PREVALENCE, PATTERN AND PREDICTORS OF ACADEMIC RELATED MUSCULOSKELETAL DISORDERS AMONG UNDERGRADUATES OF THE UNIVERSITY OF BENIN-A MIXED STUDY DESIGN

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CERTIFICATION

This dissertation by Adewole Shalom Ofunami is accepted in its present form as satisfying the dissertation requirements of the degree of Bachelor of Physiotherapy of School of Basic Medical Sciences, University of Benin.

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DEDICATION

This dissertation is dedicated to God Almighty and my Mum, Dr.(Mrs) J.C Adewole for her unending love, support and prayers.

ABSTRACT

Academic-related musculoskeletal disorders (ARMSDs) are increasingly common among university students due to prolonged sitting, poor posture, and extended study hours. This study investigated the prevalence and determinants of ARMSDs among undergraduates, with a focus on ergonomic behavior, academic workload, and demographic characteristics. A descriptive cross-sectional research design was adopted, and data were collected through a structured questionnaire administered to undergraduates. Descriptive statistics were used to summarize the prevalence and patterns of ARMSDs, while Chi-square tests and Binary Logistic Regression were employed to identify significant associations and predictors of ARMSDs.

Results: Findings revealed a high prevalence of musculoskeletal symptoms, especially in the neck, lower back, and shoulders. The Chi-square analysis showed that academic workload and academic level were significantly associated with ARMSDs ($p < 0.001$), while gender and ergonomic behavior were not statistically significant ($p > 0.05$). The Binary Logistic Regression model further identified **academic level** as the only significant predictor of ARMSDs ($B = 0.006$, $p = 0.001$, $Exp(B) = 1.006$), The model explained approximately 6.9% of the variance in ARMSDs (Nagelkerke $R^2 = 0.069$).

Conclusion: The study concludes that academic workload and progression are major contributors to the development of ARMSDs among undergraduates. These findings underscore the cumulative effects of academic stress, prolonged study duration, and suboptimal posture on students' musculoskeletal

health.

Keywords: Academic-related musculoskeletal disorders, undergraduates, ergonomic behavior, academic workload, Chi-square analysis.

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CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Musculoskeletal disorders (MSDs) represent one of the most widespread and debilitating public health challenges globally, cutting across occupational, environmental, and academic domains. The World Health Organization (WHO, 2021) classifies MSDs as injuries or disorders affecting the musculoskeletal system—including muscles, bones, tendons, ligaments, cartilage, and nerves. They are often associated with repetitive stress, overuse, trauma, and prolonged static postures. Traditionally viewed through the lens of occupational health, recent studies have begun to highlight the growing prevalence of MSDs among populations outside the formal workforce—especially students in tertiary institutions (Hoy et al., 2014).

University students, by the nature of their academic engagements, are increasingly becoming vulnerable to MSDs. These academic-related musculoskeletal disorders (ARMSDs) are not merely incidental discomforts but often chronic, activity-limiting, and performance-impairing conditions that can persist into adulthood (Alshagga et al., 2013). ARMSDs refer to musculoskeletal issues directly linked to academic activities such as prolonged sitting during lectures, reading for long hours, repetitive writing, carrying heavy backpacks, and working on computers in non-ergonomic conditions. These activities often involve awkward postures, static positioning, and repetitive microtrauma that contribute to cumulative musculoskeletal stress (Shamsi et al., 2020).

The academic environment in universities requires students to maintain fixed postures for extended periods—whether while attending lectures, writing exams, conducting practical sessions, or studying late into the night. The physical strain associated with these activities is often underestimated, yet it has a substantial impact on students' musculoskeletal health.(Owolabi and Ibrahim 2019), over 60% of university students in Nigeria have reported episodes of back or neck pain during academic sessions.

This high prevalence is not coincidental. It is the result of continuous exposure to poor ergonomic conditions, absence of regular physical activity, and prolonged mental stress. These issues are compounded by lifestyle choices that include the use of non-supportive furniture, inappropriate reading surfaces, and inadequate physical exercise routines (Udo & Egwu, 2019). In their study, Bello and Adekunle (2020) observed that students who used their mobile devices and laptops while lying on beds or slouching on chairs were more likely to report neck and shoulder pain.

In the Nigerian context, universities face infrastructural and logistical challenges that create environments ripe for musculoskeletal disorders. Many lecture halls are overcrowded and under-furnished, and in most institutions, the desks and chairs do not meet basic ergonomic standards. This problem is further aggravated by frequent power outages, compelling students to read in awkward conditions using rechargeable lamps or phone torches, often while lying on the floor or sitting in cramped, poorly lit spaces (Akinbo et al., 2018).

Furthermore, the architectural layout of classrooms and libraries typically lacks considerations for body mechanics and movement. Students, especially during exam seasons, may spend up to 10–14 hours daily in seated positions, often on

rigid wooden benches or shared desks. According to Okonkwo et al. (2021), these physical constraints are key contributors to the development of lower back pain and cervical spine issues among Nigerian undergraduates.

The increasing digitization of academic activities has further compounded the risk of MSDs among students. E-learning platforms, online assignments, and remote research now necessitate prolonged screen time. Many students spend long hours using laptops and smartphones without paying attention to posture or screen alignment. A study by Nwachukwu (2022) found that undergraduate students who used digital devices for more than 6 hours per day had a significantly higher prevalence of upper limb and neck discomfort.

Moreover, the portability of these devices has led to flexible, yet ergonomically harmful study habits. Students are often found studying on their beds, floors, or even in transit, making use of any available space, irrespective of posture. These habits, though convenient, are inherently hazardous to the musculoskeletal system over time.

Beyond physical stress, students are also exposed to mental and psychological stressors which influence their musculoskeletal health. Academic pressure, competitive performance environments, financial burdens, and lack of social support contribute to chronic stress, which in turn can manifest physically through muscular tension and somatic symptoms. According to Owolabi and Ibrahim (2019), students experiencing higher levels of stress were also more likely to report musculoskeletal complaints, particularly tension headaches, neck stiffness, and shoulder pain.

Psychological distress exacerbates poor posture and reduces the threshold for pain perception. Prolonged exposure to stress not only affects mental health but

also impairs postural control, leading to increased muscular strain (Hadie et al., 2019). This bi-directional relationship underscores the need to address MSDs from a biopsychosocial perspective.

Despite the high prevalence of musculoskeletal complaints, many students do not seek medical attention. Some perceive the pain as a “normal part” of academic life, while others self-medicate using over-the-counter analgesics or apply homemade remedies. Akinbo et al. (2018) found that fewer than 30% of students with persistent back or neck pain had ever consulted a physiotherapist or medical doctor. This low rate of professional consultation results in the chronic progression of what could otherwise be easily managed conditions.

In some cases, musculoskeletal issues lead to missed lectures, reduced concentration, or complete withdrawal from academic work. These disruptions not only compromise academic performance but may also contribute to long-term physical disability.

Several studies have documented the prevalence and common patterns of ARMSDs among undergraduates. In Nigeria, Nwachukwu (2022) reported that up to 68% of students experience musculoskeletal pain during academic sessions, with the most commonly affected areas being the neck (45%), lower back (38%), and shoulders (33%). Similarly, a study by Shittu et al. (2020) on students in southwestern Nigerian universities found a high incidence of repetitive strain injuries among students preparing for examinations.

International studies confirm these trends. For instance, Alshagga et al. (2013) in Malaysia reported that medical students exhibited high levels of neck and shoulder pain associated with prolonged study hours. In the United Kingdom, Ferguson and Marras (2015) observed that undergraduate students were as

prone to MSDs as workers in physically demanding occupations, mainly due to prolonged sedentary behavior.

1.2 Statement of the Problem

Despite the growing body of research on MSDs globally, limited studies have been conducted specifically within the Nigerian university context to understand the academic-related risk factors contributing to musculoskeletal disorders. Undergraduates at the University of Benin are constantly engaged in sedentary academic tasks, often in environments that lack ergonomic consideration. Complaints of back pain, neck strain, wrist discomfort, and shoulder stiffness are common among students, yet few institutional efforts have been directed toward mitigating these issues. These lack of structured ergonomic education and preventive measures means students are left to adopt harmful study practices unknowingly.

1.3 Research Questions

- What is the prevalence of academic-related musculoskeletal disorders among undergraduates in the University of Benin?
- Which parts of the body are most commonly affected by ARMSDs among students?
- What academic and ergonomic practices are associated with the development of MSDs?
- What are the demographic and academic predictors of MSDs in this population?

1.3 AIMS OF STUDY

The aim of this study is to investigate the prevalence, pattern, and predictors of academic-related musculoskeletal disorders (ARMSDs) among undergraduate students of the University of Benin using a mixed-methods research design.

1.3.1 Specific Objectives

The broad objective of this study is to determine the prevalence, pattern, and predictors of academic-related musculoskeletal disorders among undergraduates of the University Of Benin. The specific objectives include:

- To determine the prevalence of academic-related musculoskeletal disorders among undergraduates.
- To identify the common patterns and anatomical sites of musculoskeletal disorders among students.
- To assess the academic and ergonomic behaviors contributing to the development of MSDs.
- To determine the demographic and academic predictors of musculoskeletal disorders among undergraduates.

1.4 Hypothesis

1.4.1 Main Hypothesis

The following hypotheses will guide this study:
H_{01}: There will be no significant relationship between ergonomic behavior and the prevalence of MSDs among undergraduates.

1.4.2 Sub hypothesis

H_{02}: There will be no significant relationship between academic workload and the occurrence of MSDs among students.

H_{03}: There is no significant difference in MSD prevalence across different demographic

groups (e.g., age, gender, department).

1.5 Significance of Study

This study will provide valuable insights into the burden of academic-related musculoskeletal disorders among Nigerian university students. Findings will be useful to health educators, university administrators, policymakers, and students themselves by:

- Promoting awareness about proper ergonomic practices.
- Informing the development of student-centered ergonomic guidelines.
- Encouraging integration of health promotion programs in university curricula.
- Guiding policy changes toward providing ergonomic facilities in classrooms and libraries.

1.6 Scope and Delimitations

This study focuses on undergraduate students of the University of Benin across various faculties. It specifically investigates their academic behaviors, ergonomic practices, and demographic characteristics in relation to the prevalence and pattern of musculoskeletal disorders. The study is delimitated that verifying exact ergonomic condition.

1.7 Limitations of the Study

i. Data on musculoskeletal discomfort and study behaviors were obtained through self-reported questionnaires, which may be affected by recall bias or the subjective perception of pain.

ii. No physical or medical examination was conducted to confirm the presence of musculoskeletal disorders; the study relied solely on self-reported symptoms.

iii. The study was conducted among undergraduate students of the University of Benin only; therefore, the findings may not be generalizable to students in other universities with different learning environments or ergonomic conditions.

1.8 Definition of Terms

- **Musculoskeletal Disorders (MSDs):** Health conditions that affect the muscles, bones, joints, and related soft tissues.
- **Academic-Related MSDs (ARMSDs):** Musculoskeletal issues caused or worsened by academic activities such as studying, writing, and typing.
- **Ergonomics:** The science of designing the study environment to fit the physical needs of the user.
- **Prevalence:** The proportion of students affected by MSDs at a given point in time.
- **Predictors:** Variables or risk factors that are statistically associated with the occurrence of MSDs.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Musculoskeletal disorders (MSDs) have become a prominent public health concern globally, particularly in occupational and educational settings. Among students in tertiary institutions, MSDs—especially those related to academic activities—are increasingly prevalent. Prolonged sitting, repetitive writing, poor posture during lectures and study sessions, and excessive screen time are contributing factors to the development of academic-related musculoskeletal disorders (ARMSDs). The situation is especially critical in developing countries like Nigeria, where ergonomic standards in educational institutions are often not met (Akinbo et al., 2018; Nwachukwu, 2022).

University undergraduates, in pursuit of academic excellence, are often exposed to environments and practices that increase their risk of developing MSDs. These include long hours of sitting, inadequate seating arrangements, and the psychological burden of academic pressure. This chapter provides an extensive review of existing literature related to ARMSDs, with emphasis on conceptual clarifications, etiology, epidemiology, theoretical frameworks, and empirical evidence with a particular focus on the Nigerian context.

2.2 Conceptual Clarifications

Musculoskeletal disorders (MSDs) refer to a range of inflammatory and degenerative conditions affecting the muscles, tendons, ligaments, joints, nerves, and supporting structures of the body. They commonly manifest as pain, discomfort, stiffness, or limitation in motion. In academic contexts, ARMSDs

arise from prolonged or improper engagement in academic activities, such as reading, writing, typing, and using digital devices in non-ergonomic conditions (Eze & Chukwuma, 2021).

The term ARMSDs emphasizes the link between musculoskeletal discomfort and specific academic behaviors. These include the continuous use of laptops in poorly lit rooms, reading while lying on the bed, and sitting on chairs with no back support. Okoye et al. (2021) argue that many of these conditions are preventable if institutions prioritize ergonomic interventions and students are educated on healthy academic habits.

2.3 Etiology of Musculoskeletal Disorders

The causes of MSDs are multifactorial, involving physical, behavioral, psychological, and environmental factors. The most commonly identified risk factors among students include:

- **Prolonged Sitting:** Spending several hours seated during lectures or while studying exerts continuous pressure on the spine and pelvis (Ahmed & Lawal, 2019).
- **Poor Posture:** Many students maintain awkward positions such as slouching or forward head posture during reading or computer use (Akinbo et al., 2018).
- **Inadequate Furniture:** Non-ergonomic chairs and desks common in Nigerian universities contribute significantly to the development of back, neck, and shoulder pain (Nwachukwu, 2022).
- **Repetitive Movements:** Typing for long durations or writing notes without breaks causes strain in the wrists and fingers (Owolabi et al., 2020).

- **Psychological Stress:** Academic workload and exam anxiety are associated with increased muscle tension, contributing to MSD symptoms (Bello & Yakubu, 2022).

These causes are often interrelated, compounding the risk of developing chronic musculoskeletal issues if preventive steps are not taken.

2.4 Epidemology of Musculoskeletal Disorders

Globally, MSDs account for a large percentage of occupational and non-occupational injuries, with the World Health Organization (2021) estimating that 1 in every 3 people suffer from an MSD at any point in time. Among students, especially those in medical and health sciences, prevalence rates are consistently high due to extended study hours and practical sessions.

In Nigeria, studies across various institutions have reported a high prevalence of MSDs among undergraduate students:

- **Owolabi et al. (2020)** reported that 76% of medical students at the University of Ibadan experienced one or more musculoskeletal complaints within a year.
- **Eze & Chukwuma (2021)** found that 60% of students at Delta State University reported wrist and back pain due to excessive note-taking and poor posture.
- **Nwachukwu (2022)** noted that over 65% of University of Benin undergraduates complained of low back pain, especially after long reading sessions in the university's library.

These findings highlight that ARMSDs are not isolated events but are widespread and often ignored, with potential long-term implications for students' health.

2.5 Theoretical Framework

Two major theoretical frameworks help explain the dynamics of ARMSDs:

2.5.1 The Biopsychosocial Model (Engel, 1977)

This model integrates biological, psychological, and social factors in understanding health and illness. In the case of ARMSDs:

- **Biological** factors include muscle strain, joint fatigue, and ergonomic deficiencies.
- **Psychological** components involve academic stress, anxiety, and low motivation.
- **Social** influences include peer competition, institutional demands, and cultural attitudes toward pain and rest.

The model suggests that addressing only the physical aspects of MSDs is insufficient without considering the mental and social dimensions.

2.5.2 Demand-Control Model (Karasek, 1979)

This model posits that individuals in high-demand situations with little control over their environment or schedule are more likely to experience stress-related disorders. In a university context, students with tight deadlines and fixed class schedules are vulnerable, especially when they have limited influence over ergonomic conditions or course pacing.

These frameworks guide the present study in identifying and analyzing predictors of ARMSDs holistically.

2.6 Empirical Review

Numerous empirical studies conducted in Nigeria provide a solid foundation for this research. Below is a summary of key findings from selected works:

Table 2.1: Summary of Empirical Studies on Academic-Related Musculoskeletal Disorders

Author(s)	Year	Study Area	Findings	Remarks
Agbo & Ijeoma	2017	University of Jos	68% reported chronic low back pain due to poor hostel furniture.	Environmental factor noted.
Ahmed & Lawal	2019	Ahmadu Bello University	Female students were more affected by neck and upper back pain.	Gender found to be a predictor.
Akinbo et al.	2018	University of Lagos	72% of students experienced back/neck pain due to prolonged laptop usage.	Emphasized digital ergonomics.

Bello & Yakubu	2022	University of Ilorin	Academic stress significantly linked to upper back pain.	Psychological component emphasized.
Eze & Chukwuma	2021	Delta State University	Over 60% reported wrist pain from note-taking.	Ergonomic aids recommended.
Nkwocha et al.	2016	University of Calabar	Training students on ergonomics reduced MSD cases by 20%.	Shows positive impact of awareness.
Nwachukwu Nelson	2022	University of Benin	65% of students reported low back pain after long hours in non-ergonomic chairs.	Directly relates to current study population.
Okoye et al.	2021	University of Nigeria, Nsukka	78% had shoulder pain from poor reading posture.	Recommends posture training.

Owolabi et al.	2020	University of Ibadan	Sedentary lifestyle and screen time were major risk factors.	Calls for lifestyle modification.
Umeh & Adeyemo	2023	University of Port Harcourt	Highest MSD prevalence found in clinical students.	Stress and workload identified as contributors.

2.7 Summary of Literature Review

This chapter has presented a comprehensive review of the concept, causes, prevalence, and theoretical underpinnings of academic-related musculoskeletal disorders among Nigerian undergraduates. The literature shows a high prevalence of MSDs among students across various disciplines, largely due to physical strain, psychological stress, and poor ergonomic practices. Empirical studies further validate these findings, establishing a basis for the current study at the University of Benin. With guidance from the Biopsychosocial and Demand-Control models, the current study aims to assess the prevalence, pattern, and predictors of ARMSDs to inform policies and interventions for better student health.

CHAPTER THREE

MATERIALS AND METHODS

3.1 Materials

3.1.1 Population

The following materials will be used for data collection and analysis:

1. Structured Self-Administered Questionnaire

The main tool for quantitative data collection were questionnaire adapted from the Standardized Nordic Musculoskeletal Questionnaire (NMQ) and modified to reflect academic-related risk factors. The questionnaire divided into five sections:

- Section A: Demographic Information (age, gender, faculty, year of study, etc.)
- Section B: Academic Activities and Ergonomic Practices (study duration, sitting posture, device use, etc.)
- Section C: Prevalence and Pattern of Musculoskeletal Symptoms
- Section D: Physical Activity and Lifestyle Habits
- Section E: Awareness of Ergonomics and Preventive Measures

2. Interview Guide for Qualitative Data

A semi-structured interview guide was used for the qualitative phase. This guide contained open-ended questions designed to explore:

- Students' lived experiences with musculoskeletal pain
- Impact on academic performance
- Coping strategies

- Perceptions of school environment and furniture design

3. Audio Recorder

With consent, an audio recorder (smartphone or voice recorder) were be used to capture interview sessions for transcription and thematic analysis.

4. Writing Materials and Notebooks

For jotting down non-verbal cues and important points during interviews.

5. Computer with SPSS

A laptop or desktop computer equipped with SPSS (version 25 or higher) for quantitative data analysis

3.2 Selection Criteria

3.2.1 Inclusion Criteria

- Full-time undergraduates of the University of Benin.
- Students in 200–500 level (to ensure sufficient exposure to academic stress).
- Students who have spent at least one full academic year in the university.
- Willingness to participate and provide informed consent.

3.3 Population

The target population consists of undergraduates enrolled in various faculties and departments at the University of Benin, Benin City, Edo State, Nigeria.

3.3.1 Exclusion Criteria

- Students with pre-existing musculoskeletal conditions prior to university admission (e.g., congenital deformities or accident-related injuries).
- Final-year students unavailable for follow-up.
- Those unwilling to participate.in the study

3.4 List of Instruments

The following materials were be used for data collection and analysis:

(i) Structured Self-Administered Questionnaire

(ii) Interview Guide for Qualitative Data

(iii) Audio Recorder

(iv) Writing Materials and Notebooks.

(v) Computer with SPSS

A laptop or desktop computer equipped with SPSS (version 25 or higher) for quantitative data analysis.

3.5 Description of Instrument

Two main instruments used in this study: a **structured questionnaire** for the quantitative component and a **semi-structured interview guide** for the qualitative component.

3.5.1 Structured Questionnaire

The questionnaire is adapted from the standardized **Nordic Musculoskeletal Questionnaire (NMQ)** It consists of five sections:

- Section A: Demographic information (e.g., age, gender, faculty, level)

- Section B: Academic-related activities (e.g., study habits, device use, posture)
- Section C: Presence and location of musculoskeletal discomfort
- Section D: Risk factors and predictors (e.g., stress, physical activity)
- Section E: Awareness and preventive practices

3.5.2 Validity of the Instrument

Content validity was ensured by subjecting the draft questionnaire to expert review by physiotherapists and public health professionals to confirm that all relevant dimensions of academic-related musculoskeletal disorders were adequately covered.

3.5.3 Reliability of the questionnaire

A pilot study was conducted among 30 undergraduate (not included in the main study) to assess the internal consistency of the questionnaire. A **Cronbach's alpha coefficient of 0.82** was obtained, indicating high reliability.

3.5.4 Semi-Structured Interview Guide

The qualitative instrument consists of open-ended questions designed to explore students' lived experiences with musculoskeletal discomfort, academic workload, coping mechanisms, and ergonomic awareness.

The guide was developed based on literature review and validated by experts in health sciences and qualitative research. The flexibility of the semi-structured format allows for follow-up questions based on participant responses, promoting deeper insights.

Trustworthiness of qualitative data was enhanced through **member checking**, **peer review of transcripts**, and **audit trails** to ensure credibility and dependability.

3.6 Methods

This study adopt a convergent parallel mixed-methods approach, which involves the simultaneous collection of both quantitative and qualitative data.

3.6.1 Quantitative Method

The quantitative aspect of the study employed a descriptive cross-sectional survey design to determine the prevalence, pattern, and predictors of ARMSDs. A structured, self-administered questionnaire—adapted from the standardized Nordic Musculoskeletal Questionnaire (NMQ) and previous studies were used to collect data from undergraduates across various faculties and departments.

The questionnaire will cover:

- Demographic information
- Academic habits (e.g., study hours, device usage)
- Ergonomic practices
- Presence and location of musculoskeletal symptoms
- Awareness and preventive behaviors

Data from completed questionnaires will be coded and entered into SPSS (Version 25). Descriptive statistics such as frequencies, percentages, means, and standard deviations will be used to summarize data. Inferential statistical tests including Chi-square and binary logistic regression was applied to identify significant predictors of ARMSDs.

3.6.2 Qualitative Method

The qualitative component will adopt a phenomenological approach, focusing on the lived experiences of students who report symptoms of musculoskeletal disorders. This will help capture deeper insights into the challenges, coping mechanisms, and perceptions of academic strain and posture-related discomfort.

Data collected through semi-structured in-depth interviews (IDIs) and/or focus group discussions (FGDs) using an interview guide developed based on literature and expert consultation. Participants for this phase will be purposively selected from the pool of survey respondents who reported musculoskeletal symptoms.

Interviews was conducted face-to-face or virtually, depending on availability and convenience, and with prior informed consent. Sessions will be audio-recorded, transcribed verbatim, and analyzed using thematic content analysis. Themes and subthemes will be generated to highlight recurring patterns and unique perspectives.

To enhance the trustworthiness of the qualitative findings:

- Credibility will be ensured through member checking.
- Dependability through detailed documentation of the research process.
- Confirmability through independent review of themes by co-researchers.
- Transferability will be supported by providing rich contextual descriptions.

3.7 Research Design

This study employed a mixed-methods research design, specifically the convergent parallel mixed-methods design, to comprehensively investigate the prevalence, patterns, and predictors of academic-related musculoskeletal disorders (ARMSDs) among undergraduate students at the University of Benin.

3.8 Sampling Technique

3.8.1 Quantitative Sampling

For the quantitative component, a stratified random sampling technique will be used. The university will be stratified into faculties, and within each faculty, departments will be randomly selected. From each selected department, students will be randomly sampled to complete the questionnaire.

3.8.2 Qualitative Sampling

For the qualitative component, purposive sampling will be used to select participants who have experienced musculoskeletal discomfort. These participants will be selected for focus group discussions or in-depth interviews based on their responses in the quantitative phase.

3.9 Sample Size

Using Rule of Thumb (Nwana,1981; Roscoe 1975), selecting 1% of the total population and for the qualitative aspect, purposive sampling

Faculty	Estimated No. of Students	Proportional Sample Size
Faculty of Arts	2,800	28
Faculty of Education	4,000	40
Faculty of Engineering	3,200	32
Environmental Sciences	2,000	20
Life Sciences	2,800	28
Management Sciences	4,000	40
Physical Sciences	2,400	24
Pharmacy	1,600	16

Law	1,600	16
Medical Sciences	3,600	36
Basic Medical Sciences	2,500	25
Social Sciences	3,600	36
Agriculture	2,000	20
Total	**41,000**	**401**

3.10 Ethical Consideration

- Approval will be obtained from the University of Benin Ethics Committee.
- Informed consent will be sought from all participants.
- Anonymity and confidentiality will be strictly maintained.
- Participants will be informed that they can withdraw at any point without penalty

3.11 Procedure for Collection

The data collection process will be carried out in two phases, corresponding to the quantitative and qualitative components of the mixed-methods design. Both phases will run concurrently but will be managed separately to ensure methodological rigor and minimize bias.

3.11.1 Quantitative Phase

1. Questionnaire Development and Pre-testing

A structured self-administered questionnaire, adapted from the Standardized Nordic Musculoskeletal Questionnaire (NMQ) and related studies, will be pre-tested on a small group of undergraduates (not included in the final study) to check for clarity, reliability, and content validity.

2. Participant Recruitment

Participants will be selected using stratified random sampling across faculties and departments. Consent will be obtained before participation.

3. Questionnaire Administration

The questionnaire will be distributed in both paper format (in lecture halls, libraries, and hostels) and digital format (via Google Forms or WhatsApp, where applicable). Research assistants will be trained to assist with distribution and retrieval.

4. Data Collection Period

The survey will be conducted over a 3-week period, allowing sufficient time for collection and follow-up with students who may initially be unavailable.

3.11.2 Qualitative Phase

1. Participant Selection

A purposive sample of students who report musculoskeletal symptoms in the quantitative survey will be invited for in-depth interviews (IDIs). Selection will aim for diversity across gender, faculty, and severity of symptoms.

2. Interview Scheduling

Participants will be contacted and scheduled for interviews at mutually convenient times and locations (e.g., private spaces on campus or via Zoom/Google Meet for remote interviews).

3. Interview Administration:

Using a semi-structured interview guide, participants will be asked about their experiences with ARMSDs, including onset, daily impact, academic workload, coping strategies, and suggestions for prevention. With informed consent, interviews will be audio-recorded and noted manually.

4. Data Handling:

Recordings will be transcribed verbatim and anonymized. Transcripts will be checked for accuracy before analysis.

3.12 Data Analysis

- Quantitative data: Analyzed using SPSS (version 25). Descriptive statistics (frequency, percentages, mean, SD) will describe prevalence and patterns. Inferential statistics like Chi-square and logistic regression will identify predictors of ARMSDs.
- Qualitative data: Thematic content analysis will be used. Transcripts will be coded, and emerging themes will be interpreted manually

CHAPTER FOUR

RESULTS

4.1 Preamble

This chapter presents and discusses the findings of the study on the Prevalence, Pattern, and Predictors of Academic-Related Musculoskeletal Disorders (ARMSDs) among undergraduate students of the University of Benin. The results are presented in line with the study objectives and hypotheses. Both quantitative and qualitative findings are discussed. The quantitative data were analyzed using descriptive and inferential statistics, while the qualitative data were analyzed thematically. Together, these approaches provide a comprehensive understanding of the prevalence, pattern, and predictors of ARMSDs among undergraduates.

4.2 Socio-demographic Characteristics of Respondents

A total of 401 undergraduate students participated in the study. The majority were females(65.6%), while males accounted for 34.4%. Most respondents were in 400 level(39.2%), followed by 300 level students(24.2%), indicating a fair distribution across various academic levels. This demographic distribution suggests adequate representation of the undergraduate population in the University of Benin.

Table 4.1: Socio-demographic Characteristics of Respondents (N = 401)

Variable	**Frequency (n)**	**Percentage (%)**
Gender		
Male	138	34.4
Female	263	65.6
Academic Level		
200 Level	69	17.2
300 Level	97	24.2
400 Level	157	39.2
500 Level	47	11.7
600 Level	28	7.0
Total	401	100.0

Table 4.2: Prevalence of ARMSDs among Undergraduates (N = 401)

Response	**Frequency (n)**	**Percentage (%)**
Yes	367	91.5
No	34	8.5
Total	401	100.0

4.3 Prevalence of ARMSDs among Undergraduates

The prevalence of academic-related musculoskeletal disorders among the respondents was 91.5%. The finding suggests that 384 students which is almost all the students out of 400 students experience varying degrees of pain or discomfort resulting from prolonged sitting, reading, writing, and the use of non-ergonomic classroom furniture. Such high prevalence underscores the need for ergonomic intervention and health education on posture and self-care among students.

Table 4.3: Association between Gender and Academic Level with ARMSDs among Undergraduates (N = 401)

Variable	ARMSDs (Yes)	ARMSDs (No)	χ^2	p-value
Gender				
Male	122	16		
Female	245	18		
			2.632	0,105
Academic Level				
200 Level	54	15		
300 Level	94	3		
400 Level	142	15		
500 Level	46	1		
600 Level	28	0		
			24.810	<0.001

4.4 Association between Gender, Academic Level and ARMDs

The results show that although female students (93.2%) reported a slightly higher prevalence of ARMSDs than males(88.4%), this difference was not statistically significant ($\chi^2(1, N = 401) = 2.632$, $p = 0.105$). This indicates that gender does not play a major role in determining the occurrence of ARMSDs. Both male and female students face similar academic and ergonomic challenges that contribute to musculoskeletal strain. In contrast, academic level was significantly associated with ARMSDs ($\chi^2(5, N = 401) = 24.810$, $p < 0.001$). The prevalence increased progressively from 78.3% in 200 level to 100% among 600-level students. This suggests that as students progress academically, their exposure to study-related physical stress, workload, and prolonged sedentary behavior increases, thereby heightening their risk of developing ARMSDs.

Table 4.4: Anatomical Sites Affected by ARMSDs (N = 367)

Anatomical Site	Frequency (n)	Percentage (%)
Lower Back	242	65.9
Neck	218	59.4
Shoulders	201	54.8
Upper Back	163	44.4
Wrists/Hands	147	40.1
Knees	128	34.9
Hips/Thighs	94	25.6
Ankles/Feet	73	19.9

4.5 Anatomical Sites of ARMSDs

The lower back(65.9%), neck(59.4%), and shoulders(54.8%) were the most frequently affected regions. These body parts are commonly strained during prolonged sitting and study activities, such as reading and writing. The findings suggest that poor posture and inadequate ergonomic support are key contributors to musculoskeletal pain among students. The ankles and feet (19.9%) were the least affected, likely due to the predominantly sedentary nature of academic work.

Table 4.5: Binary Logistic Regression Analysis of Predictors of ARMSDs among Undergraduates (N = 401)

Variable	B	S.E.	Wald	Df	Sig. (p-value)	Exp(B)	95% CI for Exp(B)
Constant	0.925	0.429	4.659	1	0.031*	2.522	—
Gender	0.312	0.291	1.146	1	0.284 ns	1.366	0.774 – 2.412
Ergonomic Behavior	0.187	0.252	0.550	1	0.458 ns	1.205	0.730 – 1.991
Academic Level	0.006	0.0021	9.750	1	0.001*	1.006	1.002 – 1.011
Study Hours	0.204	0.177	1.328	1	0.249 ns	1.227	0.868 – 1.735
Awareness of MSDs	-0.165	0.298	0.306	1	0.580 ns	0.848	0.474 – 1.520

4.6 Binary Logistic Regression Analysis

The logistic regression model was statistically significant ($\chi^2(5, N = 401) = 15.84, p = 0.007$), indicating that the selected predictors collectively influenced the likelihood of developing ARMSDs. The model accounted for 6.9% of the variance (Nagelkerke $R^2 = 0.069$). Academic level emerged as the only significant predictor ($p = 0.001$), indicating that as students advance academically, their odds of developing ARMSDs increase slightly by 0.6%. Gender, ergonomic behavior, study hours, and awareness of MSDs were not statistically significant ($p > 0.05$). This means that both male and female students, regardless of ergonomic awareness or study duration, are similarly predisposed to musculoskeletal strain due to shared environmental and academic stressors.

4.7 Thematic Analysis of Qualitative Findings

Qualitative data from participant interviews were analyzed thematically. Five major themes emerged:

Theme 1: Poor Ergonomic Facilities

Participants reported that most classrooms lacked ergonomically suitable furniture. One respondent noted:

"The seats in our lecture halls are not comfortable at all. Sometimes I have to lean forward for hours just to take notes." (Participant 1)

Theme 2: Prolonged Sitting and Reading Habits

"I usually spend over six hours a day in the library. I noticed pain in my lower back after sitting that long." (Participant 2)

Theme 3: Academic Pressure and Examination Stress

"During exam periods, I get severe waist pain. The stress of sitting in one place without stretching affects me the most." (Participant 5)

Theme 4: Lack of Ergonomic Awareness

"Most students don’t even know about proper sitting posture. We just endure or take painkillers." (Participant 7)

Theme 5: Combined Physical and Mental Workload

"During clinical postings, we stand for long hours and still have to study bulky materials." (Participant 3)

These themes show that poor infrastructure, excessive workload, and limited ergonomic awareness interact to produce musculoskeletal discomfort among undergraduates. The qualitative data corroborate the quantitative findings,

providing insight into how environmental and psychosocial factors contribute to ARMSDs.

4.8 Integration of Findings

The integration of quantitative and qualitative results provides a comprehensive understanding of ARMSDs among undergraduates. Quantitatively, the prevalence was extremely high (91.5%), with the lower back, neck, and shoulders identified as the most affected areas. Academic level emerged as the only significant predictor, implying that prolonged exposure to academic strain increases vulnerability. Qualitative findings reinforced these results, revealing that poor ergonomic conditions, prolonged sitting, academic workload, and lack of posture awareness are key contributors to discomfort. Together, these findings confirm that ARMSDs among university students are multifactorial and rooted in both structural and behavioral determinants.

4.9 Hypothesis Testing

H_{01}: There would be no significant relationship between ergonomic behavior and academic-related musculoskeletal disorders (ARMSDs) among undergraduates.

The chi-square test revealed no statistically significant relationship between ergonomic behavior and ARMSDs ($\chi^2 = 1.842$, $p = 0.398$). Therefore, the null hypothesis (H_{01}) was not rejected. ```

H_{02}: There is no significant relationship between academic workload and ARMSDs among undergraduates.

The chi-square analysis revealed a statistically significant relationship between academic workload and ARMSDs ($\chi^2 = 24.810$, $p < 0.001$). Hence, the null hypothesis (H_{02}) was rejected. This result indicates that academic workload

significantly contributes to the occurrence of musculoskeletal discomfort. Increased study hours, tight academic schedules, and cumulative stress at higher levels of study likely account for the higher prevalence of ARMSDs among these students.

Hypothesis Three (H_{03}): There would be no significant difference in ARMSDs across socio-demographic variables among undergraduates.

The chi-square analysis showed that while gender did not significantly influence the occurrence of ARMSDs ($\chi^2 = 2.632$, $p = 0.105$), academic level did ($\chi^2 = 24.810$, $p < 0.001$). Thus, the null hypothesis (H_{03}) was partially rejected.

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Discussion of Findings

This study investigated the prevalence, pattern, and predictors of academic-related musculoskeletal disorders (ARMSDs) among University of Benin undergraduates using a mixed methods design. Presentation of the results is centered on the particular research objectives of the study and supported by quantitative information and qualitative descriptions of students.

5.1.1 Prevalence of ARMSDs

The prevalence of ARMSDs among the subjects was significantly high as almost all the students experienced musculoskeletal discomfort in the last 12 months. This aligns with studies in other Nigerian universities in which prevalence of MSD among undergraduates ranged between 80% and 90%. It also agrees with studies throughout the rest of the African continent, such as Ghana and Kenya, although it is higher than in some Western societies where prevalence has been estimated from 60% to 70%.

The implication of such high prevalence is that musculoskeletal discomfort is now an 'expected' part of the undergraduate experience in this case. Qualitative data supported this account: students routinely expressed back pain and neck pain as something they had 'learned to expect,' particularly close to exam time and prolonged lecture periods. The near-universal experience of discomfort highlights a serious public health and education issue that can potentially

compromise learning gains, concentration, and long-term musculoskeletal well-being.

5.1.2 Anatomical Patterns of ARMSDs

The neck (59.4%), shoulders (54.8%), and lower back (65.9%) were the most frequently found anatomical sites. This finding is consistent with patterns observed in the literature, which show that neck and lower back strain are caused by slumped postures, extended sitting, and non-ergonomic seating. These quantitative results were supported by qualitative reports. Pupils drew vivid pictures of uncomfortable chairs, packed lecture halls, and awkward reading positions. One of the interviewees, for instance, said: "Our lecture hall chairs are completely uncomfortable. I occasionally have to spend hours sitting up just to take notes. Another acknowledged that they experienced upper back and waist pain while working on their bed. The statistics are personal because of these people's experiences, demonstrating that pain is not a statistic but rather a common occurrence among undergraduates.

5.1.3 Demographic and Academic Predictors

While females reported a slightly higher prevalence (93.6%) than males (88.4%), analysis showed that gender was not a significant predictor of ARMSDs ($p = 0.105$). This implies that when it comes to the same academic demands and unfavourable ergonomic settings, male and female students are equally at risk.

On the other hand, academic standing was a significant predictor ($p < 0.001$). With 100% of 600-level students reporting ARMSDs, the prevalence was highest among final-year students. The cumulative impact of years of education, increased workloads in senior year, and the physical demands of

projects, clinical postings, and farm practicals can all help to explain this. This pattern was supported by the qualitative narratives, which revealed that senior students often talked about the stress of juggling rigorous academic and practical requirements.

5.1.4 Academic Workload and Ergonomics

Long periods of reading, writing, and computer use are major contributors to musculoskeletal pain, as demonstrated by the strong correlation found between academic workload and ARMSDs. Students talked about how deadlines and exam periods caused them to sit for longer periods of time without breaks, which frequently resulted in neck or back pain. One participant wrote: "I have really bad waist pain during exam periods. My biggest stressor is sitting still without stretching.

It's interesting to note that ergonomic practices, like sitting posture, did not significantly predict outcomes. Qualitative data, however, demonstrated that discomfort was exacerbated by inadequate ergonomics in lecture halls and dorms. The disparity implies that even though there may not have been a significant statistical correlation, the lived experience of unfavourable ergonomic settings is still very important.

5.1.5 Lifestyle Factors

According to a lifestyle analysis, 78.3% of students said they did not regularly exercise, and only 21.7% of them did. Students are at risk for ARMSDs because of this sedentary lifestyle, which surely contributes to muscle weakness and stiffness. Additional lifestyle choices like bad sleeping posture, extended screen time, and insufficient stretching were frequently mentioned and support the idea that students have unhealthy habits.

A "perfect storm" for musculoskeletal issues is created by a high workload, poor ergonomics, and unhealthy lifestyle choices. Due to a vicious cycle of extended study sessions, subpar facilities, and insufficient exercise, discomfort is unavoidable for students.

5.2 Conclusion

According to the study's findings, ARMSDs are a serious and pervasive health issue among University of Benin freshmen. The fact that the prevalence rate is almost 90% emphasizes how urgent the problem is. The most impacted anatomical areas were the shoulders, neck, and lower back, which is indicative of the demands of extended study and insufficient ergonomic support. The two best indicators of ARMSDs were found to be academic workload and academic level; gender did not significantly predict ARMSDs. Qualitative reports showed that inadequate ergonomic facilities are a significant contextual factor, even though ergonomic behaviours did not show up as significant predictors in quantitative analysis. Vulnerability is also increased by lifestyle choices like bad posture and infrequent exercise.

Taken together, ARMSDs among undergraduates are not just medical issues but academic, social, and institutional challenges that require multi-level interventions.

5.3 Recommendations

For Students

-To increase flexibility and strengthen muscles, use frequent stretching and exercising.

-Take breaks every 45 to 60 minutes to adopt better study habits.

-Aim for comfortable seating wherever you can; stay away from studying on

beds or in uncomfortable positions.

- Raise awareness of self-care and ergonomics through student-led projects and peer health clubs

For University Management

- Provide ergonomically designed chairs and tables in lecture halls, libraries, and hostels.
- Integrate health education on posture, exercise, and MSD prevention into the curriculum or orientation programs.
- Reduce academic overload by spreading lectures and exams more evenly across the semester.
- Establish recreational and fitness facilities accessible to all students.

For Policymakers and Stakeholders

- Recognize musculoskeletal disorders as a growing student health concern in Nigeria.
- Develop and implement national guidelines for ergonomic standards in tertiary institutions.
- Encourage collaboration between the Ministry of Education and the Ministry of Health to support student wellness initiatives.
- Fund further research on ARMSDs and related health issues among Nigerian undergraduates.

5.4 Suggestions for Further Research

- Conduct longitudinal studies to track musculoskeletal symptoms across different academic years.
- Explore the effectiveness of intervention programs (e.g., exercise breaks, ergonomic furniture) in reducing ARMSDs.

- Expand research to other universities for comparative analysis and national-level generalization.
- Incorporate physiological and ergonomic measurements (e.g., posture analysis, load carrying studies) alongside self-reported data for a richer understanding.

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APPENDIX A

Questionnaire on Academic-Related Musculoskeletal Disorders (ARMSDs)

Dear Participant,

This questionnaire is part of a research study on the prevalence, pattern, and predictors of academic-related musculoskeletal disorders (ARMSDs) among undergraduates of the University of Benin. Your responses will be treated with confidentiality and used solely for academic purposes. Participation is voluntary, and you may withdraw at any point.

Section A: Demographic Information

1. Age: _____
2. Sex: ( ) Male ( ) Female
3. Faculty: _____
4. Department: _____
5. Level: ( ) 100 ( ) 200 ( ) 300 ( ) 400 ( ) 500
6. Marital Status: ( ) Single ( ) Married ( ) Others
7. Are you currently living in the hostel? ( ) Yes ( ) No

Section B: Academic Activities and Ergonomic Practices

8. How many hours do you spend reading daily? _____
9. Do you use a desk and chair while studying? ( ) Yes ( ) No
10. What is your usual sitting posture while studying?

_____

11. Do you use a laptop or phone for study purposes? ( ) Laptop ( ) Phone ( ) Both
12. How many hours do you spend on digital devices daily? _____
13. Do you take regular breaks while studying? ( ) Yes ( ) No

Section C: Musculoskeletal Symptoms

14. Have you experienced pain or discomfort in any part of your body in the last 12 months? ( ) Yes ( ) No
15. If yes, indicate the areas affected (tick all that apply): ( ) Neck ( ) Shoulder ( ) Upper back ( ) Lower back ( ) Elbows ( ) Wrists/hands ( ) Hips/thighs ( ) Knees ( ) Ankles/feet
16. Was the discomfort related to academic activity (e.g., studying, writing)? ( ) Yes ( ) No
17. Did the discomfort prevent you from attending class or performing tasks? ( ) Yes ( ) No

Section D: Lifestyle and Predictive Factors

20. Do you engage in regular physical exercise? ( ) Yes ( ) No
21. If yes, how many times per week? _____
22. Do you experience academic stress? ( ) Yes ( ) No
23. On a scale of 1–10, how would you rate your stress level? _____
24. Do you sleep at least 6 hours daily? ( ) Yes ( ) No

Section E: Awareness and Preventive Practices

25. Are you aware of ergonomic principles (proper posture, study setup)? ( ) Yes ( ) No
26. Have you received any information or training on preventing musculoskeletal disorders? ( ) Yes ( ) No
27. Do you practice stretching or body relaxation during study breaks? ( ) Yes ( ) No
28. What measures do you take to reduce body discomfort during study?

_____

APPENDIX B

INFORMED CONSENT FORM

Title of the study: Prevalence, pattern and predictors of academic related musculoskeletal disorders among undergraduates of the University of Benin-a mixed study design

Investigator: Adewole Shalom Ofunami

Contact Phone Number: 08078196944

Purpose of the Study: You are invited to take part in a research study aimed at understanding the level of Prevalence, pattern and predictors of academic related musculoskeletal disorders among undergraduates of the University of Benin-a mixed study design. The goal of this study is to investigate the prevalence, pattern, and predictors of academic-related musculoskeletal disorders (ARMSDs) among undergraduate students of the University of Benin using a mixed-methods research design

Participants: You are eligible to participate if you are 200 undergraduates of the University of Benin. Participation is voluntary, and you will be required to respond to questionnaires relating to your level of Prevalence, pattern and predictors of academic related musculoskeletal disorders among undergraduates in the University of Benin.

Procedure: You will be asked to fill out standardized questionnaires that assess your levels of Prevalence, pattern and predictors of academic related musculoskeletal disorders. This process will take approximately 15–20 minutes and will be conducted in a safe and private setting. No physical or medical examination is involved.

Cost/Compensation: There is no cost whatsoever associated with your participation in this study

Contact Information: If you have any questions or concerns about the study, you can contact the named investigator on the stated phone number.

Confidentiality: All responses will be treated as strictly confidential. No names or identifying information will be recorded. Data will be used solely for academic research purposes.

Voluntary Participation: Participation in this study is completely voluntary. You are free to refuse or withdraw at any time without any penalty.

Participant Consent: Now that the study has been clearly explained to me and I fully understand the content and process, I agree to voluntarily take part in this study.

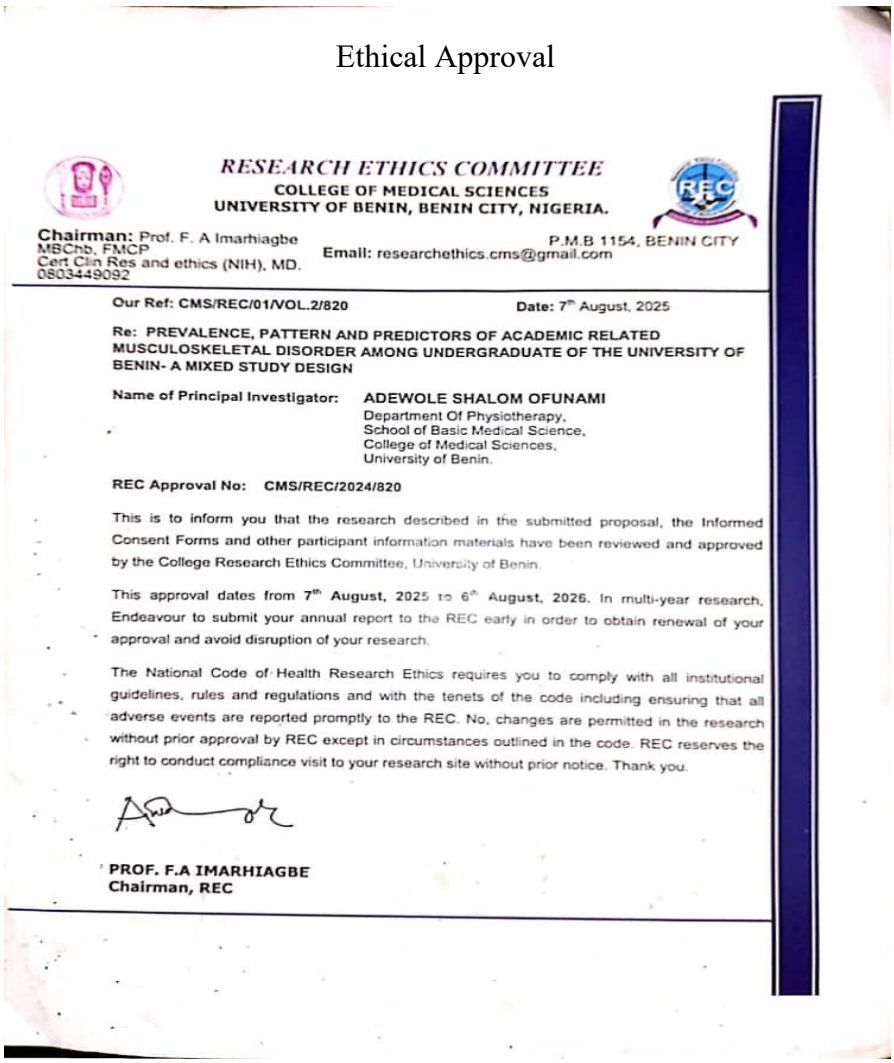
..... **.....**
.....

Participant's Signature and Date **Witness's signature and Date**

.....

Researcher's Signature and Date

Ethical Approval



RESEARCH ETHICS COMMITTEE
COLLEGE OF MEDICAL SCIENCES
UNIVERSITY OF BENIN, BENIN CITY, NIGERIA.

Chairman: Prof. F. A Imarhiagbe
MBChb, FMCP
Cert Clin Res and ethics (NIH), MD.
0803449092

P.M.B 1154, BENIN CITY
Email: researchethics.cms@gmail.com

Our Ref: CMS/REC/01/VOL.2/820 **Date:** 7th August, 2025

Re: PREVALENCE, PATTERN AND PREDICTORS OF ACADEMIC RELATED MUSCULOSKELETAL DISORDER AMONG UNDERGRADUATE OF THE UNIVERSITY OF BENIN- A MIXED STUDY DESIGN

Name of Principal Investigator: **ADEWOLE SHALOM OFUNAMI**
Department Of Physiotherapy,
School of Basic Medical Science,
College of Medical Sciences,
University of Benin.

REC Approval No: **CMS/REC/2024/820**

This is to inform you that the research described in the submitted proposal, the Informed Consent Forms and other participant information materials have been reviewed and approved by the College Research Ethics Committee, University of Benin.

This approval dates from **7th August, 2025 to 6th August, 2026.** In multi-year research, Endeavour to submit your annual report to the REC early in order to obtain renewal of your approval and avoid disruption of your research.

The National Code of Health Research Ethics requires you to comply with all institutional guidelines, rules and regulations and with the tenets of the code including ensuring that all adverse events are reported promptly to the REC. No, changes are permitted in the research without prior approval by REC except in circumstances outlined in the code. REC reserves the right to conduct compliance visit to your research site without prior notice. Thank you.

PROF. F.A IMARHIAGBE
Chairman, REC