD/MS:	Doctor of Medicine / Master of Surgery
NHLBI:	National Heart, Lung, and Blood Institute
NIH:	National Institutes of Health
OSA:	Obstructive Sleep Apnoea
SHI:	sleep Hygiene Index
SBS:	Sleep Belief Scale
PSQI:	Pittsburgh Sleep Quality Index
SDI:	Sleep Duration Index
UHAS:	University of Health and Allied Sciences
UNIBEN:	University of Benin
UNIOSUN:	Osun State University

DEFINITION OF TERMS

Sleep patterns: Are the behavioural and physiological characteristics of sleep, including sleep duration, sleep timing, sleep quality, sleep latency, and wake–sleep regularity.

Academic Performance: The measurable level of achievement in educational activities, including examination scores and clinical competence.

Circadian Rhythm Disorder: A disruption in the body's internal biological clock that affects the sleep–wake cycle.

Cross-Sectional Study: A research design that analyses data from a population at a specific point in time.

Excessive Daytime Sleepiness: An increased tendency to fall asleep during normal daytime activities, often resulting from poor sleep quality or sleep disorders.

Insomnia: A sleep disorder characterized by difficulty in initiating or maintaining sleep, leading to impaired daytime functioning.

Narcolepsy: A neurological sleep disorder marked by excessive daytime sleepiness and sudden episodes of sleep.

Obstructive Sleep Apnoea: A sleep disorder in which breathing repeatedly stops and starts during sleep due to obstruction of the upper airway.

Prevalence: The proportion of individuals in a population who have a particular condition at a specific period of time.

Psychosocial Stressors: Psychological and social factors such as anxiety, fear of failure, and financial instability that contribute to stress.

Screen Time: The amount of time spent using digital devices such as smartphones, computers, or televisions, especially before sleep.

Sleep: A natural physiological state characterized by reduced consciousness, decreased sensory responsiveness, and lowered voluntary muscle activity, essential for memory consolidation, immune function, and emotional regulation.

Sleep Aid: Any substance or medication used to induce or maintain sleep.

Sleep Deprivation: A condition resulting from inadequate quantity or quality of sleep over a period of time.

Sleep Disorder: A medical or behavioural condition that disrupts normal sleep patterns, including insomnia, narcolepsy, obstructive sleep apnoea, circadian rhythm disorders, and sleepwalking.

Sleep Hygiene: Behavioural and environmental practices that promote consistent, uninterrupted, and restorative sleep.

Sleep Quality: An individual's perception of how well they sleep, including sleep duration, latency, efficiency, and restfulness.

ABSTRACT

Background: Sleep is a fundamental physiological process necessary for optimal cognitive function, emotional stability, physical health, and academic performance. Medical students are particularly vulnerable to unhealthy sleep patterns due to demanding academic activities, prolonged study hours, clinical responsibilities, and psychosocial stressors. Poor sleep among medical students has been associated with impaired concentration, daytime dysfunction, reduced academic productivity, and mental health problems. This study assessed the sleep patterns of medical students of the University of Benin and evaluated associated factors, sleep-related behaviours, and awareness of behaviours linked to unhealthy sleep patterns.

Methodology: A descriptive cross-sectional study was conducted among 427 undergraduate medical students from 200 to 600 level at the University of Benin, Benin City, Edo State, Nigeria. A stratified random sampling technique was used to select respondents. Data were collected using a structured self-administered questionnaire comprising standardized instruments including the Pittsburgh Sleep Quality Index (PSQI), Sleep Hygiene Index (SHI), and Sleep Beliefs Scale (SBS). Data were analysed using IBM SPSS version 27. Descriptive statistics were summarized using frequencies, percentages, means, and standard deviations, while Chi-square tests were used to determine associations between variables at a significance level of $p < 0.05$.

Results: The mean age of respondents was 22.56 ± 3.02 years, and 55.3% were male. The mean sleep duration was 5.5 ± 1.2 hours per night. Overall, 187 (43.8%) respondents had disturbed sleep patterns, while 240 (56.2%) had normal sleep patterns. The most commonly reported sleep disturbances were waking up in the middle of the night or early morning and nocturnal awakening to use the bathroom. Place of residence was significantly associated with sleep patterns ($p = 0.043$), with on-campus students demonstrating better sleep patterns than off-campus students. Sleep behaviours ($p = 0.002$) and awareness of sleep-related behaviours ($p = 0.007$) were also significantly associated with sleep patterns. Although 55.0% of respondents demonstrated good sleep behaviours, only 15.9% had good awareness of behaviours associated with healthy sleep.

Conclusion: A considerable proportion of medical students at the University of Benin experienced disturbed sleep patterns and inadequate sleep duration. Poor sleep behaviours and low awareness of healthy sleep practices were significantly associated with disturbed sleep. There is a need for targeted interventions, including sleep hygiene education, mental health support, and institutional policies aimed at promoting healthy sleep practices and improving the well-being of medical students.

Keywords: Sleep patterns, medical students, sleep quality, sleep hygiene, awareness, University of Benin.

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND

Sleep is a vital physiological necessity characterised by reduced consciousness, lower sensory responsiveness, and decreased voluntary muscle activity. It plays a crucial role in memory consolidation, immune function, emotional regulation, and overall psychological well-being. Inadequate or disrupted sleep is associated with impaired cognitive performance, poor academic productivity, and reduced psychomotor alertness, which are especially detrimental to medical students who operate under high cognitive demand and frequent stress.[1]

Sleep patterns refer to the habitual timing, duration, and quality of sleep, including the regularity of sleep–wake cycles, bedtime routines, night-time sleep duration, wake-up times, and sleep disturbances. Healthy sleep patterns generally include sufficient sleep duration, consistent sleep timing, minimal night-time disruptions, and feelings of refreshment upon waking. In contrast, unhealthy sleep patterns may involve short sleep duration, irregular sleep times, frequent awakenings, and poor sleep quality, which are common among students pursuing demanding academic programmes.[2]

Medical education is widely recognised as one of the most academically demanding undergraduate programmes, characterised by long study hours, clinical rotations, frequent examinations, and the need to assimilate large volumes of complex information. These demands often result in sleep deprivation, irregular sleep schedules, and poor sleep quality among medical students. Several studies have shown that medical students are particularly vulnerable to sleep problems, including poor sleep quality and excessive daytime sleepiness.[3]

Evidence from Nigeria also supports this concern. A study among Nigerian medical students reported irregular bedtimes, insufficient sleep duration, and lifestyle factors contributing to poor sleep quality and related academic and health concerns.[1] Similarly, a study on sleep hygiene practices and sleep quality among undergraduate medical students reported a high prevalence of poor sleep quality and identified bedtime use of digital devices and other behaviours as key contributors to poor sleep outcomes.[2]

Understanding sleep patterns and their influencing factors is important because sleep plays a critical role in maintaining physical health and psychological resilience. Poor sleep has been linked with increased stress levels, impaired concentration, compromised immune function, and mood disorders such as anxiety and depression. It may also contribute to reduced motivation and poorer academic performance, which can affect medical students' training and future clinical competence.[3]

Despite the growing global concern and research on sleep health among students, limited locally focused studies have examined sleep patterns, associated factors, and awareness of risks among medical students in Nigerian universities, including the University of Benin. This gap highlights the need for research that assesses sleep patterns within this specific student population. Such an investigation will provide evidence to inform health education, student well-being programmes, and institutional policies aimed at supporting healthy sleep practices among future healthcare providers.

1.2 STATEMENT OF THE PROBLEM

The demanding nature of medical education places students at significant risk of unhealthy sleep patterns, including insufficient sleep duration, irregular sleep cycles, and poor sleep quality. These sleep problems can affect cognitive performance, emotional stability, physical health, and academic outcomes. Available evidence indicates that poor sleep quality is common among medical students and is often linked to stress, lifestyle behaviours, and academic pressure.[3]

In Nigeria, sleep health among medical students remains under-studied, but available literature indicates poor sleep health. A descriptive study in Abakaliki, Nigeria, reported that only a small proportion of medical students had good sleep health, with average sleep duration below recommended levels and poor performance across key sleep domains.[4] These findings suggest that sleep disruption is prevalent and may be severe among medical students within the local context.

Medical students often adopt unhealthy behaviours such as late-night studying, excessive use of electronic devices before bedtime, consumption of caffeine or stimulants, and irregular schedules

to cope with academic demands. These behaviours can disrupt circadian rhythms, contribute to chronic sleep deprivation, and increase risks for stress, anxiety, and daytime dysfunction.[2]

Furthermore, there is limited information on the factors associated with sleep patterns, the actions students take to modify their sleep, and the level of awareness about risks linked to unhealthy sleep patterns among medical students at the University of Benin (UNIBEN). Understanding these aspects is fundamental for designing meaningful interventions that promote sleep health and academic well-being within this population. This study aims to fill these gaps by providing comprehensive data on sleep patterns, associated factors, coping strategies, and risk awareness among medical students at the University of Benin.

1.3 JUSTIFICATION OF STUDY

Sleep plays a vital role in maintaining physical health, psychological functioning, and cognitive performance. For medical students, healthy sleep patterns are necessary not only for academic success but also for patient safety, critical thinking, and professional resilience. However, research has shown that poor sleep patterns and poor sleep quality are highly prevalent among medical students globally and are associated with negative academic outcomes and mental health issues.[4]

In Nigeria, where student well-being is influenced by socio-economic, environmental, and academic stressors, the burden of unhealthy sleep patterns may be profound.[4] Despite these concerns, there is limited research on the prevalence and characteristics of sleep disruptions among medical students, particularly at the University of Benin. This study is important because it provides local evidence on how sleep patterns manifest among medical students in UNIBEN, determines the association between sleep hygiene practices and sleep patterns, examines actions students take to alter sleep patterns, including the use of stimulants, sleep aids, or lifestyle adjustments and assesses students' awareness of the health behaviours associated with poor sleep, which is important for targeted health promotion and educational interventions.[5]

The data from this study will generate evidence that will support student health services, inform curriculum planners, and aid policymakers in developing interventions to improve sleep hygiene, mental wellness, and academic performance among medical students.

1.4 RESEARCH QUESTIONS

1. What are the patterns of sleep?
2. What factors are associated with sleep patterns
3. What are the behaviours that alter sleep patterns?
4. What is the level of awareness of behaviours associated with sleep patterns?

1.5 OBJECTIVES

1.5.1 GENERAL OBJECTIVES

To assess the prevalence of sleep patterns and associated behaviours among medical students in the University of Benin.

1.5.2 SPECIFIC OBJECTIVES

Regarding students of the University of Benin:

1. To determine the patterns of sleep.
2. To determine the factors associated with sleep patterns.
3. To assess the behaviours that alter sleep patterns.
4. To assess the level of awareness of behaviours associated with sleep patterns.

CHAPTER 2

PREAMBLE

Medical students carry a substantial academic workload that may contribute to poor sleep quality beyond the levels already observed in the general population. This global review of the literature on sleep among medical students demonstrates that poor sleep is highly prevalent within this group and occurs more frequently than among non-medical students and the general population. Several contributing factors have been identified, including medical students' attitudes toward sleep, limited knowledge and awareness of healthy sleep practices, and demanding academic schedules. However, other underlying mechanisms remain incompletely understood.[6]

A more comprehensive understanding of the aetiology of sleep disturbances in medical trainees is essential to improving their overall quality of life and academic performance. Evidence from multiple studies suggests that sleep self-awareness and general knowledge regarding sleep health are inadequate among many medical student populations. Consequently, enhancing sleep education may represent a beneficial intervention. Overall, the literature provides strong evidence of a high prevalence of sleep problems among medical students. Future research should therefore shift toward developing and evaluating interventions aimed at improving sleep education, identifying students at increased risk of sleep disturbances, and implementing targeted programs to promote healthier sleep patterns.[6]

2.1 TO DETERMINE THE PATTERNS OF SLEEP

A cross-sectional study to evaluate the sleeping patterns of medical students and their relationships with psychological distress was conducted in Jeddah, Saudi Arabia, from January 2022 to March 2022. It was a self-administered, questionnaire-based study, using the Pittsburgh Sleep Quality Index (PSQI) and the Athens Insomnia Scale (AIS). A total of 397 students participated in the study. The study revealed that 98.7% of the participants exhibited insomnia symptoms and that 70.5% of the participants had poor sleep quality. Students in their fundamental and junior years had significantly higher percentages of insomnia symptoms and poor sleep quality compared with students in their senior years.[7]

The study made use of widely used validated tools which enhance the validity of the study.

Similarly, a cross-sectional study was conducted to evaluate sleep patterns and self-reported academic performance among medical students at the University of Ghana School of Medicine and Dentistry. A total of 153 respondents were assessed using a 39-item questionnaire adopted from Sweileh et al. 2011, and based on the Diagnostic and Statistical Manual of Mental Disorders IV (DSM-IV) criteria for sleep disorders and the Pittsburgh Sleep Quality Index (PSQI). Results showed the mean duration of night sleep was 5.7 ± 1.2 hours; 88 (57.5%) students had sleep latency of 10-30 minutes while 18 (11.8%) woke up nightly. 23 (15%) students experienced nightmares, 13 (8.5%) snored at night, and only one student reported coffee intake of 2-3 times daily. Sleep quality was poor in 86 (56.2%) and was significantly associated with sleep latency, morning tiredness, daytime sleepiness during lectures, academic performance, living conditions, leisure time, frequency of nocturnal awakenings, waking up due to noise, sleep walking, and nocturnal awakening to use the washroom. There was also a significant positive relation between sleep quality and academic performance.[8]

The study described not just global sleep quality but specific sleep habits (bedtime, wake time, latency, nocturnal awakenings) and associated daytime dysfunctions.

Also, in a cross-sectional observational study conducted to investigate the pattern of sleep health among the medical students of 2 public institutions in Abakaliki Nigeria from 16th to 23rd June 2023. It was a questionnaire-based study that made use of an adapted SATED questionnaire. A total of 288 medical students participated in the study. The study revealed that out of the 288 medical students, good sleep health was recorded in 6.6 %. The mean SATED sleep score was 4.9 ± 1.7 and it was significantly lower among the final-year students. Age difference, sex difference, and presence of chronic headache did not significantly affect the SATED sleep score. The mean sleep duration was 6.1 ± 1.5 hours. Sleep duration (54.5 %) had the best rating while sleep efficiency (44 %) had the lowest rating among the assessed sleep domains.[4]

The SATED sleep health questionnaire is brief, validated, and multidimensional, it captures both the quantitative (duration) and qualitative aspects (satisfaction, alertness) of the study.

2.2 TO DETERMINE THE FACTORS ASSOCIATED WITH SLEEP PATTERNS.

In a cross-sectional study conducted to explore the factors associated with sleep quality among medical students in Vietnam from December 2019 to February 2020. The study made use of the Pittsburgh Sleep Quality Index, Patient Health Questionnaire nine items and EuroQOL-5 dimensions. 1284 medical students participated in the study with made use of convenience sampling method. Results revealed that 36.6% of the study participants had poor sleep quality. There were statistically significant differences in the percentage of poor sleep quality across genders, health-related quality of life, morbidity status and depression. Depression and any morbidity were factors associated with higher PSQI Score and increased risk of poor sleep quality. In contrast, higher health-related quality of life scores were related to lower PSQI scores and reduced risk of poor sleep quality. [9]

Given the nature of the convenience sampling approach used, the findings might not be generalizable to all medical students in Vietnam.

In another multicentre cross-sectional study to assess the prevalence and associated factors of poor sleep quality was conducted between July and August 2025 among medical students from four universities in Mogadishu. A total of 272 students participated in the study which made use of a structured socio-demographic and behavioural questionnaire, the PSQI, the Patient Health Questionnaire-9 (PHQ-9) and the Oslo Social Support Scale-3 (OSSS-3) to collect data. The prevalence of poor sleep quality among medical students was 41.5%. Poor sleep predictors included night time screen use, stressful life events, physical inactivity, depressive symptoms and poor social support. Mediation analysis indicated that depressive symptoms fully mediated the association between social support and sleep quality, implying that lower social support may contribute to poorer sleep primarily through its influence on. depressive symptomatology.[10]

The study made use of well-established validated data collection tools which ensures accuracy of the study results.

Similarly, in another cross-sectional study conducted in 2024 to assess the sleep patterns and quality among Nigerian medical students pursuing their undergraduate degrees at University of Ilorin, Ladoke Akintola University of Technology (LAUTECH) and Osun State University (UNIOSUN) in Southwest Nigeria involving 802 medical students. A convenience sample method was utilized. A significant proportion of students consumed coffee late at night (27.1%) and used medication to induce sleep (24.3%). Sleep patterns and behaviours, such as snoring (36.1%) and nocturnal eating (57.6%), were reported. Overall, participants reported satisfactory (28.3%) or poor (29.7%) sleep quality.[1]

The use of PSQI, a widely accepted and validated tool for assessing subjective sleep quality across populations, including students, enhances the validity of the study.

2.3 TO ASSESS THE BEHAVIOURS THAT ALTER SLEEP PATTERNS.

A cross-sectional study to determine the association of the pattern and quality of sleep with consumption of stimulant beverages, cigarette and alcohol was conducted among the undergraduate medical students at BP Koirala Institute of Health Sciences, Dharan. The Pittsburgh Sleep Quality Index was used to collect data from 350 participants. Results showed that out of 350 participants, almost half of the students (44.6%) had poor sleep quality. 40.8% of the students reported sleeping six hours or per less night and 10.1% used medications to sleep. 96% reported consuming caffeinated beverages, 20% consumed cigarettes and 38.3% consumed alcoholic beverages. There was significant association of poor sleep quality with the increased consumption of caffeine, cigarette and alcohol.[11]

The study focuses on stimulant use behaviours and how they correlate with sleep quality, making it relevant for the assessment of determinants of sleep patterns in student populations.

In another cross-sectional study, the prevalence of poor sleep hygiene practices and poor sleep quality among 504 medical students at Tanta University, Egypt, was assessed using a random two-stage cluster sampling technique. The study used validated questionnaires, the Pittsburgh Sleep Quality Index (PSQI) and the Sleep Hygiene Index (SHI), as well as a sociodemographic

section. Results showed that the prevalence of poor sleep quality among the study participants was 71.2%. A total of 93.6% of the participants reported having poor sleep hygiene. There was a statistically significant positive correlation between sleep hygiene practices and sleep quality. The prevalence of poor sleep quality was the highest among students in the first grade (83.6%) and decreased to 66.0% among students in the fifth grade. Using the bed for activities other than sleeping or sex, thinking, planning, or worrying when in bed, and doing important work before bedtime were the three most prevalent negative sleep hygiene practices, affecting 59.3%, 58.9%, and 54% of the participants, respectively.[5]

A sample size of 504 is reasonably large for cross-sectional research. The sampling across all five medical school years improves representativeness within that university.

Also, in a cross-sectional study conducted to describe sleep practices among undergraduate medical students in the University of Nigeria Teaching Hospital, Ituku Ozalla, Enugu, from October 2012 to February 2013. Using convenience sampling, data was collected from 222 students. The study revealed that the median number of hours of night sleep on a weekday and weekend were 6 and 7 h respectively. There was a significant correlation between the number of hours of sleep and use of caffeine. Ninety-two (45.3%) had a sleep latency of 10-30 min while 157 (70.7%) woke up 1-2 times/night. Twenty-five (11.3%) experience unusual sleep practices such as sleep walking, talking or night terrors.[12]

The study made use of convenience sampling which could introduce bias and limit how broadly you can apply the conclusions.

2.4 TO ASSESS THE LEVEL OF AWARENESS OF BEHAVIOURS ASSOCIATED WITH SLEEP PATTERNS.

In a cross-sectional study to find out the relationship of sleep hygiene awareness and its importance in overall sleep quality among medical students, conducted in the College of Medicine, King Saud University, Riyadh, Saudi Arabia, during the period between April and July 2016. A total of 225 students participated in this study and were recruited by a convenience

sampling method. Two validated questionnaires were used, Pittsburgh Sleep Quality Index (PSQI) to assess sleep quality and the Sleep Beliefs Scale (SBS) to assess the awareness of students about sleep hygiene. Results showed that more than half of the participants, 113 (56.5%), had a poor sleep quality. Sixty-one (30.5%) students got excellent score in sleep hygiene awareness and the rest of the participants (n = 139; 69.5%) scored poor/intermediate. Thirty-five (57.4%) poor sleepers and 42.6% of good sleepers scored excellent in sleep hygiene awareness.[13]

The study made use of validated tools such as PSQI and SBS which strengthen measurement credibility.

Similarly, in a multicentre cross-sectional study to assess the knowledge of Egyptian final year medical students and house officers about normal sleep and sleep disorders conducted between January 2015 and June 2015. A total of 726 respondents were assessed with the Assessment of Sleep Knowledge in Medical Education (ASKME) survey. Results showed that the vast majority, 663 students (≈91.5%) scored <60% (low knowledge), indicating limited awareness of normal sleep physiology and sleep disorders. There was a statistically significant difference in the scores of the participants with regard to their faculty location and gender, while no statistically significant difference was found with regard to the study year.[14]

The study is a multicentre study with a large sample giving a broader picture than single-site studies.

Also, a cross-sectional study to assess the knowledge, interest and awareness of medical students about sleep medicine at the Obafemi Awolowo University, Ile-Ife, Nigeria, from June to September 2021. A total of 488 students were assessed with the Assessment of Sleep Knowledge in Medical Education (ASKME) survey. The study revealed that about three-quarters of the respondents (376, 77%) had a low sleep knowledge score. Age, year of study, and awareness about sleep medicine were the predictors of sleep knowledge.[15]

The study specifically targets knowledge and awareness, which is relevant to understanding if students appreciate the risks and clinical implications of unhealthy sleep.

CHAPTER THREE

METHODOLOGY

This chapter outlines the research methodology employed in this study to assess the prevalence of sleeping disorders among medical students of the university of Benin, Edo state. The research design, population and sample selection, data collection methods, instrumentation, data analysis procedures, ethical considerations, reliability and validity, and potential limitations are detailed in this chapter.

3.1 STUDY AREA

This study was conducted in the School of Medicine, College of Medicine, at the University of Benin, located in Benin City, Edo State, Nigeria. The University of Benin is a public research institution situated at approximately 6°20.022' North latitude and 5°36.009' East longitude.[16]

The University of Benin was established in 1970 as an Institute of Technology. It became a university on July 1, 1971, and a Federal University on April 1, 1975. The institution offers academic programs at various levels, including undergraduate, postgraduate, JUPEB, and certificate courses. It operates on two main campuses: Ugbowo and Ekehuan which house fifteen faculties and colleges, with multiple departments, as well as three centres of excellence and several institutes and academic units. The University offers a range of sports and recreation facilities, including a stadium, volleyball and lawn tennis courts, basketball, and an Olympic-sized swimming pool.[17] A Health Centre on the Ugbowo campus, delivers comprehensive medical care to students, staff, and the wider university community. It is fully equipped for 24-hour emergency service.[18]

The College of Medical Sciences originally known as the Faculty of Medicine and Pharmacy was established in principle at the inception of the University in 1970. It was restructured and renamed in 1975 following an amendment to the University of Benin's founding edict. The College currently comprises three Schools and the Institute of Child Health (ICH). Recently, to

strengthen the institution's academic and research capacity the Centre of Excellence in Reproductive Health Innovation (CERHI), a World Bank-funded project, was added.[19]

The School of Medicine is a core component of the College founded in 1973. It offers a full-time Bachelor of Medicine and Bachelor of Surgery (MBBS) degree program with a duration of six years. It comprises several departments which are: Anaesthesiology, Obstetrics and Gynaecology, Chemical Pathology, Ophthalmology, Orthopaedics and Traumatology, Community Health, Haematology, Medical Microbiology, Internal Medicine, Mental Health, Morbid Anatomy (Pathology), Radiology, Child Health, Surgery, Clinical Pharmacology and Therapeutics, Ear, Nose and Throat (ENT), and Family Medicine.[19]

3.2 STUDY DESIGN

This study made use of a cross-sectional study design utilizing quantitative data collection methods. The primary tool for data collection is a structured questionnaire.

3.3 STUDY POPULATION

The study was conducted among 200 level to 600 level undergraduate medical students in the School of Medicine, University of Benin. Medical education is widely recognised as one of the most academically demanding undergraduate programmes, characterised by long study hours, clinical rotations, frequent examinations, and the need to assimilate large volumes of complex information. These demands often result in sleep deprivation, irregular sleep schedules, and poor sleep quality among medical students. These challenges result in them acquiring some behaviours which alter their sleep patterns. Several studies have shown that medical students are particularly vulnerable to sleep problems, including poor sleep quality and excessive daytime sleepiness.

3.4 SELECTION CRITERIA

3.4.1 INCLUSION CRITERIA

1. Participants must be currently enrolled students at the University of Benin.
2. Undergraduates who were willing to provide informed consent and participate in the study.

3.4.2 EXCLUSION CRITERIA

1. Participants who do not provide informed consent to participate in the study.
2. 100 level medical students as they have not undergone the rigors of medical school.
3. Medical students who were on academic leave, suspension, or not present during data collection.

3.5 SAMPLE SIZE DETERMINATION

The minimum sample size (n) for this study was calculated statistically using Cochran's formula for descriptive studies.[4]

$n = Z^2pq/d^2$

Where:

n = Minimum Sample Size.

Z = Standard normal deviation set at 95% confidence interval (1.96).

p = Prevalence rate of a particular characteristic of the target population. In this case, p = 50% from a 2025 study which assessed sleep hygiene practices and sleep quality among medical students in Egypt. The study revealed that the prevalence of poor sleep quality among the study participants was 71.2% and a total of 93.6% of the participants reported having poor sleep hygiene.[5]

q = 1-p = 1 - 0.5 = 0.5

d = Degree of precision set at 0.05

Hence,

$$n = \frac{(1.96)^2 (0.5) (0.5)}{(0.05)^2}$$

$$n = \frac{0.9604}{0.0025}$$

n = 384.16 ≈ 384.

Therefore, the minimum sample size for this study is 384 students.

To make room for non-response, a 10% non-response rate was added to the minimum sample size, using the formula for non-response rate.

$$ns = \frac{n}{1-nr}$$

Where;

ns = Adjusted sample size

n = Calculated sample size

nr = non response rate = 10% = 0.1

Hence

$$ns = \frac{384}{1-0.1}$$

ns = 426.84≈ 427.

Thus, minimum sample size for this study is 427.

Therefore, a sample size of 427 was used for this study.

3.6 SAMPLING METHOD

A stratified random sampling technique was employed to select respondents from the School of Medicine who meet the inclusion criteria for this study.

In the School of Medicine, the study was conducted on students from 200L to 600L. The student population that fitted into the selection criteria was 1213, comprising:

200L -237 students

300L -184 students

400L -313 students

500L -176 students

600L -303 students

A sampling fraction was obtained using the formula: minimum sample size (n) / population size (N).

$$\text{Sampling fraction} = \frac{nf}{N}$$

$$\text{Sampling fraction} = \frac{430}{1213}$$

$$\text{Sampling fraction} = 0.354$$

The sampling size for each stratum (level) was calculated thus;

Sampling fraction x population of students in each level.

The proportional allocation of students is as follows:

200L: 0.354 x 237 = 84

300L: 0.354 x 184 = 65

400L: 0.354 x 313 =111

500L: 0.354 x 176 =62

600L: 0.354 x 303 = 107

3.7 DATA MANAGEMENT

3.7.1 DATA COLLECTION TOOL

The study employed a quantitative data collection method, utilizing a structured questionnaire. The questionnaire was digital, using Google forms.

The questionnaire was divided into 5 sections as follows:

Section A: Sociodemographic data.

Section B: Determination of the patterns of sleep.

Section C: Assessing the behaviours that alter sleep patterns.

Section D: Evaluating the awareness of behaviours associated with unhealthy sleep patterns. (See appendix 1)

The questionnaire was pretested among a small group of students (10% of our sample size) who were not part of the study population in order to assess clarity, relevance, and ease of understanding. Necessary adjustments were made based on feedback obtained from the pretest.

3.7.2 QUESTIONNAIRE ADMINISTRATON

The questionnaire was self-administered.

3.7.3 DATA COLLATION

Data from the questionnaires was entered into a statistical software program, such as **SPSS** Statistical Package for Social Sciences Version 27 (SPSS 27.0) for analysis.

Before analysis, the dataset was cleaned to check for:

- Missing or incomplete responses.
- Duplicate entries.
- Outliers or inconsistencies in responses.

3.7.4 DATA PRESENTATION

The data obtained from this study was presented using a combination of numerical summaries, non-numerical graphical illustrations, and descriptive prose to ensure clarity and comprehensive reporting.

Frequency distribution tables and percentages was utilized to summarize categorical sociodemographic data, including the respondents' sex, level of study, religion, ethnicity, and current residential status. Measures of central tendency and dispersion, specifically means and standard deviations, was employed to present continuous quantitative variables such as age, sleep latency in minutes, and the actual hours of sleep obtained per night.

3.7.5 DATA ANALYSIS

Data analysis was conducted using the IBM SPSS Statistics version 27.0. The analysis was guided by the study objectives and employed both descriptive and inferential statistics.

For descriptive analysis, sociodemographic characteristics (such as age, sex, and level of study) were summarized using frequencies and proportions.

To facilitate inferential analysis, continuous data derived from the three standardized tools: the Pittsburgh Sleep Quality Index (PSQI), the Sleep Hygiene Index (SHI), and the Sleep Beliefs Scale (SBS) were computed into composite scores and subsequently dichotomized.

To test for associations with sleep patterns at the bivariate level, the Pearson Chi-square (χ^2) test will be utilized to determine the association between the categorical independent variables (which include sociodemographic factors, SHI categories, and SBS awareness levels) and the primary binary dependent variable of sleep patterns (Good vs. Poor).

For all statistical tests the level of statistical significance will be set strictly at a p-value of < 0.05.

3.7.6 SCORING OF VARIABLES

SECTION B: Determination of sleep patterns

The Pittsburgh sleep quality index questions are framed in a 4-point Likert scale (0–3) and assess seven factors which are subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medications, and daytime dysfunction. The scores from each component are added to give a sum score, which is called a global score (range 0 – 21).

Global score of > 5: disturbed sleep pattern

Global score of 0 - 5: normal sleep pattern.

SECTION C: Assessment of behaviours that alter sleep patterns

The Sleep Hygiene Index questionnaire (SHI) examines sleep behaviour in daily life using a 13-item self-reported index. Students are asked to report the extent to which they engage in certain behaviours or are exposed to environmental factors that could affect their sleep, such as taking daytime naps, going to bed at different times, and sleeping in an uncomfortable bed or an uncomfortable bedroom.

Each response option should be coded as follows:

Response	Score
Never	0
Rarely	1
Sometimes	2
Frequently	3
Always	4

Total Score = Sum of all 13 item scores

Maximum score of **52**

Low sleep influence = **0 – 17**

Moderate sleep influence = **18 – 34**

High sleep influence = **35 – 52**

SECTION D: Assessment of the level of awareness of behaviours associated with sleep patterns

The Sleep Belief Scale questionnaire (SBS) examines a person's beliefs about whether a behaviour alters sleep. The SBS explores the beliefs of an individual on three factors. The first factor assesses beliefs about "sleep-incompatible behaviours". The second factor assesses beliefs about "sleep–wake cycle behaviours". The third factor assesses beliefs about mental and physical "feelings before sleep". The correct answer corresponds to a negative effect on all the items except questions: (**Going to bed and waking up at the same time every day), (Relaxing activities (like reading or light stretching) before bed), (Getting out of bed when it's difficult to fall asleep), (Sleeping in a quiet and dark room)** which have a positive effect.

Each response option should be coded as follows:

Response	**Score**
Neutral	0
Incorrect	0
correct	1

Total Score = Sum of all 20 item scores

Maximum score of **20**

Good awareness = **15 – 20**

Moderate awareness = **10 – 14**

Poor awareness **= 0 – 9**

3.8 ETHICAL CONSIDERATION

Ethical approval and permission to carry out the study was obtained from the Health Research Ethics Committee of the University of Benin Teaching Hospital. Informed consent was obtained from all participants after explaining the study's objectives, procedures, and potential risks. Participation was entirely voluntary, and respondents have the right to withdraw at any time. Study participants who were ill were referred for appropriate medical care.

3.9 STUDY LIMITATIONS

The cross-sectional design employed in this study limits the ability to establish causal relationship.

Due to the questionnaire being self-administered, students may either exaggerate or downplay their experiences and lifestyle habits. There is also the possibility of recall bias due to memory limitations.

All selected students may not respond to the questionnaire, leading to potential gaps in data.

Any error in sampling at any stage can lead to biases, which may compromise the overall representativeness of the final sample.

3.10 STUDY STRENGTHS

The integration of globally recognized and validated tools (PSQI, SHI, and SBS) ensures high reliability and validity of the collected data. This approach allows the findings to be accurately compared with similar local, regional, and international studies.

The study addresses a significant gap in the literature by focusing on medical students in Nigeria, an understudied population. They are encounter various challenges and stressors, therefore examining their sleep patterns is essential for identifying where the problems are, and raising awareness for intervention and support.

This knowledge can inform educational institutions and healthcare professionals in developing strategies to support medical students' well-being and academic success.

CHAPTER FOUR

RESULTS

A total of 427 medical students from the University of Benin, Benin City, Edo State, Nigeria, participated in this study, achieving a 100% response rate. The results are presented in line with the objectives as follows:

Section A: Sociodemographic characteristics of respondents

Section B: Assessment of sleep patterns of respondents (PSQI)

Section C: Determination of the factors associated with sleep patterns

Section D: Assessment of behaviours that alter sleep patterns

Section E: Assessment of awareness of behaviours associated with sleep patterns

SECTION A: SOCIODEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

Table 1: Sociodemographic characteristics of respondents

Variable	Frequency (n=427)	Percent (%)
Age (years) (Mean ± SD: 22.56 ± 3.02 years)		
≤20 years	120	28.1
21-25 years	237	55.5
26-30 years	50	11.7
>30 years	6	1.4
Sex		
Male	236	55.3
Female	191	44.7
Level of study		
200 Level	45	10.5
300 Level	73	17.1
400 Level	117	27.4
500 Level	64	15.0
600 Level	128	30.0

Religion		
Christianity	403	94.4
Islam	22	5.2
African Traditional Religion	2	0.5
Ethnicity		
Benin/Edo	122	30.2
Igbo	65	16.1
Esan	62	15.3
Yoruba	48	11.9
Urhobo	22	5.4
Owan/Afemai	20	5.0
Etsako	13	3.2
Isoko	11	2.7
Hausa	7	1.7
Ijaw	6	1.5
Itsekiri	4	1.0

Ika	4	1.0
Others*	20	5.0
Place of residence		
On-campus (hostel/staff quarters)	255	59.7
Off-campus (housing/with family)	172	40.3

**Others include: Benue (2), Efik (1), Ibibio (1), Igala (1), Idoma (1), and other unspecified minority groups*

Among the 427 respondents, the majority were aged 21-25 years, accounting for 237 (55.5%), followed by those aged 20 years and below at 120 (28.1%), 26-30 years at 50 (11.7%), and those above 30 years at 20 (4.7%). The mean age of respondents was 22.56 ± 3.02 years. By sex, 236 (55.3%) were male and 191 (44.7%) were female. With respect to level of study, 128 (30.0%) were in the 600 Level, 117 (27.4%) in the 400 Level, 73 (17.1%) in the 300 Level, 64 (15.0%) in the 500 Level, and 45 (10.5%) in the 200 Level. Regarding religion, the vast majority, 403 (94.4%), were Christians, 22 (5.2%) were Muslims, and 2 (0.5%) practised African Traditional Religion. In terms of ethnicity, the largest group were Benin/Edo at 122 (30.2%), followed by Igbo 65 (16.1%), Esan 62 (15.3%), Yoruba 48 (11.9%), Urhobo 22 (5.4%), Owan/Afemai 20 (5.0%), Etsako 13 (3.2%), Isoko 11 (2.7%), Hausa 7 (1.7%), Ijaw 6 (1.5%), Itsekiri 4 (1.0%), and Ika 4 (1.0%), whilst 20 (5.0%) belonged to other minority ethnic groups. Concerning place of residence, 255 (59.7%) resided on-campus (in student housing or staff quarters) and 172 (40.3%) resided off-campus (off-campus housing or with family/relatives).

SECTION B: ASSESSMENT OF SLEEP PATTERNS

Table 2: Sleep characteristics and PSQI component scores of respondents

Variable	Frequency (n=427)	Percent (%)
Usual bedtime (past month)		
7pm-9pm	54	12.6
10pm-11pm	192	45.0
12am-1am	134	31.4
2am-4am	47	11.0
Usual wake time (past month)		
2am-4am	96	22.5
5am-6am	257	60.2
7am-9am	74	17.3
Sleep latency (Mean ± SD: 17.8 ± 13.5 minutes)		
≤15 minutes	236	55.3
16-30 minutes	147	34.4
31-60 minutes	44	10.3
Sleep hours per night (Mean ± SD: 5.5 ± 1.2		

hours)		
>7 hours	22	5.2
6-7 hours	177	41.5
5-6 hours	153	35.8
<5 hours	75	17.6
Sleep efficiency (Mean ± SD: 96.3 ± 29.8%)		
≥85%	289	67.7
75-84%	67	15.7
65-74%	36	8.4
<65%	35	8.2
Overall sleep quality		
Very good	81	19.0
Fairly good	239	56.0
Fairly bad	82	19.2
Very bad	25	5.9

Table 3: Sleep disturbances and daytime dysfunction

During the past month, how often had trouble sleeping because of:	Not during the past month Freq (%)	Less than once a week Freq (%)	Once or twice a week Freq (%)	Three or more times a week Freq (%)
Cannot get to sleep within 30 minutes	221 (51.8)	81 (19.0)	80 (18.7)	45 (10.5)
Wake up in the middle of the night or early morning	105 (24.6)	77 (18.0)	110 (25.8)	135 (31.6)
Have to get up to use the bathroom	98 (22.9)	106 (24.8)	123 (28.8)	100 (23.4)
Cannot breathe comfortably	326 (76.3)	49 (11.5)	47 (11.0)	5 (1.2)
Cough or snore loudly	319 (74.7)	59 (13.8)	41 (9.6)	8 (1.9)
Feel too cold	249 (58.3)	78 (18.3)	82 (19.2)	18 (4.2)
Feel too hot	152 (35.6)	84 (19.7)	109 (25.5)	82 (19.2)
Have bad dreams	261 (61.1)	89 (20.8)	54 (12.6)	8 (1.9)
Have pain	283 (66.3)	80 (18.7)	59 (13.8)	5 (1.2)

Table 3b: Sleep medication, daytime dysfunction, and enthusiasm

Variable	Frequency (n=401)	Percent (%)
Frequency of taking sleep medication		
Not during past month	309	77.1
Less than once a week	60	15.0
Once or twice a week	26	6.5
Three or more times a week	6	1.5
Trouble staying awake during day		
Not during past month	236	55.3
Less than once a week	91	21.3
Once or twice a week	78	18.3
Three or more times a week	22	5.2
Problem keeping up enthusiasm		
No problem at all	122	28.6
Only a very slight problem	152	35.6
Somewhat of a problem	128	30.0

A very big problem	25	5.9

Regarding sleep medication use, the majority of respondents, 309 (77.1%), reported taking no medication to aid sleep during the past month, whilst 60 (15.0%) did so less than once a week. Only 26 (6.5%) used sleep medication once or twice a week and 6 (1.5%) three or more times per week. Concerning daytime sleepiness, more than half of respondents, 236 (55.3%), experienced no difficulty staying awake during the day in the past month, whilst 91 (21.3%) reported this less than once a week, 78 (18.3%) once or twice a week, and 22 (5.2%) three or more times per week. Regarding enthusiasm, 122 (28.6%) reported no problem keeping up enthusiasm, 152 (35.6%) reported only a very slight problem, 128 (30.0%) experienced somewhat of a problem, and 25 (5.9%) reported a very big problem.

Table 4: Sleep pattern category of respondents

Variable	Mean ± SD
PSQI Component Mean ± SD)	
Sleep latency	0.55 ± 0.67
Sleep duration	1.66 ± 0.83
Sleep disturbances	1.28 ± 0.61
Daytime dysfunction	1.15 ± 0.81
Sleep efficiency	0.57 ± 0.95
Medication use	0.32 ± 0.66
Subjective quality	1.12 ± 0.78

Table 5: Global score of sleep pattern category of respondents

Global Score (Mean ± SD: 5.21 ± 2.17; Range: 0-11)	Frequency	Percent (%)
Normal sleep pattern (Score 0-5)	240	56.2
Disturbed sleep pattern (Score >5)	187	43.8

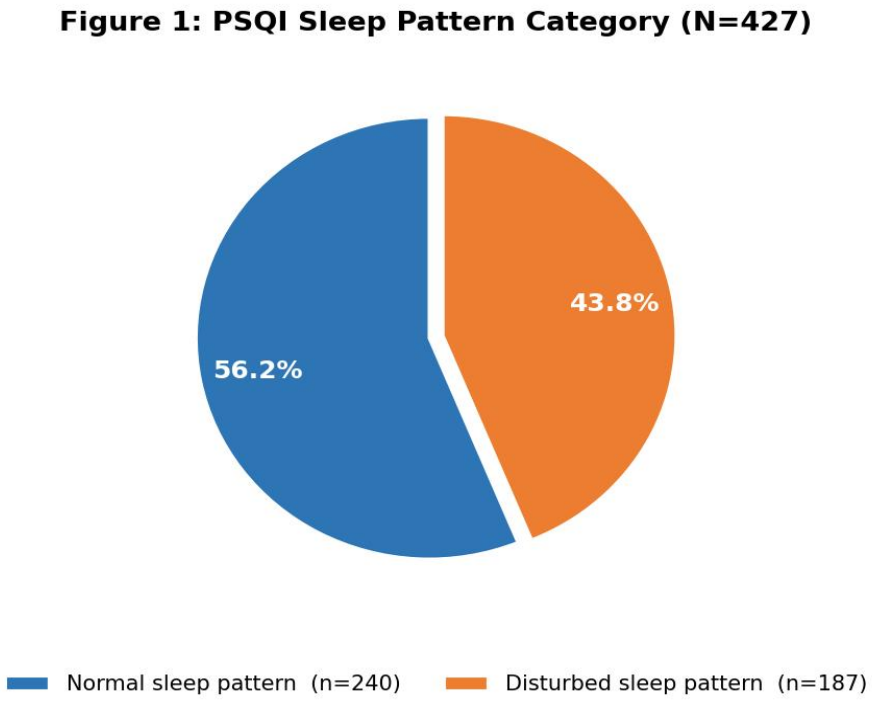

Figure 1: Sleep Pattern Category among medical students of the University of Benin (N=427)

As shown in Figure 1, 240 (56.2%) of respondents had a normal sleep pattern (PSQI score 0–5), whilst 187 (43.8%) had a disturbed sleep pattern (PSQI score >5). The mean PSQI global score was 5.21 ± 2.17 (range 0–11).

The majority of respondents reported retiring to bed between 10pm and 11pm, with 192 (45.0%), whilst 134 (31.4%) went to bed between midnight and 1am. The most common wake time was between 5am and 6am, reported by 257 (60.2%). The mean sleep latency was 17.8 ± 13.5 minutes; the majority of respondents, 236 (55.3%), fell asleep within 15 minutes. Regarding actual sleep hours per night, the mean was 5.5 ± 1.2 hours, with 177 (41.5%) sleeping 6-7 hours and 75 (17.6%) sleeping fewer than 5 hours. Sleep efficiency had a mean of 96.3 ± 29.8%, with 289 (67.7%) achieving the optimal level of ≥85%.

Concerning sleep disturbances, waking up in the middle of the night or early morning was the most frequently reported problem, with 135 (31.6%) experiencing this three or more times per week, followed by the need to use the bathroom, reported three or more times weekly by 100 (23.4%). Regarding overall sleep quality, 239 (56.0%) rated their sleep as fairly good and 81 (19.0%) as very good, whilst 82 (19.2%) rated it as fairly bad and 25 (5.9%) as very bad. The mean PSQI global score was 5.21 ± 2.17 (range 0-11). Overall, 240 (56.2%) of respondents had a normal sleep pattern whilst 187 (43.8%) had a disturbed sleep pattern.

SECTION C: TO DETERMINE THE FACTORS ASSOCIATED WITH SLEEP PATTERNS.

Table 6: Factors associated with sleep patterns among respondents

Variables	Sleep Pattern		Test	p-value
	Normal Freq (%) n=240	Disturbed Freq (%) n=187	statistics	
Age group			4.109	0.250
≤20 years	62 (51.7)	58 (48.3)		
21-25 years	143 (60.3)	94 (39.7)		
26-30 years	24 (48.0)	26 (52.0)		
>30 years	3 (50.0)	3 (50.0)		
Sex			0.313	0.576
Male	136 (57.6)	100 (42.4)		
Female	104 (54.5)	87 (45.5)		
Level of study			9.142	0.058
200 Level	19 (42.2)	26 (57.8)		
300 Level	34 (46.6)	39 (53.4)		
400 Level	68 (58.1)	49 (41.9)		

500 Level	39 (60.9)	25 (39.1)		
600 Level	80 (62.5)	48 (37.5)		
Religion				
Christianity	229 (56.8)	174 (43.2)	1.127	0.569
Islam	10 (45.5)	12 (54.5)		
ATR	1 (50.0)	1 (50.0)		
Ethnicity				
Edo indigene	161 (57.5)	119 (42.5)	0.411	0.521
Non-Edo indigene	79 (53.7)	68 (46.3)		
Place of residence				
On-campus	154 (60.4)	101 (39.6)	4.094	**0.043**
Off-campus	86 (50.0)	86 (50.0)		
Sleep behaviour				
Good behaviour (0-25)	148	87	12.061	**0.002**
Moderate behaviour (26-34)	66	81		
Poor behaviour (≥35)	26	19		

Sleep behaviour awareness				
Good awareness (0-25)	47	21	10.043	**0.007**
Moderate awareness (26-34)	90	59		
Poor awareness (≥ 35)	103	107		

Among respondents aged 21-25 years, 143 (60.3%) had normal sleep compared with 94 (39.7%) with disturbed sleep, whilst in the ≤20 years group, 62 (51.7%) had normal and 58 (48.3%) had disturbed sleep (Fisher's exact = 4.109, p = 0.250). By sex, 136 (57.6%) of males and 104 (54.5%) of females had normal sleep patterns ($\chi^2 = 0.313$, p = 0.576). Regarding level of study, a trend was observed with higher levels having more normal sleep, 80 (62.5%) of 600 Level students had normal sleep compared with only 19 (42.2%) of 200 Level students, though this did not reach significance ($\chi^2 = 9.142$, p = 0.058). Ethnicity showed no significant association, with 161 (57.5%) of Edo indigenes and 79 (53.7%) of Non-Edo indigenes having normal sleep patterns ($\chi^2 = 0.411$, p = 0.521). Place of residence was significantly associated; 154 (60.4%) of on-campus students had normal sleep compared with 86 (50.0%) of off-campus students ($\chi^2 = 4.094$, p = 0.043). Religion was also not significantly associated (Fisher's exact = 1.127, p = 0.569). Sleep pattern was also significantly associated; 26 (10.8%) of those with normal sleep had poor behaviour compared with 19 (10.2%) of those with disturbed sleep, though those with normal sleep had a higher proportion of good behaviour at 148 (61.7%) versus 87 (46.5%) among those with disturbed sleep ($\chi^2 = 12.061$, p = 0.002). Sleep behaviour awareness was significantly associated with sleep pattern. Of those with disturbed sleep, 107 (57.2%) had poor awareness compared with 103 (42.9%) of those with normal sleep ($\chi^2 = 10.043$, p = 0.007).

SECTION D: BEHAVIOURS THAT ALTER SLEEP PATTERNS

Table 7: Distribution of respondents by sleep behaviours

Variable	Never Freq (%)	Rarely Freq (%)	Sometimes Freq (%)	Frequently Freq (%)	Always Freq (%)
I take daytime naps lasting two or more hours	21 (4.9)	114 (26.7)	175 (41.0)	80 (18.7)	37 (8.7)
I go to bed at different times from day to day	12 (2.8)	50 (11.7)	151 (35.4)	147 (34.4)	67 (15.7)
I get out of bed at different times from day to day	17 (4.0)	66 (15.5)	163 (38.2)	120 (28.1)	61 (14.3)
I exercise to the point of sweating within 1h of bed	187 (43.8)	109 (25.5)	80 (18.7)	36 (8.4)	15 (3.5)
I stay in bed longer than I should 2-3 times a week	33 (7.7)	87 (20.4)	172 (40.3)	94 (22.0)	42 (9.8)
I use alcohol, tobacco, or caffeine within 4h of bed	258 (60.4)	47 (11.0)	76 (17.8)	33 (7.7)	13 (3.0)
I do something that may wake me up before bedtime	80 (18.7)	73 (17.1)	147 (34.4)	86 (20.1)	41 (9.6)
I go to bed feeling stressed, angry, upset, or nervous	66 (15.5)	101 (23.7)	139 (32.6)	87 (20.4)	34 (8.0)
I use my bed for things other than sleeping	39 (9.1)	41 (9.6)	159 (37.2)	108 (25.3)	80 (18.7)

I sleep on an uncomfortable bed	125 (29.3)	112 (26.2)	95 (22.2)	66 (15.5)	29 (6.8)
I sleep in an uncomfortable bedroom	101 (23.7)	101 (23.7)	119 (27.9)	67 (15.7)	39 (9.1)
I do important work before bedtime (e.g. studying)	29 (6.8)	35 (8.2)	141 (33.0)	144 (33.7)	78 (18.3)
I think, plan, or worry when I am in bed	46 (10.8)	46 (10.8)	155 (36.3)	109 (25.5)	71 (16.6)

Table 8: Overall sleep behaviour category of respondents

Variable	**Frequency (n=427)**	**Percent (%)**
Total Score (Mean ± SD: 24.56 ± 8.53; Range: 0-52)		
Good sleep behaviour (Score 0-25)	235	55.0
Moderate sleep behaviour (Score 26-34)	147	34.4
Poor sleep behaviour (Score ≥35)	45	10.5

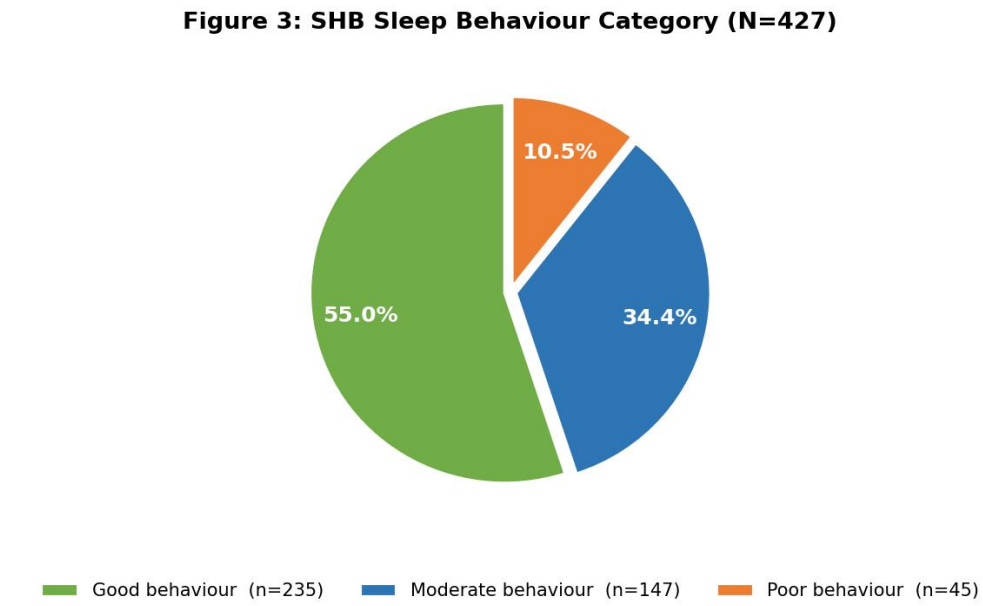

Figure 2: Sleep Behaviour Category among medical students of the University of Benin (N=427)

As shown in Figure 3, 235 (55.0%) of respondents demonstrated good sleep behaviour (Sleep behaviour score 0–25), 147 (34.4%) demonstrated moderate sleep behaviour (Sleep behaviour score 26–34), and 45 (10.5%) demonstrated poor sleep behaviour (Sleep behaviour score ≥35). The mean Sleep behaviour total score was 24.56 ± 8.53.

Concerning sleep behaviours, doing important work before bedtime was the most prevalent poor behaviour, with 144 (33.7%) doing so frequently and 78 (18.3%) always. Going to bed at irregular times was reported as frequent or always by 214 (50.1%) of respondents. Using the bed for activities other than sleeping was frequently or always done by 188 (44.0%). Going to bed feeling stressed, angry, or nervous was reported as frequent or always by 121 (28.4%). The mean Sleep behaviour total score was 24.56 ± 8.53. Overall, 235 (55.0%) demonstrated good sleep behaviour, 147 (34.4%) moderate, and 45 (10.5%) poor sleep behaviour.

SECTION E: AWARENESS OF BEHAVIOURS ASSOCIATED WITH SLEEP PATTERNS

Table 9: Distribution of respondents by awareness of sleep behaviours

Variable	Correct Response Freq (%)	Incorrect/Neutral Freq (%)
Sleep-incompatible behaviours		
Drinking alcohol in the evening	304 (71.2)	123 (28.8)
Drinking caffeinated drinks before bedtime	279 (65.3)	148 (34.7)
Using sleep medication regularly	269 (63.0)	158 (37.0)
Smoking before bedtime	299 (70.0)	128 (30.0)
Sleep-wake cycle behaviours		
Doing intense physical exercise before bed	174 (40.7)	253 (59.3)
Taking a long nap during the day	131 (30.7)	296 (69.3)
Going to bed and waking up at the same time every day	213 (49.9)	214 (50.1)
Going to bed later than usual	201 (47.1)	226 (52.9)
Going to bed earlier than necessary	100 (23.4)	327 (76.6)
Trying to recover lost sleep by sleeping longer later	78 (18.3)	349 (81.7)
Feelings before sleep		

Thinking about obligations/tasks before sleep	146 (34.2)	281 (65.8)
Relaxing activities (e.g., reading, calm activities) before bed	249 (58.3)	178 (41.7)
Going to bed without feeling ready to sleep	105 (24.6)	322 (75.4)
Working intensely late at night	213 (49.9)	214 (50.1)
Getting out of bed when it is hard to fall asleep	85 (19.9)	342 (80.1)
Going to bed with an empty stomach	225 (52.7)	202 (47.3)
Doing non-sleep activities in bed (e.g., studying, eating)	125 (29.3)	302 (70.7)
Going to bed soon after eating a big meal	195 (45.7)	232 (54.3)
Worrying before going to sleep	228 (53.4)	199 (46.6)
Sleeping in a quiet and dark room	238 (55.7)	189 (44.3)

Table 10: Overall sleep behaviour awareness category of respondents

Variable	Frequency (n=427)	Percent (%)
Total Score (Mean ± SD: 9.04 ± 5.08; Range: 0-20)		
Good awareness (Score ≥15)	68	15.9
Moderate awareness (Score 10-14)	149	34.9
Poor awareness (Score <10)	210	49.2

Figure 4: SBS Sleep Awareness Category (N=427)

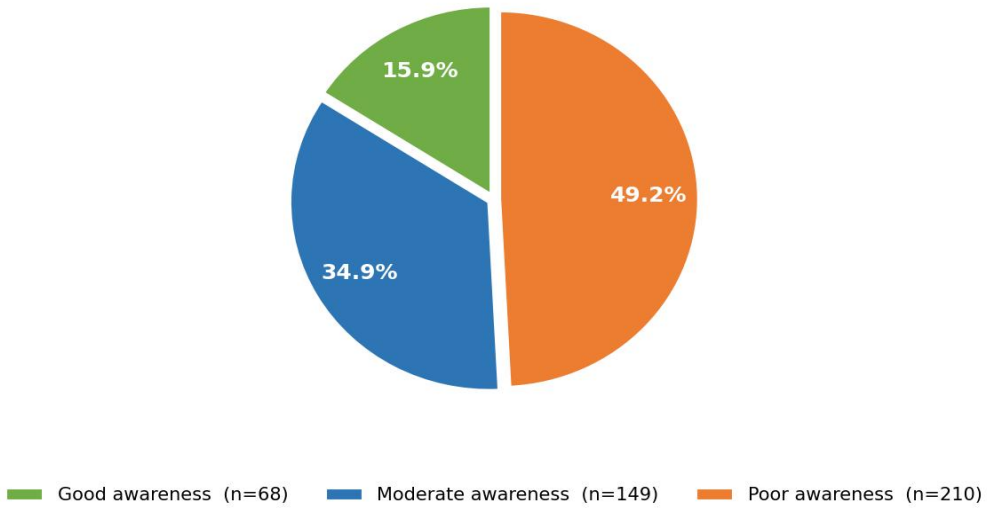

Figure 3: Sleep Behaviour Awareness Category among medical students of the University of Benin (N=427)

As shown in Figure 4, 210 (49.2%) of respondents had poor awareness of sleep behaviours (Sleep behaviour score <10), 149 (34.9%) had moderate awareness (Sleep behaviour score 10–14), and only 68 (15.9%) had good awareness (Sleep behaviour score ≥15). The mean Sleep behaviour total score was 9.04 ± 5.08.

Regarding awareness of sleep behaviours, respondents demonstrated the highest correct response rates for items related to substance use: drinking alcohol in the evening was correctly identified as having a negative effect by 304 (71.2%), smoking before bedtime by 299 (70.0%), and caffeinated drinks before bedtime by 279 (65.3%). However, awareness was substantially lower for items related to sleep-wake cycle behaviours; only 78 (18.3%) correctly identified that trying to recover lost sleep by sleeping longer later has a negative effect, and only 85 (19.9%) correctly identified that getting out of bed when unable to sleep has a positive effect. Concerning feelings before sleep, 249 (58.3%) correctly identified that relaxing activities before bed have a positive effect, whilst only 105 (24.6%) recognised that going to bed without feeling ready to sleep has a negative effect. The mean sleep behaviour total score was 9.04 ± 5.08. Overall, only 68 (15.9%) of respondents had good awareness, 149 (34.9%) had moderate awareness, and 210 (49.2%) had poor awareness of sleep related behaviours.

CHAPTER FIVE

DISCUSSION

The age distribution of respondents showed that the majority were between 21 and 25 years, with a mean age in the early twenties. This is consistent with the expected age profile of undergraduate medical students in Nigeria, where students typically gain admission into medical school between the ages of 16 and 20 and spend six years completing the programme, placing the bulk of the student population in their early to mid-twenties. A similar age profile was reported in a cross-sectional study conducted among Nigerian medical students at the University of Ilorin, Ladoke Akintola University of Technology, and Osun State University in Southwest Nigeria, where the mean age of respondents was comparably within the early twenties range, reflecting the uniform academic timelines across Nigerian medical schools.[1] Likewise, a cross-sectional observational study conducted among medical students of two public institutions in Abakaliki, Nigeria, reported a comparable age profile, further reinforcing the consistency of this demographic pattern within the Nigerian medical student population.[4]

Slightly more than half of respondents were male, while slightly below half were female. This male predominance is not unexpected in Nigerian medical schools, where sociocultural expectations have historically favoured male participation in highly demanding and prestigious professional programmes such as medicine. However, the substantial female representation observed in this study reflects the gradual shift toward gender inclusivity in Nigerian tertiary education, driven by improved access to secondary education for girls and growing societal recognition of women in medicine. A similar male predominance was reported in a questionnaire-based cross-sectional study conducted among medical students in Jeddah, Saudi Arabia, where males also constituted the larger proportion of respondents, suggesting that this pattern is not limited to the Nigerian context.[7]

Almost all respondents identified as Christians, with a very small minority being Muslims and an even smaller fraction practising African Traditional Religion. This distribution closely mirrors

the religious composition of Edo State and the broader South-South geopolitical zone of Nigeria, where Christianity is the dominant religion. The preponderance of Benin and Edo indigenes, followed by Igbo and Esan respondents, reflects the catchment area of the University of Benin, which draws its student population largely from Edo State and neighbouring South-South and South-East states.

Nearly three-fifths of respondents resided on-campus while the remaining two-fifths lived off-campus. This distribution is consistent with the accommodation capacity of the University of Benin, which cannot house all enrolled students, necessitating off-campus living arrangements for a significant proportion. This residential split is particularly relevant to this study, as place of residence may influence sleep patterns through differences in noise exposure, overcrowding, commuting demands, and access to study facilities, all of which are well-recognised determinants of sleep quality among students.

Regarding bedtime and wake time habits, the majority of respondents reported retiring to bed between 10pm and 11pm, while more than three-fifths woke between 5am and 6am. Late bedtimes are a widely documented characteristic of medical students and are primarily attributable to the demands of academic work, which frequently extends study sessions well into the night. This pattern of late sleep onset and early waking is consistent with findings from a cross-sectional study conducted among medical students at the University of Ghana School of Medicine and Dentistry, where similar sleep-wake timing was reported alongside a mean sleep duration below the recommended threshold.[8] Similarly, a cross-sectional study conducted in 2024 among medical students at three universities in Southwest Nigeria reported comparable trends of late sleep onset and early wake times driven by academic obligations.[1]

The mean sleep duration among respondents was below the seven to nine hours recommended by sleep medicine guidelines for adults and young people, and more than half slept fewer than six hours per night. The probable reason for this is the heavy academic workload of medical training,

which compels students to sacrifice sleep in favour of studying, particularly during examination periods and clinical rotations. This has significant public health implications, as chronic sleep insufficiency is associated with impaired cognitive function, reduced academic performance, weakened immune response, and increased vulnerability to anxiety and depression, all of which are detrimental to both the academic success and the future clinical competence of medical students.[3] A similar finding was reported in a cross-sectional observational study conducted among medical students of two public institutions in Abakaliki, Nigeria, where the mean sleep duration was below recommended levels and only a very small minority of students demonstrated good sleep health, underscoring the widespread nature of sleep insufficiency among Nigerian medical students.[4] Medical schools and student health services should consider incorporating structured sleep health education into academic orientation programmes to raise awareness of the consequences of chronic sleep deprivation and promote healthier sleep routines from the earliest years of training.

With respect to sleep disturbances, waking up in the middle of the night or early morning was the most frequently reported problem, affecting nearly a third of respondents three or more times per week, followed by the need to use the bathroom at night. Feeling too hot was also a prominent disturbance, affecting more than a fifth of respondents three or more times weekly. These findings reflect both the physiological patterns of young adults and the environmental conditions typical of student accommodation in tropical climates, where heat and inadequate ventilation are common contributors to sleep fragmentation. A cross-sectional study conducted among medical students at the University of Ghana School of Medicine and Dentistry similarly reported frequent nocturnal awakenings as a key component of poor sleep quality among medical students.[8] To mitigate these disturbances, university management should ensure that student hostels are adequately ventilated, sanitation facilities are accessible, and the sleeping environment meets basic comfort standards.

Concerning overall sleep quality, more than half of respondents rated their sleep as fairly good and about a fifth as very good, while a fifth rated it as fairly bad and a small minority as very bad.

Overall, slightly more than half of respondents had a normal sleep pattern while nearly two-fifths had a disturbed sleep pattern. Although the majority fell within the normal category, the substantial proportion with disturbed sleep is a concern, as even subclinical sleep disturbance can impair concentration, emotional regulation, and academic performance in a demanding academic environment. This finding is comparable to a cross-sectional observational study conducted among medical students in Abakaliki, Nigeria, where the proportion of students with good sleep health was markedly lower, suggesting that students at the University of Benin may have marginally better sleep outcomes within the Nigerian context but still carry a significant burden of sleep disruption.[4] This is also similar to findings from a cross-sectional study conducted among medical students in the College of Medicine, King Saud University, Riyadh, Saudi Arabia, which reported that more than half of medical students had poor sleep quality.[13] Universities should therefore establish peer-led sleep wellness programmes and ensure that academic scheduling allows for reasonable rest intervals, particularly during high-stakes assessment periods.

Doing important work before bedtime, including studying and scheduling, was the most prevalent sleep-disruptive behaviour, with more than half of respondents reporting doing so frequently or always. This is an expected finding in a medical student population, where the sheer volume of academic content to be covered often leaves students with no choice but to extend their study sessions into the late hours of the night. This behaviour directly delays sleep onset, disrupts circadian rhythms, and reduces total sleep duration. A cross-sectional study conducted among medical students at Tanta University, Egypt, similarly identified doing important work before bedtime as one of the three most prevalent negative sleep hygiene practices among medical students.[5] Going to bed at irregular times, reported as frequent or always by about half of respondents, and using the bed for activities other than sleeping, reported by nearly half, were also prominent disruptive behaviours, reflecting a broader pattern of poor sleep scheduling and boundary-setting that is characteristic of student life, where academic demands routinely override healthy sleep routines.

Going to bed while feeling stressed, angry, upset, or nervous was reported as frequent or always by more than a quarter of respondents. This is a particularly harmful behaviour, as emotional arousal at bedtime increases sleep latency and reduces sleep quality through activation of the hypothalamic-pituitary-adrenal axis, leading to physiological hyperarousal that is incompatible with restorative sleep. A national cross-sectional study conducted among medical students in Vietnam reported depression and psychological morbidity as significant predictors of poor sleep quality, highlighting the close relationship between emotional state at bedtime and subsequent sleep outcomes.[9] Universities should integrate mindfulness and emotional regulation strategies into student wellness programmes to help students decompress before sleep.

This study examined the factors associated with sleep patterns among respondents. The analysis revealed that age group, sex, level of study, religion, and ethnicity were not significantly associated with sleep quality. In contrast, place of residence, sleep behaviour, and sleep behaviour awareness were significantly related to sleep patterns. Students residing off-campus reported more disturbed sleep compared to those living on-campus. Similarly, poor sleep behaviours and poor awareness of sleep behaviours were strongly associated with disturbed sleep.

The probable explanation for these findings is that off-campus residence may expose students to environmental stressors such as noise, commuting fatigue, and less structured routines, which can negatively affect sleep quality. Furthermore, poor sleep behaviours, including late-night study, excessive screen use, and irregular schedules, directly disrupt circadian rhythm and contribute to disturbed sleep. Low awareness of healthy sleep practices also means that students may not recognize the importance of sleep hygiene, thereby perpetuating maladaptive habits.

These findings are consistent with previous studies. In Vietnam, poor sleep quality among medical students was significantly associated with depression and morbidity, while higher health-related quality of life scores reduced the risk of poor sleep[9]. Similarly, the Mogadishu study reported that poor sleep was linked to screen use, stressful life events, physical inactivity, depressive symptoms, and poor social support[10]. In Nigeria, medical students reported poor sleep quality associated with caffeine use, medication, and nocturnal habits. Taken together, these studies highlight the role of behavioural and environmental factors in shaping sleep quality,

which aligns with the present study's findings that sleep behaviour and awareness are key predictors of disturbed sleep[1].

The public health significance of these findings is considerable. Sleep quality is critical for academic performance, mental health, and overall well-being of students. Poor sleep among medical students may compromise future healthcare delivery, as fatigue and burnout are linked to medical errors. Identifying behavioural and environmental factors provides actionable targets for interventions in student populations. Addressing sleep quality is therefore not only important for individual health but also for the broader health system.

Based on these findings, several recommendations can be made. Firstly, universities should promote sleep behaviour education by integrating awareness campaigns into student orientation and health programs. Also, policies that encourage on-campus residence or provide structured housing support may help reduce environmental stressors. Furthermore, behavioural interventions should be developed to regulate screen time, caffeine use, and encourage physical activity. Also, psychosocial support services, including counseling and peer support, should be made available to address stress and depression that may underlie poor sleep. Finally, institutional policies should consider adjusting academic schedules to reduce late-night study demands, thereby fostering healthier sleep patterns among students.

Overall, slightly more than half of respondents demonstrated good sleep behaviour, about a third had moderate sleep behaviour, and approximately one in ten had poor sleep behaviour. While the majority fell into the good category, the combined proportion with moderate or poor sleep behaviour represents a substantial minority whose behavioural practices are likely contributing meaningfully to their sleep disruption. A cross-sectional study conducted among medical students in the University of Nigeria Teaching Hospital, Ituku Ozalla, Enugu, similarly reported a range of disruptive sleep practices among Nigerian medical students, including irregular sleep schedules and frequent nocturnal awakenings.[12] Targeted behavioural interventions, including structured sleep hygiene workshops and digital tools for sleep scheduling, should be made available to all students, with particular attention to those identified as having moderate or poor sleep behaviour.

Awareness of sleep behaviours was generally poor among respondents. Items related to substance use attracted the highest correct response rates, with more than two-thirds correctly identifying alcohol in the evening and smoking before bedtime as having a negative effect on sleep, and nearly two-thirds correctly identifying caffeinated drinks before bedtime as harmful. However, awareness dropped markedly for sleep-wake cycle behaviours, with fewer than a fifth correctly identifying that trying to recover lost sleep by sleeping longer has a negative effect, and fewer than a fifth correctly recognising that getting out of bed when unable to sleep has a positive effect. Awareness of feelings before sleep was also variable, with fewer than a quarter recognising that going to bed without feeling ready to sleep is harmful. These gaps suggest that students have absorbed general health messaging about substance use but lack deeper understanding of sleep physiology, circadian regulation, and the concept of sleep restriction therapy. A cross-sectional study conducted to assess the knowledge, interest, and awareness of medical students about sleep medicine at Obafemi Awolowo University, Ile-Ife, Nigeria, similarly found that about three-quarters of medical students had low sleep knowledge scores, with poor understanding of sleep physiology and sleep disorders being the dominant gaps.[15] This is also similar to findings from a cross-sectional study conducted in the College of Medicine, King Saud University, Riyadh, Saudi Arabia, which reported that the majority of students scored at poor or intermediate levels on sleep hygiene awareness.[13]

Overall, only about one in six respondents had good awareness of sleep behaviours, about a third had moderate awareness, and nearly half had poor awareness. This represents a significant knowledge deficit in a population that will be expected to counsel patients on sleep health as future medical practitioners. A multicentre cross-sectional study conducted to assess the knowledge of Egyptian final-year medical students and house officers about normal sleep and sleep disorders reported that the vast majority scored below the threshold for adequate knowledge, indicating that this deficit persists even into the later stages of medical training.[14] This has major public health significance, as doctors with poor sleep knowledge are less likely to screen for sleep disorders, counsel patients on sleep hygiene, or recognise the health consequences of poor sleep in clinical settings. Sleep medicine should be formally incorporated

into undergraduate medical curricula, with dedicated teaching on sleep physiology, the consequences of sleep deprivation, and evidence-based sleep hygiene practices.

5.2 CONCLUSION

This study assessed the sleep patterns, associated factors, behaviours that alter sleep patterns, and level of awareness of behaviours associated with sleep among medical students of the University of Benin. The findings of the study showed that a considerable proportion of the respondents had disturbed sleep patterns, with many students reporting inadequate sleep duration, irregular sleep schedules, and poor sleep-related behaviours.

The study also showed that place of residence, sleep behaviours, and awareness of sleep-related behaviours were significantly associated with sleep patterns among respondents. Students residing off-campus were more likely to have disturbed sleep patterns compared to those residing on-campus. Unhealthy sleep behaviours such as studying late at night, irregular bedtimes, going to bed feeling stressed, and using the bed for activities other than sleeping were commonly practiced among respondents and may have contributed to poor sleep quality.

Furthermore, the level of awareness regarding behaviours associated with healthy sleep was generally poor among the respondents, particularly in areas relating to sleep-wake cycle behaviours and pre-sleep activities. This suggests that many medical students may not fully understand the effects of unhealthy sleep practices on their physical health, mental well-being, and academic performance.

In conclusion, disturbed sleep patterns and unhealthy sleep behaviours are common among medical students in the University of Benin. There is therefore a need for interventions aimed at improving sleep hygiene practices, increasing awareness of healthy sleep behaviours, and promoting the overall well-being of medical students.

5.3 RECOMMENDATIONS

Recommendations to the Government

1. The government should support policies and programmes aimed at promoting mental health and healthy living practices among university students.

2. Government should improve funding for student health services and counselling centres in tertiary institutions.

3. Public health campaigns should be carried out to increase awareness about the importance of adequate sleep and the dangers associated with poor sleep habits.

4. Further studies should be encouraged in other universities and among other student populations to provide more information on sleep patterns and associated factors in Nigeria.

Recommendations to the Medical and Dental Council of Nigeria (MDCN)

1. The Medical and Dental Council of Nigeria should encourage the inclusion of sleep health and sleep hygiene education in the undergraduate medical curriculum.

2. The council should encourage medical schools to establish student wellness programmes aimed at promoting mental health and healthy lifestyle practices among medical students.

3. Periodic assessment of student welfare and learning conditions should be incorporated into accreditation exercises for medical schools.

Recommendations to the University of Benin

1. The University of Benin should organize health education programmes and seminars on sleep hygiene and healthy sleep practices for medical students.

2. Student counselling and support services should be strengthened to assist students experiencing stress, anxiety, and other factors that may negatively affect sleep.

3. The university management should make efforts to improve hostel conditions by reducing overcrowding, improving ventilation, and ensuring a conducive environment for rest and sleep.

4. Academic activities and schedules should be structured in a manner that reduces excessive academic stress and prolonged study hours among students.

5. Recreational and stress-relieving activities should be encouraged among students to promote better mental health and healthier sleep habits.

REFERENCES

1. Aderinto N, Olatunji G, Afolabi S, Muili A, Olaniyi P, Edun M, et al. Sleep patterns and quality among Nigerian medical students: A cross-sectional study. Medicine (Baltimore). 2024 Mar 22;103(12):e37556. https://pmc.ncbi.nlm.nih.gov/articles/PMC10956952/

2. Kanyadi SR, Shindhe VM, Kamate RP, Javali SB. Sleep Hygiene Practices and Sleep Quality Among Undergraduate Medical Students: A Cross-Sectional Study. National Journal of Community Medicine. 2025 Sept 1;16(09):879–86. https://njcmindia.com/index.php/file/article/view/5548

3. Vidović S, Rakić N, Kraštek S, Pešikan A, Degmečić D, Zibar L, et al. Sleep Quality and Mental Health Among Medical Students: A Cross-Sectional Study. J Clin Med. 2025 Mar 26;14(7):2274. https://pmc.ncbi.nlm.nih.gov/articles/PMC11989636/

4. Eze C. Sleep health among medical students in Abakaliki Nigeria: A descriptive study. Sleep Medicine: X. 2024 Dec 1;7:100103. https://www.sciencedirect.com/science/article/pii/S2590142724000016

5. Talaia A, Sowidan A, Fahim A, Elzohery A, Hammoda A, Kabbash I. Sleep hygiene practices and sleep quality among medical students in Egypt: a cross-sectional study. Sleep Science Practice. 2025 Mar 25;9(1):6. https://link.springer.com/article/10.1186/s41606-025-00125-y

6. Mc A, K F, N R, Af A, N S, Pj H, et al. Sleep disturbances among medical students: a global perspective. Journal of clinical sleep medicine : JCSM : official publication of the American Academy of Sleep Medicine [Internet]. 2015 Jan 15 [cited 2026 Jan 23];11(1). Available from: https://pubmed.ncbi.nlm.nih.gov/25515274/?utm_source=chatgpt.com

7. Gd A, Aa A, Aa A, Bh S, Hz F, Fh A, et al. Sleep Patterns and Associated Insomnia in Junior and Senior Medical Students: A Questionnaire-Based Cross-Sectional Study. International archives of otorhinolaryngology [Internet]. 2024 Feb 5 [cited 2026 Jan 23];28(2). Available from: https://pubmed.ncbi.nlm.nih.gov/38618585/

8. Lawson HJ, Wellens-Mensah JT, Nantogma SA. Evaluation of Sleep Patterns and Self-Reported Academic Performance among Medical Students at the University of Ghana School of Medicine and Dentistry. Sleep Disorders. 2019 June 11;2019:1278579. https://pmc.ncbi.nlm.nih.gov/articles/PMC6594317/

9. Nguyen CT, Dam VAT, Nguyen LH, Phung D, Vu TS, Do HP, et al. Factors associated with sleep quality among medical students in Vietnam: a national cross-sectional study. BMJ Open. 2025 Mar 4;15(3):e083168. https://bmjopen.bmj.com/content/15/3/e083168

10. Mohamed NA, Mohamud RYH, Hassan MS, Nur HI, Hidigow AMH, Gabow AA, et al. Restless nights, demanding days: assessment of the prevalence and associated factors of poor sleep quality among medical students in Mogadishu, Somalia. BMC Med Educ. 2025 Dec 10;26(1):70. https://link.springer.com/article/10.1186/s12909-025-08438-3

11. Bogati S, Singh T, Paudel S, Adhikari B, Baral D. Association of the Pattern and Quality of Sleep with Consumption of Stimulant Beverages, Cigarette and Alcohol among Medical Students. J Nepal Health Res Counc. 2020 Nov 13;18(3):379–85. https://jnhrc.com.np/index.php/jnhrc/article/view/2633

12. Chinawa JM, Chukwu BF, Obu HA. Sleep practices among medical students in Pediatrics Department of University of Nigeria Teaching Hospital, Ituku/Ozalla, Enugu, Nigeria. Niger J Clin Pract. 2014;17(2):232–6. https://journals.lww.com/njcp/fulltext/2014/17020/sleep_practices_among_medical_students_in.20.aspx

13. Alshahrani M, Al Turki Y. Sleep hygiene awareness: Its relation to sleep quality among medical students in King Saud University, Riyadh, Saudi Arabia. J Family Med Prim Care. 2019 Aug 28;8(8):2628–32. https://pmc.ncbi.nlm.nih.gov/articles/PMC6753813/

14. Zaki NF, Marzouk R, I O, Hy A, Ws Z, A H, et al. Sleep Medicine Knowledge among Medical Students in Seven Egyptian Medical Faculties. Journal of Sleep Disorders & Therapy. 5(2):1–7. https://www.researchgate.net/topics?_tp=eyJjb250ZXh0Ijp7ImZpcnN0UGFnZSI6InB1YmxpY2F0aW9uIiwicGFnZSI6InB1YmxpY2F0aW9uIn19

15. Olorunmoteni OE, Ogundipe OK, Sanusi AA, Kolawole KA, Fawale MB, Adebowale AA, et al. Assessment of sleep knowledge among medical and dental students in a Nigerian tertiary institution: a cross-sectional study. Sleep Breath. 2023 Aug;27(4):1589–96. https://link.springer.com/article/10.1007/s11325-022-02755-3

16. Latitude.to. GPS coordinates of University of Benin (Nigeria), Nigeria. Latitude: 6.3337 Longitude: 5.6001 [Internet]. Latitude.to, maps, geolocated articles, latitude longitude coordinate conversion. [cited 2025 Nov 15]. Available from: http://latitude.to:8080/articles-by-country/ng/nigeria/26486/university-of-benin-nigeria
17. UniBEN - ABOUT Us [Internet]. [cited 2025 Nov 15]. Available from: https://www.uniben.edu/about-uniben.html
18. UniBEN - Health Centre [Internet]. [cited 2025 Nov 15]. Available from: https://uniben.edu/health-centre.html
19. History- – School of Medicine [Internet]. [cited 2025 Nov 15]. Available from: https://medicine.uniben.edu/history/
20. Seun-Fadipe CT, Aloba OO, Oginni OA, Mosaku KS. Sleep Hygiene Index: Psychometric Characteristics and Usefulness as a Screening Tool in a Sample of Nigerian Undergraduate Students. Journal of Clinical Sleep Medicine : JCSM : Official Publication of the American Academy of Sleep Medicine. 2018 Aug 15;14(8):1285. https://pmc.ncbi.nlm.nih.gov/articles/PMC6086965/?utm_source=chatgpt.com#sec22
21. Coelho J, Rey M, Labonne A, Adan A, Taillard J, Geoffroy PA, et al. Better characterizing sleep beliefs for personalized sleep health promotion: the French sleep beliefs scale validation study. Front Public Health. 2024 Jan 11;11:1293045. https://pmc.ncbi.nlm.nih.gov/articles/PMC10808670/?utm_source=chatgpt.com#sec6

APPENDIX 1

QUESTIONNAIRE

ASSESSING THE SLEEP PATTERNS OF MEDICAL STUDENTS OF THE UNIVERSITY OF BENIN.

Dear respondent we are 600L medical students of the University of Benin, Benin City, conducting a research project on the sleep patterns of the medical students of the University of Benin.

All information provided will be treated with utmost confidentiality. Kindly answer all questions as accurately as possible.

Instructions: Please tick the number corresponding to your answer or fill in the blank where required.

SECTION A: DEMOGRAPHIC INFORMATION

1. Age (in years as at last birthday) _____

2. Sex of respondent
a. Male
b. Female

3. What is your current level in school?
a. 200 Level (Second Year)
b. 300 Level (Third Year)
c. 400 Level (Fourth Year)
d. 500 Level (Fifth Year)
e. 600 Level (Sixth Year)

4. Religion: Christian ( ) Islam ( ) ATR ( ) others(please specify):_____

5. Ethnicity: Benin ( ) Esan ( ) Owan ( ) Igbo ( ) Yoruba ( ) Hausa ( )

Others (please specify):_____

6. Where do you currently reside?

a. On-campus hostel
b. Staff quarters
c. Off-campus housing
d. With family/relatives
e. Others (please specify): _____

7. How many people live in your current accommodation (in the same room), including yourself?

   Number: _____

SECTION B: DETERMINATION OF THE PATTERNS OF SLEEP.

Instructions: The following questions relate to your usual habits during the past month only. Your answers should indicate the most accurate reply for the majority of days and nights in the past month. **Please answer all questions**

8. During the past month, what time have you usually gone to bed at night?

   BED TIME _____

9. During the past month, how long (in minutes) has it usually taken you to fall asleep each night?

   NUMBER OF MINUTES _____

10. During the past month, what time have you usually gotten up in the morning?

    GETTING UP TIME _____

11. During the past month, how many hours of actual sleep did you get at night? (This may differ from the number of hours you spent in bed.)

HOURS OF SLEEP PER NIGHT _____

12. During the past month, how often have you had trouble sleeping because you:	Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
a. Cannot get to sleep within 30 minutes				
b. Wake up in the middle of the night or early morning				
c. Have to get up to use the bathroom				
d. Cannot breathe comfortably				
e. Cough or snore loudly				
f. Feel too cold				
g. Feel too hot				
h. Have bad dreams				
i. Have pain				
13. During the past month, how often have you taken medicine to help you sleep (prescribed or "over the counter")?				
14. During the past month, how often have you had trouble staying awake while driving,				

eating meals, or engaging in social activity?				
	No problem at all	Only a very slight problem	Somewhat of a problem	A very big problem
15. During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?				
	Very good	Fairly good	Fairly bad	Very bad
16. During the past month, how would you rate your sleep quality overall?				
	No bed partner or roommate	Partner/roommate in other room	Partner in same room but not same bed	Partner in same bed
17. Do you have a bed partner or roommate?				
	Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
18. How often in the past month have you had:				
a. Loud snoring				

b. Long pauses between breaths while asleep				
c. Legs twitching or jerking while you sleep				
d. Episodes of disorientation or confusion during sleep				
e. Other restlessness while you sleep, please describe				

SECTION C: ASSESSING THE BEHAVIOURS THAT ALTER SLEEP PATTERNS.

Instructions: A number of statements that people use to describe their sleeping habits are given below. Read each statement and then put a √ in the appropriate box (one √ per row) to the right of the statements to indicate how you generally feel. There are no right or wrong answers. Do not spend too much time on any one

Question	Always	Frequently	Sometimes	Rarely	Never
19. I take daytime naps lasting two or more hours.					
20. I go to bed at different times from day to day.					
21. I get out of bed at different times from day to day.					
22. I exercise to the point of sweating within 1 h of going to					

bed.					
23. I stay in bed longer than I should two or three times a week.					
24. I use alcohol, tobacco, or caffeine within 4 h of going to bed or after going to bed.					
25. I do something that may wake me up before bedtime (for example: play video games, use the internet, watch TV).					
26. I go to bed feeling stressed, angry, upset, or nervous.					
27. I use my bed for things other than sleeping (for example: watch television, eat, read).					
28. I sleep on an uncomfortable bed (for example: poor mattress or pillow, too much or not enough blankets).					
29. I sleep in an uncomfortable bedroom (for example: too bright, too stuffy, too hot, too cold, or too noisy).					
30. I do important work before bedtime (for example, scheduling, or study).					

31. I think, plan, or worry when I am in bed.					

SECTION D: EVALUATING THE AWARENESS OF BEHAVIOURS ASSOCIATED WITH UNHEALTHY SLEEP PATTERNS.

Instructions: For each item below, indicate whether you believe the behaviour or situation has a positive, negative, or neutral effect on sleep quality and/or quantity.

	Negative	Neutral	Positive
32. Drinking alcohol in the evening			
33. Drinking coffee or other caffeinated drinks before bedtime			
34. Doing intense physical exercise before going to bed			
35. Taking a long nap during the day			
36. Going to bed and waking up at the same time every day			
37. Thinking about tasks/obligations for the next day before sleep			
38. Using sleep medication regularly			
39. Smoking before bedtime			
40. Relaxing (e.g., reading or calm activities) before bed			
41. Going to bed later than usual			

42. Going to bed with an empty stomach			
43. Doing non-sleep activities in bed (e.g., studying, eating)			
44. Going to bed without feeling ready to sleep			
45. Working intensely late at night			
46. Getting out of bed when it's hard to fall asleep			
47. Going to bed earlier than necessary			
48. Going to bed soon after eating a big meal			
49. Worrying before going to sleep			
50. Sleeping in a quiet and dark room			
51. Trying to recover lost sleep by sleeping longer later			

APPENDIX 2

INFORMED CONSENT FORM

ASSESSMENT OF THE SLEEP PATTERNS OF MEDICAL STUDENTS OF THE UNIVERSITY OF BENIN.

INVESTIGATORS

Odunayo Emmanuel Awodu

Joshua Oiseozemen Udujie

SUPERVISOR

Prof. O.A. Adeleye

FINANCIAL SPONSORSHIP

This research project is self-sponsored

PURPOSE OF THE RESEARCH

The purpose of this research is to assess the sleep patterns of medical students in the University of Benin.

PROCEDURES AND PROTOCOL INVOLVED IN THE STUDY

You are kindly requested to complete a questionnaire designed to assess the sleep patterns of medical students in the University of Benin.

COMPENSATION

There will be no financial compensation for participating in the study.

VOLUNTARY PARTICIATION

Your participation in this research is completely voluntary. There will be no discrimination against you if you choose to participate. You are free to change your mind and withdraw from the study at any time, even if you initially agreed to take part.

SIDE EFFECTS

There is no anticipated adverse effect with participating in this study.

BENEFIT

The benefit of this study includes the provision of useful local data for understanding the prevalence of sleeping disorders among medical students in the University of Benin and providing recommendations for evidence-based interventions regarding this problem.

CONFIDENTIALITY

All information and data obtained during this study will be kept confidential. Participant names will not be recorded on the questionnaires, and all collected information will be securely stored in a password protected file on my personal computer. Any physical copies will be stored in a locked personal document cabinet.

CONTACT INFORMATION

Joshua Oiseozemen Udujie

Medical Student

Email: udujiejoshua@gmail.com

Tel: 08071206725

Odunayo Emmanuel Awodu

Medical Student

Email: wodue42@gmail.com

Tel: 07058451182

Ethics and Research committee

University of Benin Teaching Hospital

Benin city.

Email: ubthresearchethics@gmail.com

Phone number: 07063331337

APPENDIX 3

HEALTH RESEARCH ETHICS COMMITTEE (HREC)

UNIVERSITY OF BENIN TEACHING HOSPITAL

P.M.B. 1111 BENIN CITY NIGERIA Telephone: 052-600418 Website: ubth.org

CHIEF MEDICAL DIRECTOR
Prof. (Mrs) I.N Ize-Iyamu

DIRECTOR OF ADMINISTRATION
Jim Uwadie, Esq

CHAIRMAN
Prof. (Mrs.) Antoinette N. Ofili

HREC OFFICE:
Committee email: ubthresearchethics@gmail.com
Registration Number:
NHREC-UBTH-HREC/24/12/2022B

PROTOCOL NUMBER: ADM/E 22/A/VOL. VII/14865491272107

PROPOSAL TITLE: "ASSESSMENT OF THE SLEEP PATTERNS OF MEDICAL STUDENTS OF THE UNIVERSITY OF BENIN"

PRINCIPAL INVESTIGATOR(S): AWODU ODUNAYO EMMANUEL, UDUJIE JOSHUA OISEOZEMEN

DEPARTMENT/INSTITUTION: DEPARTMENT OF PUBLIC HEALTH AND COMMUNITY MEDICINE, SCHOOL OF MEDICINE, UNIVERSITY OF BENIN, BENIN CITY, EDO STATE, NIGERIA

DATE CONSIDERED: MARCH 18TH, 2026

DECISION OF THE COMMITTEE: APPROVED

THIS APPROVAL DATES 18/03/2026 TO 17/03/2027. IF THERE IS DELAY IN STARTING THE RESEARCH, PLEASE INFORM THE HREC SO THAT THE DATES OF APPROVAL CAN BE ADJUSTED ACCORDINGLY

REMARK:

CHAIRMAN: PROF. (MRS) A.N. OFILI SIGNATURE & DATE: 18/3/2026

SUPERVISOR (S): PROF. O. A. ADELEYE

DECLARATION BY INVESTIGATOR(S):

PROTOCOL NUMBER (please quote in all enquiries)

Note that no participant accrual or activity related to this research may be conducted outside of these dates and you are to furnish the committee with the research activities at the completion of the study. All informed consent forms used in this study must carry the HREC assigned number and duration of HREC approval of the study. In multiyear research, endeavor to submit your annual report to the HREC early in order to obtain renewal of your approval and avoid disruption of your research. No changes are permitted in the research without prior approval by the HREC except in circumstances outlined in the Code. The HREC reserves the right to conduct compliance visit your research site without previous notification.

Signature & Date: 8/4/2026

ubthresearchethics@gmail.com Registration Number: NHREC/24/01/2020