RESEARCH PROPOSAL

RELATIONSHIP BETWEEN SLEEP QUALITY AND ACADEMIC PERFORMANCE AMONG UNIVERSITY STUDENTS OF NORTHWEST UNIVERSITY

BY

[YOUR NAME]

Matriculation Number: [Your Matric Number]

A Research Proposal Submitted to the Department of Physiology,
Faculty of Basic Medical Sciences,
Northwest University (Yusuf Maitama Sule University), Kano.

In Partial Fulfillment of the Requirements for the Award of
Bachelor of Science (B.Sc.) Degree in Physiology

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CHAPTER ONE: INTRODUCTION

1.1 Background to the Study

Sleep is a highly complex, dynamic, and fundamental physiological process characterized by reversible unconsciousness, altered brain wave activity, and reduced responsiveness to environmental stimuli. From a physiological standpoint, sleep is essential for the restoration of cellular energy, immune system regulation, clearance of metabolic waste products from the brain via the glymphatic system, and endocrine homeostasis. Most significantly for university students, sleep plays an indispensable role in neuroplasticity, memory consolidation, and optimal cognitive functioning.

In the academic environment, university students face rigorous academic demands, psychological stress, and intense social pressures. These factors frequently lead to erratic sleep schedules, sleep deprivation, and overall poor sleep quality. Medical and life science students, particularly those studying complex disciplines like Physiology, are historically prone to abbreviated sleep durations due to voluminous curricula and demanding laboratory schedules. The transition to university life often coincides with a shift towards evening chronotypes, exacerbating circadian misalignment when early morning lectures are mandatory.

Academic performance, commonly measured by the Cumulative Grade Point Average (CGPA), is a critical metric of a student's educational success and cognitive assimilation. Extensive neurophysiological evidence suggests that deprivation of both Rapid Eye Movement (REM) sleep and Slow-Wave Sleep (SWS) significantly impairs prefrontal cortex functions, including attention, executive function, working memory, and logical reasoning. Despite this established physiological link, the specific epidemiological dynamics of sleep quality and its direct correlation with academic performance among students at Northwest University remain under-documented.

1.2 Statement of the Problem

The contemporary university student culture often normalizes sleep deprivation, frequently equating "all-nighters" with academic dedication. However, this behavioral pattern contradicts physiological principles of cognitive function and memory consolidation. Poor sleep quality leads to daytime somnolence, decreased attention span during lectures, impaired

judgment, and heightened stress levels. In Northwest University, the rigorous academic calendar and socio-environmental factors (such as power outages affecting nighttime study, and communal living conditions in hostels) pose significant challenges to healthy sleep architecture. There is a paucity of empirical data quantifying how these sleep disruptions specifically translate to the academic performance of students in this particular geographical and institutional setting. This knowledge gap necessitates a targeted investigation.

1.3 Justification for the Study

Understanding the physiological implications of sleep on academic performance is crucial for educational and institutional policy-making. This study is justified as it will provide empirical, context-specific data on the sleep habits of Northwest University students. By demonstrating the quantitative relationship between sleep quality and CGPA, the findings will serve as an evidence-based advocacy tool for student counseling, structural adjustments in lecture scheduling, and the promotion of sleep hygiene programs. For Physiology students, this study directly applies neurophysiological concepts of sleep to a real-world, relatable public health issue.

1.4 Aim of the Study

The primary aim of this study is to evaluate the relationship between sleep quality and academic performance among university students at Northwest University.

1.5 Objectives of the Study

The specific objectives of this study are:

1. To assess the prevalence of poor sleep quality among students of Northwest University using a standardized metric.
2. To determine the average academic performance (CGPA) of the study population.
3. To examine the correlation between sleep quality parameters (such as sleep duration, sleep latency, and sleep disturbances) and academic performance.
4. To compare sleep quality and academic performance variations across different genders and academic levels.

CHAPTER TWO: LITERATURE REVIEW

2.1 The Physiology of Sleep

Sleep architecture is broadly categorized into Non-Rapid Eye Movement (NREM) and Rapid Eye Movement (REM) sleep. NREM is further subdivided into three stages (N1, N2, and N3). Stage N3, also known as slow-wave sleep (SWS), is the deepest stage and is primarily associated with physical restoration, hormonal release (such as Growth Hormone), and the clearance of brain metabolites. REM sleep is characterized by brain activity that closely resembles wakefulness and is heavily implicated in emotional regulation and the consolidation of procedural and spatial memory. Disruption in either SWS or REM sleep fundamentally alters synaptic plasticity, which is the physiological basis of learning and memory formation.

2.2 Sleep Quality and Cognitive Function

Sleep quality goes beyond mere sleep duration; it encompasses sleep latency (time taken to fall asleep), sleep efficiency, and the absence of awakenings. Poor sleep quality leads to a state of chronic low-grade physiological stress, characterized by elevated cortisol levels and sympathetic nervous system hyperactivity. Neuroimaging studies have shown that sleep deprivation results in decreased metabolic activity in the thalamus and prefrontal cortex, the areas responsible for executive function, alertness, and complex problem-solving. For a student, this translates directly to an inability to focus during lectures and poor recall during examinations.

2.3 Empirical Evidence on Sleep and Academic Performance

Numerous global studies have established a positive correlation between good sleep quality and high academic achievement. A landmark study by Kelly et al. (2001) demonstrated that students categorized as "long sleepers" reported significantly higher GPAs than "short sleepers." However, more recent research emphasizes that consistency and quality of sleep are stronger predictors of academic success than duration alone. In the Nigerian context, studies by Aina et al. (2020) on university students in the Southwest region found a high prevalence of sleep abnormalities linked to academic stress, though regional differences exist, making the study of Northwest University students uniquely valuable.

CHAPTER THREE: METHODOLOGY

3.1 Study Area

The study will be conducted at Northwest University (Yusuf Maitama Sule University), Kano State, Nigeria. The university comprises various faculties, including Basic Medical Sciences, Science, Humanities, and Education, providing a diverse student population suitable for this physiological and epidemiological study.

3.2 Study Design

A descriptive, cross-sectional, institution-based study design will be employed. This design is appropriate for assessing the prevalence of sleep quality issues and simultaneously observing the academic performance within a specific timeframe without manipulating the study environment.

3.3 Study Population

The target population will consist of registered undergraduate students of Northwest University across different faculties and levels of study (100 Level to 500 Level), actively enrolled during the 2026/2027 academic session.

3.4 Sample Size Determination

The sample size will be determined using the Cochran's formula for cross-sectional studies:

$$\mathbf{n = (Z^2pq) / d^2}$$

Where:

- **n** = desired sample size
- **Z** = standard normal deviate (1.96 at 95% confidence level)
- **p** = estimated prevalence of poor sleep quality among Nigerian students (estimated at 50% or 0.5 for maximum variability). Using 0.5 for calculation.
- **q** = 1 - p (0.5)
- **d** = degree of accuracy desired (0.05)

$n = (1.96^2 \times 0.5 \times 0.5) / 0.05^2 = 384$.

To account for a 10% non-response or improperly filled questionnaires, the final sample size will be adjusted to approximately **422 students**.

3.5 Sampling Technique

A multi-stage stratified random sampling technique will be utilized. In the first stage, students will be stratified by faculties. In the second stage, they will be stratified by academic level. Finally, simple random sampling will be used to select the calculated proportionate number of students from each stratum.

3.6 Inclusion and Exclusion Criteria

Inclusion Criteria: Consenting, registered undergraduate students of Northwest University who have completed at least one academic session (to have a verifiable CGPA).

Exclusion Criteria: First-year (100L) students without a current CGPA, students with medically diagnosed psychiatric or primary sleep disorders (e.g., narcolepsy, sleep apnea), and students currently taking sedative or hypnotic medications, as these physiological variables will confound the results.

3.7 Instruments for Data Collection

Data will be collected using a structured, self-administered questionnaire divided into three sections:

- **Section A: Socio-demographic Characteristics:** Age, gender, faculty, level of study, and residential status (on-campus vs. off-campus).
- **Section B: Pittsburgh Sleep Quality Index (PSQI):** A validated and widely used physiological and psychological tool designed to measure sleep quality and disturbances over a one-month time interval. The PSQI assesses seven components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. A global PSQI score > 5 indicates poor sleep quality.
- **Section C: Academic Performance:** Self-reported Cumulative Grade Point Average (CGPA) of the most recent academic session. Where possible and with consent, this will be cross-referenced with faculty records for accuracy.

3.8 Ethical Considerations

Ethical approval will be obtained from the Research Ethics Committee of the Faculty of Basic Medical Sciences, Northwest University. Informed consent will be obtained from all participants prior to data collection. Participation will be strictly voluntary, and confidentiality of the students' academic records and personal data will be maintained by ensuring all questionnaires are anonymous.

3.9 Data Analysis

Data will be collated, coded, and analyzed using the Statistical Package for the Social Sciences (SPSS) version 28.0. Descriptive statistics (frequencies, percentages, means, and standard deviations) will be used to summarize socio-demographic data and PSQI scores. Inferential statistics, specifically the Pearson product-moment correlation coefficient, will be used to determine the relationship between global PSQI scores and CGPA. An independent samples t-test will be used to compare sleep quality between genders. A p-value of < 0.05 will be considered statistically significant.

CHAPTER FOUR: WORK PLAN AND BUDGET

4.1 Proposed Work Plan

Activity	Estimated Duration
Proposal Writing and Defense	4 Weeks
Ethical Clearance and Questionnaire Printing	3 Weeks
Data Collection / Fieldwork	4 Weeks
Data Entry and Statistical Analysis	3 Weeks
Report Writing and Formatting	4 Weeks
Final Submission and Project Defense	2 Weeks

4.2 Estimated Budget

Item / Description	Estimated Cost (NGN)

Internet Data and Literature Search	15,000
Printing of Questionnaires (500 copies)	25,000
Transportation (Fieldwork within campus)	10,000
Data Analysis (Software/Consultation)	20,000
Final Project Printing and Binding	25,000
Miscellaneous / Contingency	15,000
TOTAL	**110,000**

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