ASSOCIATION BETWEEN NUTRITIONAL STATUS, PHYSICAL ACTIVITY AND QUALITY OF LIFE AMONG NON CLINICAL STUDENTS IN THE UNIVERSITY OF BENIN.

BY

OGWU ADAEZE NICOLE
(BMS2001287)

PROJECT SUPERVISOR: DR S.O BOLARINDE

A PROJECT SUBMITTED TO THE DEPARTMENT OF PHYSIOTHERAPY, SCHOOL OF BASIC MEDICAL SCIENCES, COLLEGE OF MEDICAL SCIENCES, UNIVERSITY OF BENIN IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF BACHELOR OF PHYSIOTHERAPY DEGREE.

OCTOBER, 2025

CERTIFICATION

This dissertation by Ogwu Adaeze Nicole is accepted in its present form as satisfying the dissertation requirement of the degree of Bachelor of Physiotherapy of the School of Basic Medical Sciences, College of Medical Sciences of the University of Benin.

SUPERVISOR **SIGNATURE AND DATE**

DR S.O BOLARINDE

EXTERNAL EXAMINER **SIGNATURE AND DATE**

APPROVED

DR MRS C.O OBASEKI

HEAD

DEPARTMENT OF PHYSIOTHERAPY

COLLEGE OF MEDICAL SCIENCES

UNIVERSITY OF BENIN

DEDICATION

This dissertation is dedicated to Almighty God, my family and friends for their constant encouragement, prayers and sacrifices throughout this entire journey.

ABSTRACT

Background: University students often face challenges such as poor dietary habits, irregular physical activity, and academic stress, which can adversely affect their health and quality of life (QoL). Nutritional status, physical activity, and QoL are key interrelated health determinants, but limited evidence exists among Nigerian university populations. Understanding these relationships is essential for promoting healthy lifestyles and better well-being among young adults.

Aims: This study aimed to determine the association between nutritional status, physical activity, and quality of life among non-clinical undergraduate students of the University of Benin.

Methods: A cross-sectional descriptive study was conducted among 330 non-clinical undergraduates selected through multistage random sampling. Data were collected using a self-administered questionnaire comprising the Food Frequency Questionnaire (FFQ), International Physical Activity Questionnaire-Short Form (IPAQ-SF), and WHO Quality of Life-BREF (WHOQOL-BREF). Descriptive and inferential statistics, including Pearson's correlation and Chi-square tests, were used, with a significance level of 0.05.

Results: Among the 330 participants, 54.8% were male and 45.2% female, mostly aged 18–25 years. The mean BMI was 24.13 ± 14.18 kg/m², with 53.3% having normal weight, 19.4% overweight, 12.1% obese, and 11.2% underweight. Most students (76.1%) practiced healthy eating habits. Physical activity levels were moderate in 48.8%, low in 30.9%, and high in 20.3%. Regarding QoL, 62.7% had moderate scores, 32.7% high, and 4.5% low. A significant association was found between nutritional status and physical activity ($p = 0.037$), but not between nutritional status and QoL ($p = 0.096$) or physical activity and QoL ($p = 0.697$).

Conclusion: This study found a significant association between nutritional status and physical activity, but not with quality of life among non-clinical students in the University of Benin. Most students maintained normal BMI and moderate physical activity levels, though some displayed poor nutrition and lifestyle habits. These findings highlight the importance of university-based health programs to improve nutrition, activity levels, and overall well-being.

Keywords: Nutritional status, Physical activity, Quality of life, Undergraduate students, University of Benin.

ACKNOWLEDGEMENT

My deepest gratitude goes to God Almighty, my source and pillar of strength, wisdom and inspiration. His grace, mercy and unfailing love have guided and sustained me through every step of this entire journey.

My utmost gratitude goes to Dr S.O Bolarinde, my project supervisor, for his valuable guidance, patience, and encouragement which contributed to the completion of this work. May God bless you Sir.

My sincerest gratitude goes to the Head of Department, Dr (Mrs) C.O Obaseki, for her leadership, support and dedication to service throughout my academic program. I also wish to express my heartfelt appreciation to Prof. K.I Oke, our father in the department and all other lecturers in the department, for the discipline and knowledge imparted. I am also grateful to all the visiting Lectures, thank you sirs and mas for all the sacrifices made and your immense contributions, as well as to the administrative staff of the department. May God bless you all.

To my wonderful family, my ever supportive parents Mr John Ogwu and Mrs Folake Ogwu, thank you for your love and endless sacrifices, always willing to go beyond the bar for me I really appreciate. Your guidance and prayers have been my anchor throughout this journey, and to my siblings Miss Sarah and Mr Dumebi thank you for standing by me with your love and support. God bless and keep you all.

To my amazing friends; Jessica, Vicky, Efe, Joan, Gorgeous, Jasmine, Onyi, Ngozi, Cheta, Shalom, Christianna and Ifeoma, I am truly grateful for each and every one of you. Thank you

for the laughter, support, encouragement and the beautiful memories we have shared. I pray that God blesses you all abundantly and grants you success in all your endeavors.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER ONE

INTRODUCTION

Background of the study

The health and wellbeing of University students have become a growing concern globally, particularly due to the increasing prevalence of poor nutritional habits, physical inactivity and stress-related health issues. These lifestyle factors do not only affect students' academic productivity but also play a crucial role in determining their overall quality of life. While attention has largely focused on clinical or health science students, there is limited evidence on how these affect non-clinical students, who have less exposure to health education. This gap calls for targeted research to understand the complex relationship between nutritional status, physical activity and quality of life among this overlooked population.

Nutritional status and physical activity are crucial determinants of overall health and well-being. Nutritional status reflects the body's physiological condition as influenced by nutrient intake, absorption, and metabolism. Among university students, maintaining optimal nutritional status can be challenging due to lifestyle and academic pressures and it is not uncommon to observe dietary challenges within this population, such as meal skipping, irregular eating patterns, high consumption of snacks and fast food, and inadequate intake of fruits and vegetables. A study by Timothy Aghogho Ehawarieme et al (2024) conducted in the University of Benin found a relatively high prevalence of overweight and obesity among undergraduate students highlighting gender, age, marital status, lack of knowledge about healthy weight management, use of certain medications and physical inactivity as underlying determinants.

Another study in South-Western Nigeria reported that many students consumed only two meals per day, with breakfast being the most commonly skipped meal due to financial and time constraints and these patterns were shown to have led to attention deficits, reduced comprehension, forgetfulness, mood swings and even anger (Sholeye et al 2021). Inadequate nutrition however, can lead to reduced immunity, increased susceptibility to diseases and reduced productivity (Berthoud, 2017).

Physical activity on other hand plays a crucial role in maintaining physical and psychological health of an individual. The World Health Organization (WHO) defines physical activity as any bodily movement requiring energy expenditure, also playing a vital role in maintaining optimal health. However, evidence suggests that many students adopt sedentary lifestyles driven by academic demands and increased screen time. A study conducted by Oladejo et al (2023) assessed physical activity levels among university students in South Africa and found that 22.5% of students had objectively low physical activity levels, with average daily steps at just 6,059 well below recommended levels. Similarly, Ugwueze et al. (2021) in a study among male students in South East Nigeria found that only 19.8% had high physical activity levels, and higher physical activity was positively associated with better psychological well-being ($\beta = 0.13$, $p < 0.05$). These findings indicate a strong link between active living and students' mental and physical quality of life. Regular physical activity is known to enhance cardiovascular fitness, reduce anxiety and depression, and improve overall psychological well-being all of which contribute significantly to quality of life.

Quality of life (QOL) is a multi-dimensional concept that encompasses physical health, psychological state, social relationships, and environmental context. Physical activity and adequate nutrition are foundational to positive QOL outcomes. Studies have shown that students

with higher physical activity levels report better health-related QOL, especially in physical and psychological domains. Conversely, poor nutritional practices have been linked with fatigue, emotional distress, and weakened immune response, all of which negatively impact QOL (WHO, 2021). Students with poor nutritional status or low activity levels reported more frequent health complaints, social withdrawal, and academic stress, emphasizing the inter-correlation between these factors.

Despite the significance of all three factors, in the Nigerian context, particularly at the University of Benin, there is limited empirical data examining how nutritional status and physical activity patterns correlate with students' perceived quality of life—especially among non-clinical students who may lack regular contact with health-related education. It is more likely for clinical students to receive formal health education and adopt healthier behaviors while their non-clinical counterparts, who constitute a large segment of the university population, remain under-researched and underserved in health promotion efforts. This knowledge gap limits the development of effective, inclusive interventions that cater to all students as their experiences and behaviors may differ significantly from their clinical counterparts due to variations in health literacy, awareness, and daily routines. Investigating how nutrition and physical activity influence quality of life in this group can offer unique insights into the needs of a population often overlooked in wellness initiatives.

The University of Benin, with its diverse academic disciplines and large student population, presents an ideal environment to explore these associations. Understanding the lifestyle behaviors of non-clinical students in this setting can guide evidence-based strategies for promoting student health, well-being, and academic success. Therefore, this study aims to assess the association between nutritional status, physical activity, and quality of life among non-

clinical students in the University of Benin. The findings are expected to inform future interventions and support policies aimed at improving student health outcomes in Nigerian tertiary institutions.

1.2 Statement of the problem

It is important to understand that the transition to university life is often accompanied by profound changes in lifestyle, including dietary habits and physical activity patterns, which can significantly influence students' health and quality of life (QOL). In Nigeria, recent studies have shown that a large proportion of university students adopt poor nutritional and physical activity behaviors that may compromise their academic performance and long-term health outcomes.

Nutritional imbalances are increasingly prevalent among Nigerian university students. A research conducted by Omage and Omuemu (2018) using 800 undergraduate students selected by a multistage sampling at Igbinedion University, Okada discovered that over half 448 (56.0%) of the respondents skipped breakfast regularly, with majority of the respondents 744 (93.0%) relying heavily on snacks, contributing to under nutrition and overweight trends. Furthermore, BMI assessments revealed that while 564 (70.5%) had normal weight, 112 (14.0%) were overweight, and 76 (9.5%) were underweight (Omage and Omuemu 2018). Poor nutrition has been linked to fatigue, weakened immunity, poor cognitive function, and depression which are all factors that can significantly reduce students' QOL (WHO, 2021).

Similarly, physical inactivity among Nigerian university students is a growing concern. In a recent cross-sectional study among 102 health professional students at the University of Maiduguri, Nigeria, Adewale et al (2017) reported that although 85.3% of the students engaged in 150 minutes/week of moderate–to-vigorous physical activity, only 2.9% of students met the

guideline of 75minutes/week of vigorous intensity activity, suggesting a predominantly sedentary lifestyle. Low physical activity levels have been associated with poor physical and mental health outcomes, including weight gain, stress, anxiety, and sleep disturbances all of which detract from QOL. While several studies have focused on students in medical and health-related disciplines who often have better awareness of health practices, non-clinical students receive far less attention in research and public health interventions. These students, enrolled in faculties such as arts, law, education, engineering, agricultural sciences, social sciences and others, may have limited exposure to health information and fewer resources to adopt healthy habits. This knowledge gap hinders universities and policymakers from creating effective, inclusive wellness programs tailored to their needs.

In the University of Benin, which hosts a large population of non-clinical students from diverse backgrounds, the absence of local data on the association between nutritional status, physical activity, and quality of life poses a significant limitation to evidence-based intervention planning. Without understanding how these variables interact in this group, there is a risk that the health and academic potential of a substantial portion of the student population will remain unaddressed. Therefore, this study seeks to investigate the association between nutritional status, physical activity, and quality of life among non-clinical undergraduate students in the University of Benin. The findings will bridge the existing research gap and provide a foundation for developing comprehensive student health strategies that are equitable, sustainable, and impactful.

1.3 Research Questions

This study therefore aims to answer the following questions:

1. What is the nutritional status of non-clinical students in the University of Benin?

2. What are the physical activity levels of non-clinical students in the university?

3. What is the perceived quality of life among non-clinical students in the University of Benin?

4. Is there a significant association between nutritional status and quality of life among non-clinical students?

5. Is there a significant association between physical activity and quality of life among non-clinical students?

1.3.1 Aim of the study

The aim of the study is to determine the association between nutritional status, physical activity levels, and quality of life among non-clinical undergraduate students in the University of Benin, Edo state.

1.3.2 Specific objectives

The specific objectives of this study are to:

1. To assess the nutritional status of non-clinical undergraduate students using anthropometric indicators such as Body Mass Index (BMI) and a Food frequency questionnaire (FFQ).

2. To evaluate the physical activity levels of non-clinical students using a standardized tool (e.g., IPAQ).

3. To assess the perceived quality of life among non-clinical students using a validated instrument such as the WHOQOL-BREF.

4. To examine the association between nutritional status and quality of life among the students.

5. To determine the association between physical activity levels and quality of life among non-clinical students.

1.4 Research hypotheses

1.4.1 Main hypotheses

1. There would be no significant association between nutritional status and quality of life among non-clinical students in the University of Benin.

2. There would be no significant association between physical activity levels and quality of life among non-clinical students in the University of Benin.

3. There would no significant association between nutritional status and physical activity among non-clinical students in the University of Benin.

1.4.2 Sub hypotheses

1. There would be no significant association between BMI and risk health behavior.

2. There would be no significant association between BMI and nutritional status.

3. There would be no significant association between nutritional status and risk health behavior.

4. There would be no significant association between quality of life and risk health behavior.

1.5 Significance of the study

This study holds significance as it explores the relationship between nutritional status, physical activities and quality of life among non-clinical students.

For the participants: Understanding these associations can offer the opportunity to gain valuable insights into their nutritional status, physical activity habits, and perceived quality of life, potentially promoting healthier lifestyle choices.

For the researcher: This study will be of great importance to the researcher as it would contribute to the existing literature on university student health in Nigeria, particularly among the non-clinical populations, a group often overlooked in health research. It also provides a foundation for future investigations and enhances the researcher's practical skills in health assessment, data analysis, and evidence-based health promotion.

1.6 Scope of the study

This study is delimited to:

i. Non clinical undergraduate students in the University of Benin, Benin City, Edo state, Nigeria.

ii. Both male and female.

iii. Students from 200 level to 500 level.

1.7 Limitations of the study.

The limitations of this study include:

i. Data on physical activity levels and quality of life was self-reported and might have been a subject to recall bias or social desirability, potentially influencing the accuracy of responses.

ii. This study was conducted solely among non-clinical undergraduate students in the University of Benin, Benin City, Edo state, South-South Nigeria. Caution should therefore be taken in the application of the findings of this study to other geographical regions

iii. As a cross-sectional study, this research only identified associations between nutritional status, physical activity, and quality of life, but was unable to establish a causal relationships among these variables.

1.8 Definition of terms

i. Nutritional Status

Nutritional status refers to the condition of a person's health as influenced by the intake and utilization of nutrients. It is commonly assessed through indicators such as Body Mass Index (BMI), dietary habits, and clinical signs of malnutrition or nutrient deficiencies (WHO, 2006).

ii. Physical Activity

Physical activity is any bodily movement produced by skeletal muscles that requires energy expenditure. It includes activities undertaken while working, playing, carrying out household chores, traveling, and engaging in recreational pursuits (WHO, 2020).

iii. Quality of Life (QOL)

Quality of life is an individual’s perception of their position in life in the context of their culture, value systems, personal goals, standards, and concerns. It encompasses physical health, psychological state, level of independence, social relationships, and environmental factors (WHOQOL Group, 1995).

iv. Non-Clinical Students

Non-clinical students are undergraduate students enrolled in non-health-related academic programs, such as social sciences, agriculture, engineering, education, and arts, who do not receive clinical or medical training as part of their curriculum.

v. Association

In research, association refers to a statistical relationship between two or more variables, where changes in one variable relate to changes in another, without implying direct causation.

vi. Undergraduate Students

These are students pursuing a first-level degree (e.g., B.Sc., B.A., B.Ed) at a university and who have not yet completed a postgraduate program.

1.9 List of abbreviations

BMI	Body mass index.
WHO	World health organization.
WHOQOL	World health organization quality of life.
QOL	Quality of life.
IPAQ	International physical activity questionnaire.
SPSS	Statistical package for social sciences.
UNIBEN	University of Benin.
PA	Physical activity.
FFQ	Food frequency questionnaire.
MET	Metabolic equivalent tasks.

CHAPTER TWO

LITERATURE REVIEW

2.1 Conceptual Review on Nutritional Status

Nutritional status is a reflection of the body's condition as determined by the intake, absorption, and utilization of nutrients essential for growth, repair, and normal functioning. It can be evaluated through various methods such as anthropometric measurements, biochemical tests, clinical signs, and dietary assessments (Ogunba et al., 2020). In Nigeria, nutritional status is a vital health indicator, particularly among the youth and students, as it impacts immunity, cognitive development, and energy levels, all of which are necessary for academic productivity and day-to-day activities.

The nutritional status of students in tertiary institutions is influenced by numerous factors including food insecurity, financial constraints, unhealthy dietary choices, and lifestyle habits. A study by Ojofeitimi et al. (2021) revealed that many undergraduates in Nigeria skip meals, consume junk food, and lack adequate fruit and vegetable intake, which places them at risk of both undernutrition and overnutrition. These poor dietary practices not only affect physical health but also contribute to stress, poor academic performance, and lowered quality of life, making it a pressing public health concern.

Furthermore, nutritional status serves as a predictor of long-term health outcomes. Poor nutrition, especially during the formative years, increases the risk of chronic diseases such as diabetes, hypertension, and obesity (Adedokun et al., 2021). The growing trend of nutrition-related non-communicable diseases among young adults in Nigeria highlights the urgent need for awareness, nutritional education, and intervention programs within tertiary institutions. Addressing

nutritional status comprehensively helps lay the foundation for a healthier, more productive student population.

2.1.1 Physical Activity

Physical activity refers to any movement of the body that results in energy expenditure, ranging from simple tasks like walking and cleaning to more structured exercises such as running or aerobics (Adewoyin et al., 2021). It includes all forms of bodily movement produced by skeletal muscles, and is essential for maintaining physical fitness, managing weight, and preventing lifestyle diseases. The World Health Organization recommends at least 150 minutes of moderate-intensity physical activity per week for adults, a guideline that is often not met by students in Nigerian universities.

In Nigeria, the rise in sedentary behavior among students has become a concern. Due to prolonged hours of academic study, digital device usage, and lack of recreational facilities, physical activity levels are significantly low among undergraduates (Olumide et al., 2022). This decline is associated with increased incidences of musculoskeletal discomfort, mental stress, and cardiovascular risk factors. Without structured physical education and awareness, many students remain unaware of the importance of regular physical activity for their overall health and well-being.

Moreover, physical activity has been linked to enhanced mental and emotional health. Research has shown that regular exercise improves sleep, boosts mood through endorphin release, and enhances cognitive functions such as memory and concentration (Okonkwo et al., 2022). These benefits are particularly important for students coping with academic pressures. Therefore,

incorporating physical activity into daily routines is not only beneficial for physical health but also for optimizing academic performance and quality of life.

2.1.2 Quality of Life (QoL)

Quality of life (QoL) is a broad, multidimensional concept that refers to an individual's perception of their physical health, psychological state, social relationships, and interaction with their environment (WHO, 2012). It goes beyond mere survival or absence of disease and includes aspects such as emotional well-being, financial security, educational satisfaction, and leisure opportunities. For students, QoL encompasses not just academic performance, but also their ability to cope with stress, maintain relationships, and pursue personal goals.

Student quality of life is influenced by a myriad of socio-economic and institutional factors. Limited access to quality healthcare, poor hostel conditions, inadequate recreational facilities, and academic stress can all diminish QoL (Eboh et al., 2023). For example, students in overcrowded hostels may experience sleep deprivation and poor hygiene, while financial challenges may lead to poor diet or inability to afford learning materials. These factors collectively contribute to dissatisfaction, anxiety, and decreased academic output.

A strong link exists between QoL and healthy lifestyle behaviors. Students who engage in regular physical activity and maintain a balanced diet report higher levels of life satisfaction, reduced stress, and better academic results (Anyanwu & Agu, 2022). Hence, improving QoL among non-clinical students requires a comprehensive approach that includes institutional support, awareness programs on lifestyle choices, and mental health services. Recognizing and addressing these dimensions is crucial to fostering a supportive and productive educational environment.

2.1.3 Interrelationship Between Nutrition, Physical Activity, and QoL

Nutrition, physical activity, and quality of life are deeply interconnected in a triadic relationship that significantly impacts the health and well-being of individuals, especially students. Good nutrition provides the fuel and essential nutrients required for optimal physical activity, while regular exercise enhances nutrient metabolism and supports healthy body functions (Adedokun et al., 2021). Together, they foster a physiological balance that underpins physical and mental health, which in turn enhances an individual's perceived quality of life.

Poor nutritional habits such as skipping meals, overeating fast food, or consuming unbalanced diets can lead to fatigue, obesity, or micronutrient deficiencies that limit physical activity capacity. Similarly, a sedentary lifestyle can impair digestion, reduce metabolic efficiency, and lead to feelings of low energy or depression, all of which negatively affect one's quality of life (Ojofeitimi et al., 2021). Nigerian students are particularly vulnerable to these interlinked issues due to urban lifestyle trends, academic stress, and poor institutional support for wellness initiatives.

On the other hand, integrated health programs that promote healthy eating and active living can yield significant improvements in students' QoL. Studies in Nigeria have shown that students who maintain consistent exercise routines and balanced diets report higher satisfaction levels, better academic performance, and improved emotional resilience (Okonkwo et al., 2022). Therefore, any effort to improve students' quality of life must simultaneously address their nutritional behavior and physical activity habits in a unified framework of health promotion.

2.2 Nutritional Status among Non-Clinical Students

2.2.1 Assessment of Nutritional Status (BMI, Dietary Habits, etc.)

Nutritional status assessment among non-clinical university students is a multifaceted process that involves anthropometric measurements, dietary evaluations, and lifestyle analysis. The most commonly used anthropometric indicator is the Body Mass Index (BMI), which classifies individuals into underweight, normal weight, overweight, and obese categories. Recent studies in Nigerian universities, such as that by Ogunbode et al. (2021), have shown that a significant proportion of non-clinical students fall within the overweight and obese categories, suggesting an increasing trend toward sedentary living and poor dietary habits. This BMI data is often complemented by waist-to-hip ratio and mid-upper arm circumference measurements to offer a broader picture of nutritional well-being.

Beyond anthropometry, dietary assessments are pivotal in evaluating students' nutritional status. Techniques such as 24-hour dietary recall, food frequency questionnaires (FFQ), and food diaries are used to understand the quality, quantity, and frequency of food intake. A study conducted among undergraduates in Lagos State revealed that many students skip breakfast, consume fast food regularly, and have limited fruit and vegetable intake, all of which negatively impact their nutritional health (Ajayi et al., 2020). The findings emphasized that these habits, when unchecked, can contribute to both macro- and micronutrient imbalances, increasing the risk for non-communicable diseases in early adulthood.

Lifestyle choices play a critical role in shaping nutritional status. Factors such as irregular meal patterns, nighttime eating, and limited physical activity contribute significantly to weight-related issues. Many students living in hostels lack access to proper cooking facilities and rely on processed or fast foods, often high in fats and sugars (Adebayo et al., 2022). Coupled with academic stress and reduced time for exercise, these behaviors compound the risk of malnutrition in both directions — undernutrition from skipping meals and overnutrition from excessive consumption of calorie-dense food.

2.2.2 Common Nutritional Deficiencies and Excesses in Students

Among Nigerian non-clinical students, nutritional deficiencies such as iron, vitamin A, and protein remain prevalent due to inadequate intake of nutrient-dense foods. For example, female students are particularly susceptible to iron-deficiency anemia due to menstrual blood loss coupled with low consumption of iron-rich foods such as meat and leafy vegetables (Olumakaiye et al., 2022). Symptoms like fatigue, poor concentration, and decreased academic performance have been linked to these deficiencies. Despite living in an environment where food is culturally diverse, affordability and accessibility to nutrient-rich meals continue to be a major issue.

Conversely, nutritional excesses are also becoming more pronounced among students, particularly due to the growing reliance on ultra-processed foods. These foods, often rich in trans fats, sodium, and sugar, are convenient and cheap but contribute to obesity, hypertension, and elevated cholesterol levels. A study at the University of Nigeria, Nsukka, revealed that nearly 30% of surveyed students exhibited signs of overnutrition due to excessive fast food consumption, sugar-sweetened beverage intake, and limited physical activity (Okonkwo &

Okafor, 2023). This dual burden of malnutrition — the coexistence of undernutrition and overnutrition — is a growing public health concern in Nigerian tertiary institutions.

Micronutrient deficiencies such as low levels of zinc, calcium, and folate are also widespread due to poor dietary diversity. Many students consume monotonous diets centered on refined grains, neglecting legumes, fruits, and dairy, which are essential for optimal metabolic function and immunity. A study by Eze et al. (2021) in southeastern Nigeria noted that poor dietary diversity scores correlated strongly with reported cases of frequent illness, skin problems, and poor wound healing among students. These findings underscore the need for institutional-level interventions, such as nutrition education and meal planning services, to mitigate both deficiencies and excesses.

2.2.3 Factors Influencing Nutritional Status (Socioeconomic, Lifestyle, etc.)

Socioeconomic status is a primary determinant of nutritional health among non-clinical students in Nigerian universities. Students from lower-income backgrounds often struggle to afford diverse and nutritious meals, relying on high-carbohydrate, low-protein options like noodles, garri, and white rice. Eze et al. (2021) highlighted that limited financial resources often force students to prioritize quantity over quality, which may lead to energy sufficiency but micronutrient deficiency. Additionally, students from wealthier families are not immune; they may indulge in fast food and high-calorie snacks due to convenience and peer influence, contributing to overnutrition.

Lifestyle choices also significantly influence nutritional outcomes. Many students experience a shift in lifestyle upon entering university, marked by increased autonomy, stress, and exposure to social trends. Late-night studying, irregular sleep patterns, and academic pressure reduce the

likelihood of preparing healthy meals. Ajayi et al. (2020) observed that students who reported high academic stress also reported higher fast-food consumption and lower physical activity levels. These lifestyle patterns not only affect body weight but also mental and emotional health, linking nutrition to holistic student well-being.

Environmental and institutional factors also play critical roles. Universities with inadequate food service policies or those lacking access to campus canteens offering nutritious meals may inadvertently contribute to poor dietary behaviors. Furthermore, the absence of nutrition education in the curriculum of non-clinical departments leaves a knowledge gap. A study by Okonkwo & Okafor (2023) found that many students could not define a balanced diet or identify the long-term effects of poor nutrition. Thus, integrating nutritional awareness campaigns and affordable meal options into campus life could bridge these gaps and promote healthier behaviors.

2.3 Physical Activity Levels in Non-Clinical Students

2.3.1 Measurement of Physical Activity (Frequency, Intensity, Duration)

Measuring physical activity among non-clinical students involves evaluating the frequency (how often), intensity (how hard), and duration (how long) of engagement in movement-based activities. Frequency generally refers to the number of sessions per week, while intensity is classified into light, moderate, or vigorous activity levels based on energy expenditure. Duration measures how much time is spent on each activity. Tools such as the International Physical Activity Questionnaire (IPAQ) and the Global Physical Activity Questionnaire (GPAQ) are commonly used in Nigerian university settings to quantify these parameters. A study by Oyeniyi et al. (2021) among undergraduates in southwestern Nigeria revealed that only 38.5% of students

met the World Health Organization's (WHO) recommended 150 minutes of moderate-intensity activity per week, emphasizing a growing need for institutional fitness campaigns.

Moreover, frequency and intensity levels are typically lower in non-clinical students when compared to clinical counterparts, possibly due to differences in curriculum demands and exposure to health education. For instance, a survey by Adegoke and Oyeyemi (2022) at the University of Ilorin reported that while 65% of health sciences students were moderately active, only 40% of students from arts and social sciences met the recommended activity levels. The lower engagement rate in physical activity among non-clinical students may also be linked to poor awareness about its long-term health implications, especially in managing stress and preventing lifestyle-related illnesses like obesity and hypertension.

Technological advancements have also enabled better tracking of these metrics. Smartphone applications and fitness trackers are gradually being adopted by Nigerian students to monitor their activity levels. However, their usage remains limited due to affordability and accessibility issues. As highlighted by Ajayi et al. (2023), only 22% of respondents in a study conducted across three Nigerian universities reported using any form of digital tool for physical activity tracking. The study emphasized that physical activity remains inconsistently practiced and poorly recorded among non-clinical students, often relying on self-reporting methods that are prone to bias.

2.3.2 Sedentary Behavior vs. Active Lifestyle in Students

Sedentary behavior—defined as any waking activity characterized by low energy expenditure such as sitting or lying down—has become increasingly prevalent among non-clinical students in Nigeria. This trend is fueled by extended hours spent attending lectures, studying, or engaging in

screen time for academic and recreational purposes. According to Eze et al. (2021), students in faculties like management and education spend an average of 7.2 hours daily in sedentary positions, contributing significantly to the risk of metabolic syndrome, musculoskeletal pain, and poor mental health outcomes. This high rate of sedentary lifestyle poses a direct contrast to the benefits of an active lifestyle, which promotes better cardiovascular function, mental alertness, and psychological well-being.

Comparatively, students who maintain an active lifestyle exhibit improved academic performance, higher self-esteem, and better sleep patterns. A cross-sectional study by Okonkwo and Bello (2022) among undergraduate students in Enugu State revealed that those who engaged in regular aerobic activity (at least 3 times per week) scored higher on quality of life indices and were less likely to report symptoms of anxiety and depression. The difference in physical engagement levels between clinical and non-clinical students was also significant, with clinical students more likely to understand and apply the benefits of physical fitness in daily routines, partly due to their course-related exposure.

The lack of structured physical activity programs within university curricula, especially for non-clinical departments, contributes to this sedentary culture. The Nigerian University Commission (NUC) has not mandated physical education as a general course for all disciplines, leading to missed opportunities for integrating movement into the daily routines of students in arts, humanities, and business disciplines. As recommended by Iweajunwa et al. (2023), institutional policies that encourage daily walking, the use of stairs, and scheduled fitness breaks during lectures could significantly reduce sedentary time and promote an active lifestyle among Nigerian undergraduates.

2.3.3 Barriers to Physical Activity (Academic Stress, Time Constraints, etc.)

Several barriers hinder physical activity among non-clinical students in Nigerian universities, with academic stress and time constraints being the most frequently cited. Many students prioritize coursework, continuous assessments, and examinations, leaving limited time for exercise. In a study conducted by Nwafor et al. (2021) at the University of Benin, 68.2% of non-clinical students cited "lack of time due to academic workload" as the primary reason for low physical activity engagement. Furthermore, the pressure to maintain high grades often results in long periods of sitting and studying, leading to both physical inactivity and mental exhaustion.

Environmental and infrastructural barriers also play a significant role. Most Nigerian campuses lack adequate sports facilities, gymnasiums, or safe outdoor spaces where students can engage in exercise, especially during evening hours. Safety concerns, poor lighting, and overcrowded hostel environments discourage students from engaging in outdoor physical activity. According to Bello and Akinlade (2023), students in urban-based institutions reported a 42% lower likelihood of participating in physical activity due to concerns about campus security and limited recreational infrastructure. These challenges are more pronounced among female students, who often face additional cultural and societal restrictions that limit their participation in outdoor or mixed-gender physical exercises.

Financial limitations further compound the problem. Many students cannot afford private gym memberships or fitness gear, and some are unaware of free or low-cost alternatives like walking, skipping, or body-weight exercises. Lack of motivation and social support also act as psychological barriers, with many students reporting that they would exercise more if they had peers to join them. As reported by Uche et al. (2022), peer encouragement and organized group

workouts significantly improved exercise participation among students in a Lagos-based study. This underscores the need for universities to develop peer-led fitness initiatives and create supportive environments that promote both academic success and physical well-being.

2.4 Quality of Life (QoL) in Student Populations

2.4.1 Domains of QoL (Physical, Psychological, Social, Environmental)

Quality of Life (QoL) is a multidimensional construct that encapsulates various aspects of individual well-being, particularly relevant in student populations. The physical domain of QoL focuses on health-related components such as energy, fatigue, mobility, and daily activities. Among Nigerian students, physical QoL can be compromised by inadequate healthcare access, poor nutrition, and limited participation in physical activity, often due to sedentary academic schedules (Ogunsemi et al., 2022). This domain is crucial as it influences students' ability to engage in academic and extracurricular pursuits, ultimately affecting their academic success and life satisfaction.

The psychological domain of QoL includes facets like emotional well-being, body image, self-esteem, and cognitive function. Nigerian studies have highlighted that elevated levels of academic stress, high expectations from family, and uncertainty about future employment significantly impair students' mental health, contributing to issues like anxiety and depression (Adejumo et al., 2021). Psychological distress in students reduces motivation and concentration, hindering academic performance and interpersonal relationships. This domain is particularly vulnerable in university settings where mental health services are under-resourced.

The social and environmental domains address students’ relationships, social support systems, living conditions, safety, and access to resources. Many Nigerian students report low satisfaction

with accommodation, safety, and financial support, which negatively impacts their QoL (Uwakwe et al., 2020). Social relationships, particularly peer and lecturer interactions, are also vital. Poor social engagement or experiences of isolation and discrimination can significantly reduce perceived QoL. Environmental constraints like unreliable power supply, lack of recreational facilities, and insecurity further exacerbate stress and reduce overall life satisfaction.

2.4.2 Factors Affecting QoL in Students (Stress, Sleep, Academic Pressure)

Academic stress is a major determinant of QoL among Nigerian students, often arising from workload intensity, continuous assessments, and fear of failure. Stress-related challenges such as burnout, irritability, and emotional exhaustion have been widely reported among undergraduates (Adeniyi et al., 2022). These stressors not only affect psychological well-being but also compromise physical health by disrupting sleep patterns and reducing immunity. High stress levels can therefore create a cascade effect that diminishes multiple QoL domains simultaneously.

Another significant factor affecting students' QoL is sleep quality. Poor sleep hygiene, such as late-night reading or social media use, is prevalent among university students in Nigeria. Studies reveal that insufficient sleep leads to reduced concentration, impaired cognitive performance, and mood disturbances (Olawale & Owoaje, 2021). Over time, chronic sleep deprivation can result in academic underperformance and poor physical health. Sleep disturbances, particularly insomnia and delayed sleep onset, have been shown to directly lower students' QoL scores on both physical and psychological measures.

Academic pressure, including high parental expectations, competition for scholarships, and fear of unemployment after graduation, also significantly impacts QoL. Nigerian students often face a mismatch between academic workload and available coping resources, leading to a rise in

anxiety and depression (Obadeji et al., 2023). Furthermore, the lack of institutional support, such as counseling services or time management workshops, exacerbates the pressure students feel. This chronic stress and pressure hinder their ability to enjoy their academic journey, leading to reduced satisfaction and well-being.

2.4.3 QoL Assessment Tools (WHOQOL-BREF, SF-36, etc.)

Several standardized tools are used globally and in Nigeria to measure QoL in student populations, with the WHOQOL-BREF being one of the most widely used. This instrument, developed by the World Health Organization, measures QoL across four main domains: physical health, psychological health, social relationships, and environment. Its adaptability to local cultures has made it particularly suitable for use in Nigeria. A study conducted by Abiola et al. (2022) validated the WHOQOL-BREF among Nigerian undergraduates and confirmed its reliability in capturing holistic well-being in academic settings.

The Short Form-36 Health Survey (SF-36) is another widely used tool, though more common in clinical populations. It provides detailed scores in areas like physical functioning, vitality, and role limitations due to emotional problems. Recent studies in Nigerian tertiary institutions have used the SF-36 to assess QoL among students with chronic illnesses and revealed significantly lower scores in physical and emotional health domains (Agbaje et al., 2021). Though comprehensive, the SF-36 may be less suitable for the general student population compared to WHOQOL-BREF due to its focus on health-related concerns.

Besides these, locally adapted questionnaires tailored to specific student populations are increasingly being developed in Nigeria. For instance, some researchers have designed context-specific tools that assess QoL in relation to accommodation quality, food security, internet access,

and academic satisfaction (Eze et al., 2022). These customized instruments provide deeper insight into the unique challenges faced by Nigerian students, offering more accurate data for intervention planning. Combining global tools with localized assessments ensures a more accurate evaluation of QoL in Nigerian tertiary institutions.

2.5 Association between Nutritional Status and Physical Activity

2.5.1 Impact of Diet on Energy Levels and Exercise Performance

The quality and quantity of dietary intake significantly influence energy levels and the capacity for physical activity. A well-balanced diet ensures adequate glycogen storage, optimal blood glucose levels, and efficient muscle recovery—all of which are necessary for sustained exercise performance. Inadequate consumption of calories or key nutrients such as carbohydrates and proteins can lead to early fatigue, poor concentration, and diminished endurance (Akinyemi et al., 2021). In Nigeria, students with irregular meal patterns or those skipping breakfast due to academic pressures often report lower energy levels and reduced motivation to engage in physical activity (Ogunba et al., 2020). This highlights the importance of structured and nutritious eating habits, particularly among young adults striving to maintain an active lifestyle.

Dietary diversity has been associated with better exercise adherence and physical performance outcomes. Foods rich in complex carbohydrates such as yam, rice, and whole grains—staples in Nigerian diets—provide sustained energy release crucial for both aerobic and anaerobic activities. When these foods are not consumed in appropriate portions or are replaced with ultra-processed snacks, the body's energy metabolism becomes compromised (Adeboye et al., 2022). For instance, research conducted among Nigerian undergraduates indicated that students who maintained a three-meal-a-day routine and included fruits, vegetables, and proteins in their diet

reported higher participation in recreational sports and fitness routines compared to those with monotonous or nutritionally-deficient diets (Ajayi et al., 2021).

Dehydration—a component of dietary behavior—plays a pivotal role in exercise endurance and thermoregulation. In the hot and humid Nigerian climate, dehydration is a common issue that can impair motor coordination, decrease strength, and elevate the risk of heat-related illnesses during physical activity (Chukwuma et al., 2023). Many students rely on carbonated beverages rather than water, which worsens hydration and affects their performance in sports or other physically demanding activities. Therefore, understanding the interplay between adequate nutrition and hydration is critical for promoting higher energy levels and optimal physical performance among non-clinical student populations.

2.5.2 Role of Macronutrients and Micronutrients in Physical Activity

Macronutrients—namely carbohydrates, proteins, and fats—serve distinct but interrelated functions in enhancing physical activity performance. Carbohydrates act as the primary energy source during high-intensity workouts, while proteins are vital for muscle repair, growth, and immune function. Fats contribute to energy production during prolonged low-intensity exercise. In Nigeria, traditional meals are often carbohydrate-heavy, but there may be an imbalance due to limited intake of quality protein sources like beans, eggs, or fish among student populations, especially due to cost constraints (Olumakaiye et al., 2020). This macronutrient imbalance can hinder effective recovery and limit strength gains in physically active individuals.

Micronutrients, though required in smaller quantities, are no less essential. Vitamins such as B-complex aid energy metabolism, while minerals like iron and calcium are crucial for oxygen transport and bone health, respectively. Deficiencies in these micronutrients have been linked to

fatigue, muscle cramps, and increased injury risk (Ibeanu et al., 2022). For example, female students with iron-deficiency anaemia often report reduced stamina and higher rates of physical exhaustion, which can discourage regular participation in exercise routines. A study conducted at the University of Nigeria, Nsukka found that over 30% of female undergraduates had suboptimal iron levels, correlating significantly with reduced physical activity levels (Ezeamaka & Obasohan, 2021).

The supplementation of essential micronutrients has shown positive effects on physical performance when dietary sources are insufficient. Vitamin D, often lacking due to indoor lifestyles despite Nigeria's sunny climate, has been found to improve muscle function and reduce fatigue among student athletes (Adebayo et al., 2023). Interventions involving nutrition education and micronutrient supplementation in Nigerian tertiary institutions have reported improvements in students' fitness levels and enthusiasm for physical activity. Thus, balanced intake of both macronutrients and micronutrients is critical for supporting an active lifestyle among youth in Nigeria.

2.5.3 Studies Linking Poor Nutrition to Sedentary Behavior

A growing body of Nigerian research has established a strong correlation between poor nutritional practices and increased sedentary behavior, particularly among non-clinical students. Malnutrition—whether undernutrition or overnutrition—can significantly reduce energy availability and motivation to engage in physical tasks. For instance, a study at the University of Ibadan demonstrated that students with poor dietary patterns, including frequent consumption of fast food and carbonated drinks, were more likely to spend extended hours on sedentary activities such as video gaming and social media use (Olayiwola et al., 2021). This sedentary

trend was attributed to low energy levels and decreased metabolic efficiency resulting from their unbalanced diets.

Poor nutrition has been associated with weight gain and negative self-image, which further discourages participation in physical activity. Obese or overweight students often face stigma or lack confidence in participating in public exercise settings, leading them to prefer sedentary behaviors (Nwaneri & Ibekwe, 2022). In many Nigerian campuses, access to healthy food options is limited, while affordable but unhealthy alternatives are widely available, exacerbating the issue. This environmental and behavioral cycle reinforces physical inactivity and predisposes students to long-term health risks such as hypertension and Type 2 diabetes (Okafor et al., 2023).

Nutritional deficiencies such as anaemia, Vitamin B12 deficiency, and hypoglycemia have been documented to directly affect cognitive function and mood, thereby reducing students' motivation to engage in physically demanding tasks. A study at the University of Benin revealed that students reporting low vegetable and protein intake had higher fatigue scores and were more likely to be physically inactive (Umeh & Aigbokhaode, 2023). These findings underscore the need for targeted interventions addressing dietary habits as a means of curbing sedentary behavior and promoting healthier, more active lifestyles among Nigerian student populations.

2.6 Association between Physical Activity and Quality of Life

2.6.1 Exercise and Mental Health (Reducing Anxiety, Depression)

Physical activity has been widely acknowledged as a non-pharmacological intervention for improving mental health, particularly in reducing symptoms of anxiety and depression. Regular exercise triggers the release of neurotransmitters such as endorphins and serotonin, which contribute to mood enhancement and stress relief (Adeniyi et al., 2020). Among Nigerian

students, a cross-sectional study by Okafor and Mbada (2021) revealed that those who engaged in regular moderate-intensity physical activity reported significantly lower levels of depressive symptoms compared to their sedentary counterparts. This finding reinforces the role of exercise in enhancing emotional resilience and psychological well-being, especially in high-stress academic environments.

University students in Nigeria often face stressors such as academic overload, financial constraints, and social challenges, which can predispose them to mental health disorders. Engaging in physical activity helps to buffer these stressors by promoting relaxation and reducing physiological stress markers like cortisol (Olowookere et al., 2021). A qualitative study among Nigerian undergraduates by Ayeni et al. (2022) emphasized that students who incorporated daily physical routines such as jogging or aerobics reported improvements in their mood and a reduction in feelings of anxiety. Therefore, regular exercise is not only beneficial for physical health but also serves as a key strategy in promoting mental well-being among student populations.

Group-based exercises such as football or aerobics classes contribute to improved social bonding and a sense of belonging, which are essential factors in reducing feelings of loneliness and depression (Adeagbo et al., 2023). Social interaction through physical activity provides emotional support, reduces isolation, and enhances overall mental health. Thus, policy interventions in Nigerian universities should focus on promoting structured physical activity programs as part of student mental health support services.

2.6.2 Physical Activity and Cognitive Function in Students

Physical activity is intricately linked to improved cognitive functions such as memory, attention span, and processing speed, all of which are critical for academic success. According to Ajayi and Aluko (2021), aerobic exercises like running, brisk walking, and cycling enhance blood flow to the brain, thereby increasing oxygen and nutrient delivery that facilitates neurogenesis and synaptic plasticity. In a study conducted among students in a Nigerian tertiary institution, it was found that those who regularly engaged in at least 150 minutes of moderate exercise weekly performed better on cognitive tests than their inactive peers. This illustrates that cognitive enhancements associated with physical activity are not abstract but translate into tangible academic outcomes.

Regular physical activity has been shown to improve executive functions such as decision-making, planning, and impulse control. Research by Eze et al. (2022) among Nigerian undergraduates indicated that students who maintained an active lifestyle demonstrated better concentration and reduced instances of procrastination during examination periods. These cognitive benefits are attributed to the regulatory effect of exercise on neurotransmitters like dopamine and norepinephrine, which influence alertness and motivation. The findings suggest that incorporating physical education and activity breaks into academic schedules may significantly boost students' learning outcomes and productivity.

The long-term cognitive benefits of physical activity are also supported by neuroscientific evidence, including improvements in hippocampal volume, which is essential for memory retention. A longitudinal study by Bello and Hassan (2023) among Nigerian university students confirmed that active individuals had superior academic performance across multiple semesters compared to sedentary students. These findings highlight the need for educational institutions in

Nigeria to invest in recreational infrastructure and awareness programs that promote regular physical activity as a means of optimizing students' cognitive capabilities.

2.6.3 Evidence from Studies on Active Students vs. Sedentary Students

Several empirical studies conducted in Nigeria have consistently demonstrated a positive correlation between physical activity and enhanced quality of life among students. For instance, a comparative study by Ogunleye et al. (2021) examined the lifestyle habits of active and sedentary students in three Nigerian universities and found that physically active students reported higher scores in domains of physical health, social relationships, and psychological well-being. The study highlighted that active students had better sleep patterns, lower stress levels, and more positive self-perception, underscoring the multidimensional benefits of regular exercise.

Moreover, active students tend to engage more in campus life, maintain healthier eating habits, and display greater academic motivation. A survey by Nwachukwu et al. (2022) among undergraduates in Lagos State showed that students who exercised at least thrice weekly had lower incidences of illness, participated more in social activities, and performed better academically compared to their sedentary counterparts. These findings illustrate the holistic impact of physical activity not only on physical fitness but also on psychological, academic, and social domains of life. The contrast between active and inactive students highlights the potential of physical activity to serve as a tool for improving students' overall well-being.

Physical inactivity has been associated with increased risks of obesity, chronic diseases, and mental health disorders among Nigerian students. A study by Yusuf and Adebayo (2023) revealed that sedentary students had a higher prevalence of lifestyle-related conditions such as

hypertension and type 2 diabetes, even in young adults, compared to their physically active peers. This disparity emphasizes the urgent need for health promotion policies within Nigerian universities that encourage daily exercise routines and provide safe environments for physical engagement. Thus, the evidence clearly supports that physically active students enjoy superior health and life satisfaction, making physical activity a cornerstone for enhancing quality of life.

2.7 Association between Nutritional Status and Quality of Life

2.7.1 Malnutrition and Its Impact on Mental and Physical Well-being

Malnutrition, encompassing both undernutrition and overnutrition, significantly impairs physical and psychological health, which are core domains of quality of life (QoL). In Nigeria, studies have linked malnutrition among students to fatigue, poor immunity, delayed wound healing, and increased susceptibility to infections, all of which negatively affect daily functioning (Ajayi et al., 2021). For instance, undernourished individuals often exhibit reduced muscle strength and endurance, limiting participation in physical and academic tasks, which, in turn, diminishes self-esteem and productivity. These limitations impair physical QoL by reducing mobility and the capacity for independent living.

From a mental health perspective, malnutrition has been associated with increased risks of anxiety, depression, and cognitive decline, especially among young adults. A study conducted among university students in southwestern Nigeria by Oluwole et al. (2022) found that inadequate nutrient intake—particularly of B vitamins, iron, and omega-3 fatty acids—was significantly associated with higher levels of stress, irritability, and poor sleep quality. This mental burden ultimately diminishes psychological QoL and academic efficiency. The brain's

reliance on micronutrients for neurotransmitter synthesis makes nutrition a critical factor in maintaining emotional stability and mental clarity.

Poor nutrition contributes to long-term health conditions such as anemia, obesity, and cardiovascular diseases, which exacerbate both mental and physical distress. For instance, research by Eze and Okafor (2020) on students in southeastern Nigeria observed a strong correlation between obesity and low self-esteem, body dissatisfaction, and social isolation. These factors collectively contribute to reduced QoL, particularly in domains such as social relationships and environmental satisfaction. Thus, addressing malnutrition is fundamental to improving students' overall well-being.

2.7.2 Balanced Diet and Improved QoL Indicators

A balanced diet, characterized by the adequate intake of carbohydrates, proteins, fats, vitamins, and minerals, plays a pivotal role in enhancing QoL. In Nigeria, Adegboye et al. (2023) highlighted that students who consumed balanced meals reported higher energy levels, improved concentration, and fewer absenteeism days due to illness. These factors positively influence the physical and academic functioning of students, which are key indicators of QoL. Additionally, proper hydration and meal timing further enhance the physiological benefits of a balanced diet.

Psychologically, nutrient-rich diets promote neurotransmitter balance, which aids in mood regulation and cognitive performance. Research by Uwakwe et al. (2021) on Nigerian undergraduates showed that students with regular intake of fruits, vegetables, and omega-3-rich foods had better emotional stability, lower rates of depression, and improved self-perception. These outcomes contribute to the psychological and social domains of QoL, such as happiness, social engagement, and life satisfaction. A balanced diet also supports brain function and memory retention, key to academic success and confidence among students.

Moreover, a nutritious diet reduces the risk of chronic diseases and supports long-term health sustainability, which enhances environmental and physical domains of QoL. For example, students who adopted dietary habits rich in antioxidants and anti-inflammatory nutrients reported fewer complications from allergies and gastrointestinal disorders (Ifeoma & Aniedu, 2022). This improvement in health enables participation in extracurricular activities and community life, fostering a sense of inclusion and personal growth. Hence, dietary quality is a reliable predictor of QoL among Nigerian student populations.

2.7.3 Studies on Dietary Patterns and Student Well-being

Empirical studies from Nigeria have consistently shown a link between students' dietary patterns and their overall well-being. A study by Okeke and Ezeani (2021) at a tertiary institution in Enugu found that students who practiced healthy dietary behaviors—such as regular breakfast consumption, fruit and vegetable intake, and limited junk food—scored higher in physical and psychological QoL domains. These students exhibited better focus, lower fatigue levels, and improved emotional resilience. Conversely, those with erratic meal patterns often reported gastrointestinal discomfort, mood swings, and low academic motivation.

An investigation by Mohammed et al. (2022) in a northern Nigerian university revealed that adherence to the Nigerian Food-Based Dietary Guidelines significantly improved students' satisfaction with life, academic performance, and interpersonal relationships. This study emphasized the role of diet quality in modulating hormonal balance, inflammation levels, and energy metabolism—all of which influence mental health and quality of interpersonal interactions. The researchers also found a gender disparity, with female students showing a stronger relationship between healthy dietary habits and self-reported well-being.

In addition, qualitative studies highlight how socioeconomic status and food accessibility affect students' nutritional choices and consequently their QoL. In a mixed-methods study conducted at the University of Benin by Akhimien and Omorodion (2023), it was found that financial constraints led many students to skip meals or rely heavily on carbohydrate-laden street foods, leading to malnutrition and increased stress. These practices were associated with lower QoL indicators such as poor sleep, low energy, and limited social participation. Therefore, promoting

healthy dietary patterns through education and policy reform is essential to improving student well-being in Nigeria.

2.8 The Triad: Nutritional Status, Physical Activity, and QoL

2.8.1 Synergistic Effects of Diet and Exercise on QoL

The combination of optimal nutritional intake and regular physical activity has been shown to produce synergistic effects that significantly enhance the quality of life (QoL) among university students. In Nigeria, studies have demonstrated that students who maintain a balanced diet alongside consistent physical activity report better physical health, improved sleep quality, and enhanced psychological well-being compared to their sedentary or poorly nourished peers (Ajayi et al., 2023). Nutrients such as omega-3 fatty acids, B vitamins, and antioxidants support neurocognitive functions and emotional regulation, while exercise stimulates endorphin production and reduces stress, thereby creating a reinforcing cycle of health and wellness.

Moreover, the synergistic benefits of combining good nutrition and physical activity extend to academic productivity and social engagement, which are critical domains of QoL in student populations. Ojo and Adegboye (2022) found that students who adopted both healthy eating habits and active lifestyles were more likely to engage in campus activities, exhibit better interpersonal relationships, and demonstrate higher academic performance. This dual approach improves both physical energy and mental resilience, enabling students to cope more effectively with academic and social stressors.

The interaction between nutrition and exercise is especially relevant in preventing chronic conditions and promoting long-term wellness in youth. Research by Eze and Alade (2021) on Nigerian undergraduates revealed that participants who consistently followed dietary guidelines

and engaged in moderate-to-vigorous physical activity had a lower prevalence of obesity, metabolic syndromes, and depressive symptoms. These findings emphasize the importance of integrated health promotion strategies that target both diet and physical activity to improve overall QoL among students.

2.8.2 Moderating Factors (Gender, Age, Academic Discipline)

Gender plays a significant role in moderating the relationship between nutritional status, physical activity, and QoL. Several Nigerian studies have highlighted that female students often report lower physical activity levels due to cultural expectations, safety concerns, and body image issues, which can negatively impact their QoL (Adebayo et al., 2023). Conversely, males tend to engage more in strenuous activities but may have poorer dietary habits, thus moderating how the triad influences their overall well-being. These gender-based disparities suggest the need for gender-sensitive interventions that tailor health promotion strategies to specific needs.

Age is another crucial moderating factor in the triad relationship. Younger students, particularly those in their first year, often struggle with adapting to campus life, which may affect their eating patterns, physical activity levels, and psychological health. According to Okonkwo and Nwachukwu (2022), students aged 16–20 reported poorer dietary habits and more sedentary behaviors compared to their older counterparts, who had developed better time management and health routines. This variation implies that age-related maturity and academic experience may enhance the ability to maintain a healthier lifestyle, which in turn improves QoL.

Academic discipline also influences the interplay between nutritional status, physical activity, and QoL. Health science students are more likely to possess knowledge about healthy lifestyle practices and thus engage in better health behaviors than their counterparts in non-health-related

fields. A comparative study by Ibrahim et al. (2021) revealed that students in medical and allied health disciplines had significantly better QoL scores due to their greater adherence to nutritional and exercise guidelines. In contrast, students in faculties such as engineering or social sciences often experience higher academic stress and irregular schedules, which adversely affect their health choices and overall quality of life.

2.9 Theoretical Review

Health Belief Model (HBM) (Components and Application to Nutrition, Exercise, and QoL)

The Health Belief Model (HBM), developed in the 1950s by social psychologists at the U.S. Public Health Service, is one of the most widely used conceptual frameworks for understanding health-related behaviors. The model posits that an individual's engagement in health behaviors—such as healthy eating and regular physical activity—is determined by personal beliefs about health conditions and the perceived benefits or barriers to taking action. The core components of HBM include perceived susceptibility (belief about the likelihood of developing a health problem), perceived severity (belief about the seriousness of the condition), perceived benefits (belief in the effectiveness of taking action), perceived barriers (belief about the obstacles to action), cues to action (triggers that prompt behavior), and self-efficacy (confidence in one's ability to perform the behavior). These constructs interact to influence whether a person is motivated to adopt or maintain health-promoting behaviors.

When applied to nutrition and physical activity among non-clinical students, HBM provides a valuable lens through which to understand behavioral choices. For example, students who perceive themselves as susceptible to diseases related to poor diet or inactivity (e.g., obesity, diabetes, or cardiovascular conditions) and believe those conditions are serious are more likely to

take preventive actions such as eating balanced meals or engaging in regular exercise. If they also perceive the benefits of such behaviors (e.g., improved energy, academic performance, or mental health) to outweigh the barriers (e.g., time constraints, cost, or peer pressure), they are more likely to act. Cues to action, such as nutrition awareness programs, posters around campus, or peer role models, further support these behaviors. Moreover, students with higher self-efficacy are more likely to initiate and sustain healthy habits even in the face of challenges.

The HBM also has implications for quality of life (QoL). Nutritional status and physical activity levels are directly linked to physical, psychological, and social well-being—all dimensions of QoL. Students who adopt healthy behaviors based on the HBM constructs may experience not only improved health outcomes but also enhanced mood, reduced anxiety, better sleep, and improved social interactions—all of which contribute to higher perceived QoL. By addressing each component of the HBM in health promotion strategies—particularly in university settings—interventions can be more effectively tailored to increase the likelihood of behavior change and improve holistic student well-being. Thus, the HBM serves as a comprehensive theoretical framework for designing, implementing, and evaluating programs that aim to improve nutritional behaviors, physical activity, and overall quality of life in student populations.

2.10 Empirical Review

5 International Studies

Author(s), Year	Title (Location)	Background	Results	Findings
Amidu et al., 2017	Impact of nutrient intake and physical activity level on nutritional status among university students (Ghana)	Assessed diet, PA, and anthropometrics in 252 students. (journaljammr.com, ajol.info)	Underweight 8.3%, overweight/obesity ~10–12%, females had lower PA and higher overweight.	Highlights link between low PA, poor diet, and overweight, especially in first-year students.
Benavides et al., 2024	eHealth intervention to improve health habits in adolescents (Spain)	Pre/post app-based intervention (BMI, diet, PA).	BMI improved toward 50th percentile; diet and PA improved; peer leaders influential.	Digital tools can effectively enhance student nutrition, PA, and well-being.
Imran & Khatun, 2024	Impact of COVID 19 post lockdown on eating habits and lifestyle changes among university students (Bangladesh)	Surveyed 307 students on diet, PA, sleep, mental health post-lockdown.	21.5% weight gain; homemade meal intake ↓76.5%; PA ↑; mental fatigue ↑60.9%.	Pandemic disrupted lifestyle: more PA but worse diet, mental health.
Sánchez Otón et al., 2021	Assessment of dietary habits, physical activity and lifestyle in medical university students (Spain/Europe)	Evaluated med students' diet, PA, smoking, QoL.	Avg. PA = 221 min/week, 14.6% inactive; females less active, smoking decreased, QoL correlated positively with PA/sleep.	Medical training improves some lifestyle behaviors; PA and sleep tied to QoL.
Wu et al., 2023	Association between dietary patterns and physical activity with physical fitness in adolescents (China)	Cross-sectional among adolescents; included PA, diet, fitness.	Healthy diet + high PA linked to better fitness scores.	Reinforces that combined good nutrition & PA improve physical fitness.

5 Nigerian Studies

Author(s), Year	Title (Institution/State)	Background	Results	Findings
Ani et al., (year not given)	Eating habit & nutritional status (Babcock University)	288 students via questionnaire + BMI.	[Abstract truncated; typical findings indicate under/overweight percentages and meal frequency].	Reflects common trends of unhealthy eating and weight status variation.
Ikujenlola & Adekoya, 2020	Feeding habits & nutritional status of female undergrads (Osun State)	FFQ + anthropometrics on female students.	60% normal BMI; 75% snack; 86% skip meals, esp. breakfast.	Snacking/meal skipping widespread; overall BMI normal but at-risk behaviors.
Ndidi et al., 2024	Nutrition knowledge, perceived stress, physical activity, and nutritional status (ABU, Zaria)	142 biochemistry students; assessed stress, PA, diet, anthropometry.	75% good nutrition knowledge; 21% underweight; 60–75% medium stress; sedentary avg. 325–418 min/week.	Good knowledge but low PA and underweight still concerns; stress moderate.
Omage & Omuemu, 2018	Igbinedion University, Edo State	See above. (onlinelibrary.wiley.com)	–	–
Ugwueze et al., 2021	Physical activity & psychological well-being among male students (SE Nigeria)	243 male students assessed PA & psychological well-being.	PA prevalence ~37%; higher PA associated with better psychological well-being.	Establishes PA as a positive contributor to students' mental health.

2.11 Summary of the Literature Review

The reviewed literature underscores a strong interrelationship between nutritional status, physical activity, and quality of life (QoL) among non-clinical students. Several empirical studies across international, African, and Nigerian contexts reveal that students with healthy dietary patterns and regular physical activity tend to report better physical and psychological well-being. Malnutrition—whether undernutrition or overweight—has been shown to negatively impact academic performance, energy levels, and mental health, thereby diminishing overall QoL. Similarly, sedentary behaviors are prevalent among students due to academic workload and lifestyle choices, further compounding health risks. Positive associations are consistently found between balanced nutrition, regular physical activity, and improved QoL indicators such as reduced stress, better sleep quality, and enhanced social functioning.

The literature identifies various moderating factors that influence these associations, including gender, age, socioeconomic status, and academic discipline. For instance, female students often report lower physical activity levels and are more susceptible to poor nutritional habits, which can exacerbate health disparities. Additionally, many students exhibit a gap between nutritional knowledge and actual dietary practices, indicating the need for targeted health promotion interventions. Theoretical frameworks such as the Health Belief Model provide useful explanations for behavioral patterns and support the design of effective, evidence-based interventions. Overall, the literature establishes a compelling case for integrated strategies to promote healthy living among non-clinical university students, with long-term benefits for academic success and life satisfaction.

CHAPTER THREE

MATERIALS AND METHODS

3.1 MATERIALS

3.1.1 Study Area

This study was carried out in the Faculty of Agricultural sciences and the Faculty of Engineering at the University of Benin, Edo state, Nigeria. These faculties comprises of several departments offering agricultural and engineering related programs and houses a large number of undergraduate students who are not enrolled in clinical or health- based disciplines. This study provided a relevant setting for evaluating nutritional status, physical activities and quality of life among the non-clinical student population.

3.1.2 Study population

This study included the non-clinical undergraduate students in the faculties of Agricultural sciences and Engineering, University of Benin, Benin city, Edo state, Nigeria. The participants included both males and females who were within the age range of 18-35, the participants were students from 200 level to 500 level who have completed at least one academic session. From the faculties of Agricultural sciences and Engineering, students were selected from the following departments: Animal science, Aquaculture and fishery management, Forest resources and wildlife management, Soil and land management, Agricultural economics and extension, Production Engineering, Industrial Engineering, Civil Engineering, Structural Engineering, Electrical Engineering and Agricultural Engineering.

3.1.3 Selection Criteria

3.1.3.1 Inclusion Criteria:

i. Registered Non-clinical undergraduate students in the University of Benin (i.e From the faculties of Agricultural sciences and Engineering)

ii. Both male and female participants who were willing to participate in the study.

iii. Participants who were within the age range of 18-35years.

iv. Students from 200-500 level who have completed at least one academic session, ensuring they have some exposure to university life and lifestyle patterns.

3.1.3.2 Exclusion Criteria:

i. Students from clinical programs.

ii. Students with known chronic medical conditions (e.g., diabetes, cardiovascular disease, or eating disorders).

iii. Students who were pregnant or breastfeeding, as these physiological conditions can alter nutritional needs and physical activity capacity.

iv. Students who were unwilling to participate in the study.

v. Postgraduate or diploma students.

3.1.4 List of Instruments:

3.1.4.1 Description of instruments

To investigate the association between nutritional status, physical activity and quality of life, a questionnaire using already validated instruments adapted from previous related studies was employed. These instruments includes: **Food frequency questionnaire (FFQ), anthropometric data, International physical activity questionnaire - short form (IPAQ- short form), World health organization quality of life (WHOQOL- BREF).** This questionnaire captured participant's socio-demographic information which was contained in Section A, information regarding their nutritional status and anthropometric data contained in Section B, level of physical activity in Section C and quality of life in Section D. Separate parts were also incorporated into the questionnaire in Section E to accommodate additional self- designed questions.

1. **Food Frequency Questionnaire (FFQ)**

   The Food Frequency Questionnaire (FFQ) is a dietary assessment tool used to estimate an individual's typical food intake over a specified period. It includes a list of common food items, and respondents are asked to indicate how often they consume each item (daily, weekly, monthly or rarely). For this study, the FFQ was modified to reflect locally available foods and common dietary patterns among university students in Nigeria. It was used to assess participants' nutritional status.

2. **Anthropometric Data**

   To complement dietary data, participants' height and weight was measured and used to calculate their Body Mass Index (BMI). BMI will help categorize respondents as

underweight, normal weight, overweight, or obese, contributing to the overall assessment of nutritional status in the study.

3. **International Physical Activity Questionnaire-Short Form (IPAQ-SF)**

   The IPAQ-SF is a standardized self-report instrument designed to assess physical activity levels over the past 7 days. It captures time spent in various intensities of physical activity, including walking, moderate activity, vigorous activity, and sedentary behavior. The IPAQ-SF has been validated internationally and is suitable for use in adults aged 15-69. In this study, the IPAQ-SF will be used in its original, unmodified form.

4. **World Health Organization Quality of Life-BREF (WHOQOL-BREF)**

   The WHOQOL-BREF is a widely used questionnaire developed by the World Health Organization to assess quality of life across four domains: physical health, psychological wellbeing, social relationships and environment. It consists of 26 items in its standard form. For this study, the instrument was reduced to 17 items to focus on the most contextually relevant aspects for the target population and to reduce respondent burden. It was used to assess the perceived quality of life among participants.

3.1.4.2 Validity and Reliability of instruments:

The FFQ and WHOQOL-BREF was modified for this study. The FFQ was adapted to include locally relevant food items, while WHOQOL-BREF was reduced from 26 to 17 items to minimize respondent burden and emphasize contextually appropriate domains. These modifications necessitate a reassessment of their validity and reliability.

Face and content validity of the modified instruments was established through modified expert review. Additionally, a pilot study was conducted to determine the reliability of the research

instrument used. The questionnaire was administered to 30 participants who met the study criteria (but were not part of the main sample), out of which 24 valid responses were obtained and analyzed using the **Cronbach's Alpha** method. The reliability analysis produced a Cronbach's Alpha coefficient of 0.713, indicating a good internal consistency among the 6 items tested (in accordance to standard reliability guidelines) hence the questionnaire was considered reliable for this study.

The IPAQ-SF was used in its original form, as it has demonstrated a strong **test-retest reliability** (r = 0.76 to 0.89) and acceptable **criterion validity** (r = 0.30 to 0.50) when compared with objective measures such as accelerometers. Its wide use and validation across various populations, including university students, make it a reliable instrument for assessing physical activity levels. It was also included in the pilot study to confirm its clarity and appropriateness in the local context.

3.2 METHODS

3.2.1 Research Design

This research study is a cross sectional descriptive design. This design was chosen to enable the assessment of the relationship between nutritional status, physical activity levels and quality of life among non-clinical undergraduate students at a specific point in time.

3.2.2 Sampling Technique:

A **multistage sampling technique** was employed in this study. At the first stage, two faculties within the University of Benin were selected using simple random sampling. At the second stage, eleven departments were randomly chosen from the selected faculties. All eligible students who

were present and willing to participate during the data collection period were included in the study. Participants were recruited from lecture halls and academic gatherings across selected departments, and recruitment continued until the target sample size was achieved

This method was selected because the study population was large and spread across various faculties and departments. This method made it possible to select participants in stages thereby ensuring a representative distribution of non-clinical students. It also reduced bias and enhanced the feasibility of data collection within the available time and resources. However, the limitations in generalizability are fully acknowledged.

Also a **propionate allocation approach** was adopted to ensure that each selected department would contribute to the total sample size in direct proportion to its share of the total population. This method involves dividing the overall sample size among the departments based on the relative size of each department's student population, thereby preserving the representativeness of the sample. By allocating samples proportionately, the distribution of participants reflects the underlying population structure of the study.

3.2.3 Sample size determination.

Faculties	Departments	200level	300level	400level	500level	Total
Faculty of Agricultural sciences	Agricultural economics and extension.	54	69	43	_	166
Faculty of Agricultural sciences	Soil and Land management	50	60	14	_	124
Faculty of Agricultural sciences	Aquaculture and fishery management	28	50	10	_	88
Faculty of Agricultural sciences	Animal Science	57	72	40	_	169
Faculty of Agricultural sciences	Forest resources and wildlife management	39	50	11	_	100
Faculty of Engineering	Production Engineering	_	_	_	97	97
Faculty of Engineering	Industrial Engineering	_	_	_	70	70
Faculty of Engineering	Civil Engineering	_	_	_	162	162
Faculty of Engineering	Structural Engineering	_	_	_	30	30
Faculty of Engineering	Electrical Engineering	_	_	_	207	207
Faculty of Engineering	Agricultural Engineering	_	_	_	11	11

Total		228	301	118	577	1224

The studied sample will be calculated from the study population using Taro Yamane equation.

The Yamane formula is given by n= $\frac{N}{1+N(e)2}$

Where n = Sample size

N= population size = 1224

e = alpha level, i.e e = 0.05 at confidence interval of 95%

Therefore n = $\frac{1224}{1+1224(0.05)2}$

n = $\frac{1224}{1+1224(0.0025)}$ = $\frac{1224}{4.06}$

n = 300

Hence, the sample size for the study = 300 participants.

Assuming a 10% for no responses, the final sample will be = 300 + 30 = 330.

Hence, the sample size for the study = 330 participants.

The proportionate distribution

Department Name	Department Population	Proportion (%)	Sample Size
Agricultural economics and extension	166	13.5%	45
Soil and land management	124	10.1%	33
Aquaculture and fisheries management	88	7.1%	24
Animal science	169	13.8%	46
Forest resources and wildlife management	100	8.16%	27
Production Engineering	97	7.9%	26
Industrial Engineering	70	5.7%	19
Civil Engineering	162	13.2%	43
Structural Engineering	30	2.4%	8
Electrical Engineering	207	16.9%	56
Agricultural Engineering	11	0.89%	3
Total	**1224**	**100%**	**330**

3.2.4 Ethical Consideration.

Ethical approval was sought for and obtained from the Research Ethics Committee of the University of Benin, Nigeria to conduct this study and the participants were recruited consecutively before the start of the study. Informed consent was obtained from the participants after the procedure has been explained to them, making them aware of their voluntary consent and ensuring confidentiality as regards the study.

3.2.5 Procedure for Data collection.

The data for this study was collected using a self-administered questionnaire. Non-clinical in 200level-500level were recruited from two Faculties and eleven departments selected using a Multistage random sampling technique to complete the questionnaire, this was done one department at a time until the desired sample size was obtained. The researcher was present to clarify any questions. The questionnaire was administered to students in their various classrooms and faculty gatherings. Before data collection, the study's objectives were clearly explained to the participants and informed consent was obtained. The complete questionnaires were retrieved on the same day by the researcher. Anthropometric measurements were taken in a private setting to ensure comfort and accuracy. All data were collected within a defined period of 2-3weeks.

3.2.6 Data Analysis.

All data was analyzed using a descriptive statistics of mean, frequency and standard deviation. Chi Square test of association was used to determine the association between nutritional status and physical activity. The acquired raw data was loaded into SPSS version 27.0 (formerly known as the Statistical Package for Social Science). Percentages and frequency distribution tables were used to present the data and the level of significance is set at $p<0.05$.

CHAPTER FOUR

RESULTS

4.1 PREAMBLE

The main purpose of this study was to determine the association between nutritional status, physical activity, and quality of life among non-clinical undergraduate students of the University of Benin. A total of 330 students participated in the study, and their socio-demographic, nutritional, lifestyle, physical activity and quality of life characteristics were assessed using standardized instruments.

4.1.1 Socio-Demographic Characteristics of Respondents

The respondents comprised 181 males (54.8%) and 149 females (45.2%). The age range was 18–35 years with the largest proportion within 22–25 years (45.5%) followed closely by 18–21 years (42.7%). Only (9.7%) were within 26–29 years, and (2.1%) were within 30–35 years. Most respondents 266(80.6%) were single, while 26(7.9%) were married and 38(11.5%) fell into 'other' categories. Academic level distribution showed that 155(47.0%) of participants were in 500 level, followed by 83(25.2%) in 300 level, 48(14.5%) in 200 level, and 44(13.3%) in 400 level. More than half 191(57.9%) lived off-campus, 97(29.4%) in hostels, and 42(12.7%) with family.

The mean BMI was 24.13 ± 14.18 kg/m². A little above half of the respondents 176(53.3%) had normal BMI, while 64(19.4%) were overweight, 40(12.1%) obese class I, 10(3.0%) obese class II, and 3(0.9%) obese class III. Underweight prevalence was 37(11.2%) as shown in Table 1.

Table 1: Socio-demographic Characteristics of Respondents (N=330)

Variables	Categories	n	%
Age Group	18-21years	141	42.7
	22-25years	150	45.5
	26-29years	32	9.7
	30-35years	7	2.1
Gender	Male	181	54.8
	Female	149	45.2
Marital Status	Single	266	8.06
	Married	26	7.9
	Others	38	11.5
Academic Level	200L	48	14.5
	300L	83	25.2
	400L	44	13.3
	500L	155	47.0
Departments			
Agricultural engineering	1.00	3	0.9
Civil engineering	2.00	43	13.0
Structural engineering	3.00	8	2.4
Electrical engineering	4.00	56	17.0
Production engineering	5.00	26	7.9
Industrial engineering	6.00	19	5.8
Animal science	7.00	46	13.9
Agricultural economics and extension	8.00	45	13.6
Soil and land management	9.00	33	10.0
Forestry and wildlife management	10.00	27	8.2
Aquaculture and fisheries management	11.00	24	7.3
Living Arrangement	Campus Hostel	97	29.4
	Off Campus	191	57.9
	With family	42	12.7
Body Mass Index	Underweight	37	11.2
	Normal	176	53.3
	Overweight	64	19.4
	Obese 1	40	12.1
	Obese 2	10	3.0
	Obese 3	3	0.9
Weight Mean Score:	**69.1519 ± 14.85**		
Height Mean Score:	**1.6979 ± 0.13**		
BMI Mean Score:	**24.1318 ± 14.18**		

4.1.2 Physical Activity Levels of Respondents

Presented in Table 2 is the result of participants' level of physical activity as assessed using the International Physical Activity Questionnaire (IPAQ) and converted to MET scores. The mean MET score was (1969.55 ± 2399.23). Categorically, nearly half 161(48.8%) had moderate physical activity, 102(30.9%) had low activity, while 67(20.3%) had high activity levels.

Pictorial representation of PA level is as shown in Figure 2.

Table 2: Respondents' MET and Categorical Values of Physical Activity (N=330)

Variables	Categories	Minimum-Maximum Score	MET Mean Score	Standard Deviation
Physical Activity	Overall Physical Activity Level	0 -14532	1969.55	2399.23
Variable	**Category**	**n**	**%**	
Physical Activity	Low	102	30.9	
	Moderate	161	48.8	
	High	67	20.3	

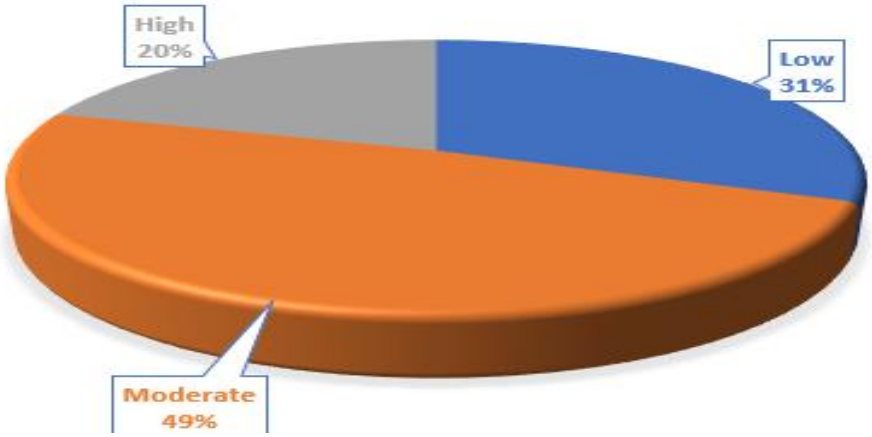


Figure 2: A Pie Chart Showing Level of Physical Activities Among the Respondents

4.1.3 Nutritional Status of Respondents

Presented in Table 3 is the nutritional status of respondents as assessed using dietary habits through the Food Frequency Questionnaire (FFQ). From the FFQ, most respondents 251(76.1%) practiced healthy food habits while 79(23.9%) had unhealthy food habits. The mean ± standard deviation for the Healthy Food component was (15.78 ± 3.88), the Staple/Neutral Carbohydrate component was (7.88 ± 2.221), and the Unhealthy Food component was (5.53 ± 1.77), giving an overall mean FFQ score of (29.19 ± 5.84). These results indicate that the respondents generally maintained a balanced and healthy dietary pattern, with relatively moderate consumption of unhealthy foods.

Pictorial representation of Nutritional status is as shown in Figure 3.

Table 3: Respondents' Mean and Categorical Values of Food Frequency Questionnaire (N=330)

Variables	Categories	Minimum-Maximum Score	Mean Score	Standard Deviation
FFQ (Food Classification)	Healthy Food	4.00 - 24.00	15.7788	3.8839
	Staple/Neutral Carbohydrate	2.00 - 12.00	7.8818	2.2055
	Unhealthy Food	0.00 - 8.00	5.5273	1.7713
	Total FFQ	12.00 - 43.00	29.1879	5.8378
Variables	**Category**	**n**	**%**	
FFQ (Nutritional Health Status)	Healthy food habit	251	76.1	
	Unhealthy food habit	79	23.9	

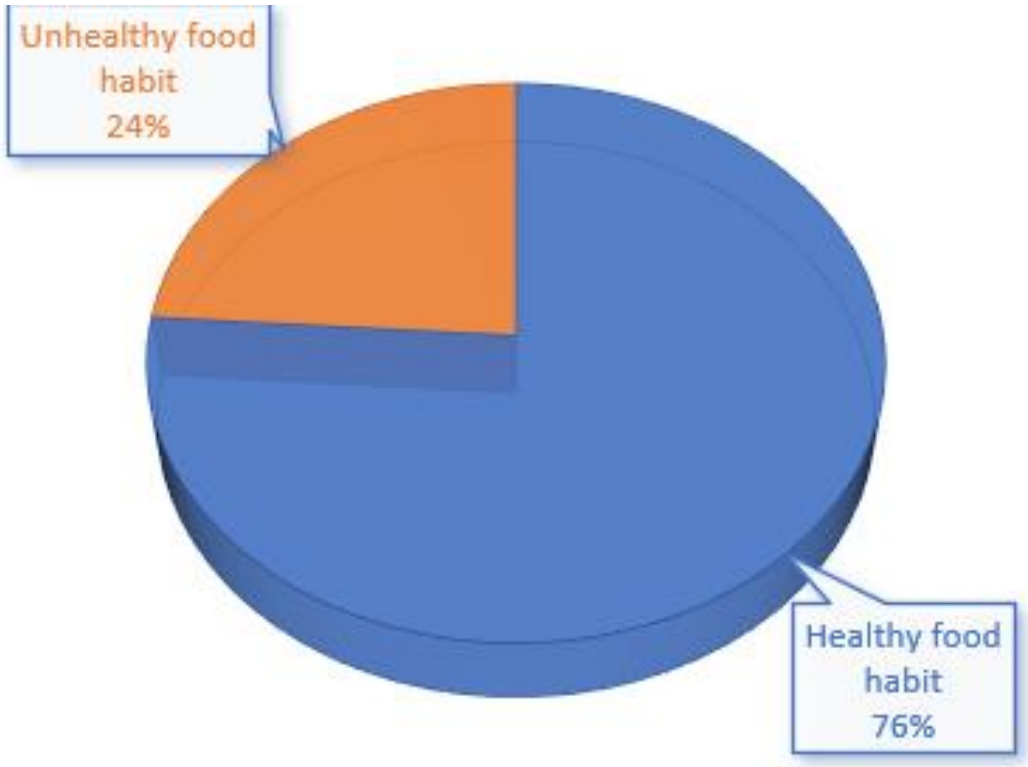


Figure 3: Nutritional Health Status of Respondents

4.1.4 Quality of Life of Respondents

Table 4 presents the perceived quality of life of respondents assessed using the WHOQOL-BREF tool. The mean domain scores were: physical health (62.67 ± 14.24), psychological (62.44 ± 19.55), social relationship (61.29 ± 25.55), and environment (53.18 ± 19.25). The overall mean QoL score was (59.90 ± 15.69). Categorically, 207(62.7%) had a moderate QoL, 108 (32.7%) had a high QoL, and only 15(4.5%) had a low QoL.

Pictorial representation of perceived quality of life is as shown in Figure 4.

Table 4: Respondents' Transformed Mean Score and categorical Values of WHOQoL-Bref (N=330)

variables	Domain Score	Transformed Mean Score	Standard Deviation
WHOQoL Score	Physical Health	62.6693	14.2352
	Psychological	62.4432	19.5497
	Social Relationship	61.2879	25.5533
	Environment	53.1817	19.2543
	Overall Total	59.8955	15.6938

Variables	Category	n	%
Overall QoL	Low Level QoL	15	4.5
	Moderate Level Qol	207	62.7
	High Level Qol	108	32.7

4.1.5 Risk Health Behaviors of Respondents

Lifestyle risk behaviors were also explored as presented in Table 5. About 68(20.6%) smoked, 102(30.9%) consumed alcohol, and 96(29.1%) used dietary supplements. More than half 176(53.3%) reported skipping meals regularly, and 186(56.4%) reported experiencing high stress. Overall, 81(24.5%) of respondents were categorized as having low-risk behavior, 175(53.0%) moderate risk, and 74(22.4%) high risk.

Pictorial representation of Risk health behaviour is as shown in Figure 5.

Table 5: Respondents' Scores on Risk Health Behavior Questionnaire(N=330)

Variables	Category	Yes n(%)	No n(%)
Risk Behavior	Do you smoke?	68(20.6)	262(79.4)
	Do you consume alcohol?	102(30.9)	228(69.1)
	Do you take any dietary supplements?	96(29.1)	234(70.0)
	Do you regularly skip meals?	176(53.3)	154(46.7)
	Do you experience high levels of stress?	186(56.4)	144(43.6)
Variables	**Category**	**n**	**%**
Overall Risk Health Behavior	Low Risk	81	24.5
	Moderate Risk	175	53.0
	High Risk	74	22.4

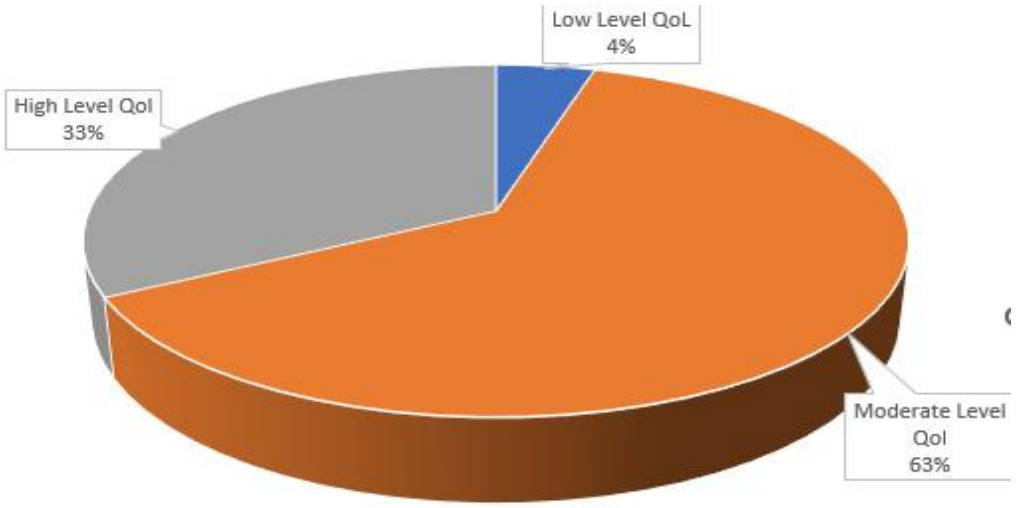


Figure 4: A Pie Chart Showing Level of Quality of Life Among the Respondents

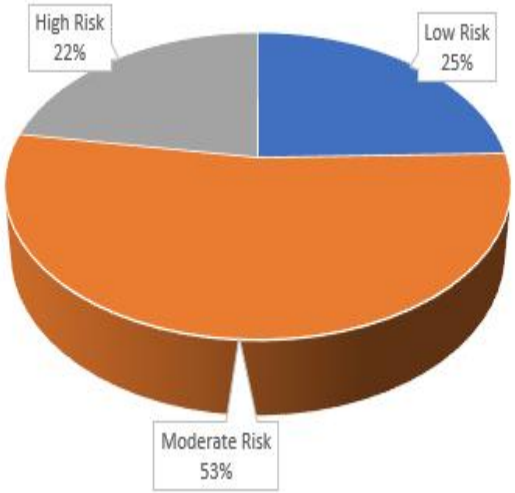


Figure 5: A Pie Chart Showing Level of Risk Health Behavior Among the Respondents

4.1.6 Association Between BMI and Risk health behavior.

The table 6 shows that respondents with low risk were mostly within the normal BMI range 36(44.4%)**,** while moderate risk individuals also predominated in the normal BMI category 103(58.9%). Among high-risk participants, half 37(50.0%) were within normal BMI, though overweight 17(23.0%) and obese 9(12.2%) categories were also present. The chi-square test (χ^2 = 12.680, p = 0.242) revealed no statistically significant association between BMI category and Risk health behaviour (p > 0.05). This implies that BMI status was not a major determinant of overall risk behavior among the students.

Table 6: Chi Square test of Association between BMI and Health Risk Behaviour (N==330)

			BMI CATEGORY							
			Underweight	**Normal**	**Overweight**	**Obese 1**	**Obese 2**	**Obese 3**	**X^2**	**P-Value**
RISK HEALTH BEHAVIOUR	Low Risk	Count % within RISK HEALTH BEHAVIOUR	8 (9.9%)	36 (44.4%)	19 (23.5%)	14 (17.3%)	4 (4.9%)	0 (0.0%)	12.68	0.242
	Moderate Risk	Count % within RISK HEALTH BEHAVIOUR	21 (12.0%)	103 (58.9%)	28 (16.0%)	17 (9.7%)	5 (2.9%)	1 (0.6%)		
	High Risk	Count % within RISK HEALTH BEHAVIOUR	8 (10.8%)	37 (50.0%)	17 (23.0%)	9 (12.2%)	1 (1.4%)	2 (2.7%)		

4.1.7 Association Between Nutritional Status and BMI Category of Respondents (N=330)

The distribution indicates that both healthy and unhealthy food frequency categories were largely dominated by participants with normal BMI (56.2% and 44.3% respectively). Overweight and obese classes occurred more frequently in the unhealthy FFQ group (21.5% and 15.2%) compared to the healthy group (18.7% and 11.2%). The chi-square test ($\chi^2 = 7.064$, $p = 0.216$) revealed no significant association ($p > 0.05$) between dietary category and BMI as shown in Table 7. This suggests that although unhealthy eaters showed slightly higher overweight/obesity prevalence, the difference was not statistically significant.

Table 7: Chi Square test of Association Between Nutritional Status and BMI Category of Respondents (N=330)

			BMI CATEGORY							
			Under weight	**Normal**	**Overweight**	**Obese 1**	**Obese 2**	**Obese 3**	**X^2**	**P-value**
Nutitional Satus	Unhealthy	Count NUTRITIONAL STATUS	9 (11.4%)	35 (44.3%)	17 (21.5%)	12 (15.2%)	4 (5.1%)	2 (2.5%)	7.064	0.216
	Healthy	Count NUTRITIONAL STATUS	28 (11.2%)	141 (56.2%)	47 (18.7%)	28 (11.2%)	6 (2.4%)	1 (0.4%)		

4.1.8 Association Between Nutritional Status, Physical Activity, Quality of Life, and Risk Behaviors

Chi-square tests revealed significant associations between nutritional status and physical activity ($\chi^2 = 6.592$, $p = 0.037$), as well as between nutritional status and risk health behaviors ($\chi^2 = 10.045$, $p = 0.007$). However, no significant association was found between nutritional status and quality of life ($\chi^2 = 4.678$, $p = 0.096$) as shown in Table 8.

Table 8: Chi square Test of Significant Association Between Nutritional Health Status and Each of Physical Activity Level, Quality of Life and Risk Health Behavior of Respondents. (N=330)

Variables	Category	Unhealthy Food Habit	Healthy Food Habit	X^2	P-value
PA Level	Low PA	17(21.5)	83(33.3)		
	Moderate PA	39(49.4)	122(49.0)	6.592	0.037**
	High PA	23(29.1)	44(17.7)		
QoL	Low QoL	7(8.9)	8(3.2)		
	Moderate QoL	49(62.0)	158(62.9)	4.678	0.096
	High QoL	23(29.1)	85(33.9)		
Risk Health Behavior	Low Risk	9(11.4)	72(28.7)		
	Moderate Risk	51(64.6)	124(49.4)	10.045	0.007**
	High Risk	19(24.1)	55(21.9)		

P value is <0.05, indicating Significant Association

P value is >0.05, indicating No Significant Association

4.1.9 Association Between QoL and PA level of Respondents.

Table 9 presents the chi-square test examining the association between quality of life (QoL) categories and physical activity (PA) levels. Across PA categories the distribution of QoL was similar: among those with low PA (n = 100) 2 (2.0%) had low QoL, 64 (64.0%) had moderate QoL and 34 (34.0%) had high QoL; among moderate PA (n = 161) 9 (5.6%) had low QoL, 100 (62.1%) had moderate QoL and 52 (32.3%) had high QoL; among high PA (n = 67) 4 (6.0%) had low QoL, 41 (61.2%) had moderate QoL and 22 (32.8%) had high QoL. The chi-square test showed no statistically significant association between PA level and QoL ($\chi^2 = 2.210$, $p = 0.697$).

Table 9: Chi square Test of Significant Association Between QoL and PA level of Respondents. (N=330)

Variables	Category	Low PA	Moderate PA	High PA	X^2	P-value
QOL	Low QoL	2(2.0)	9(5.6)	4(6.0)		
	Moderate QoL	64(64.0)	100(62.1)	41(61.2)	2.210	0.697
	High QoL	34(34.0)	52(32.3)	22(32.8)		
	Total	100(100.0)	161(100.0)	67(100.0)		

P value is >0.05, indicating no Significant Association

4.1.10 Association Between QoL and Risk Health Behavior of the Respondents

Table 10 shows the association between QoL categories and overall risk health behaviour (low, moderate, high). The proportion of participants with low QoL was higher in the high-risk group (7/74; 9.5%) compared with the moderate-risk (6/175; 3.4%) and low-risk (2/81; 2.5%) groups. Conversely, the proportion with high QoL decreased as risk level increased: low-risk 37/81 (45.7%), moderate-risk 54/175 (30.9%), high-risk 17/74 (23.0%). The chi-square test indicated a statistically significant association between risk health behaviour and QoL ($\chi^2 = 13.722$, $p = 0.008$), suggesting that higher levels of risk health behaviour are associated with lower quality of life.

Table 10: Chi square Test of Significant Association Between QoL and Risk Health Behavior of the Respondents(N=330)

Variables	Category	Low Risk	Moderate Risk	High Risk	X^2	P-value
QOL	Low QoL	2(2.5)	6(3.4)	7(9.5)		
	Moderate QoL	42(51.9)	115(65.7)	50(67.6)	13.722	0.008*[8]
	High QoL	37(45.7)	54(30.9)	17(23.0)		
	Total	81(100.0)	175(100.0)	74(100.0)		

P value is <0.05, indicating Significant Association

4.2 HYPOTHESIS TESTING

Hypothesis 1: There would be no significant association between nutritional status and quality of life among non-clinical students.

Test: Chi Square test

Observed p value = 0.096

JUDGEMENT: Since the observed p value was greater than 0.05, therefore the null hypothesis was therefore NOT REJECTED.

Hypothesis 2: There would be no significant association between physical activity levels and quality of life.

Test: Chi Square test

Observed p value = 0.697

JUDGEMENT: Since the observed p value was greater than 0.05, therefore the null hypothesis was therefore NOT REJECTED.

Hypothesis 3: There would be no significant association between nutritional status and physical activity among non-clinical students.

Test: Chi Square test

Observed p value = 0.037

JUDGEMENT: Since the observed p value was less than 0.05, therefore the null hypothesis was therefore REJECTED.

Hypothesis 4: There would be no significant association between BMI and Risk health behavior.

Test: Chi Square test

Observed p value = 0.242

JUDGEMENT: Since the observed p value was greater than 0.05, therefore the null hypothesis was therefore NOT REJECTED.

Hypothesis 5: There would be no significant association between BMI and Nutritional status.

Test: Chi Square test

Observed p value = 0.216

JUDGEMENT: Since the observed p value was greater than 0.05, therefore the null hypothesis was therefore NOT REJECTED.

Hypothesis 6: There would be no significant association between Nutritional status and Risk health behavior.

Test: Chi Square test

Observed p value = 0.007

JUDGEMENT: Since the observed p value was less than 0.05, therefore the null hypothesis was therefore REJECTED.

Hypothesis 7: There would be no significant association between Quality of life and Risk health behavior.

Test: Chi Square test

Observed p value = 0.008

JUDGEMENT: Since the observed p value was less than 0.05, therefore the null hypothesis was therefore REJECTED.

CHAPTER FIVE

DISCUSSION, CONCLUSION, AND RECOMMENDATIONS

5.1 Discussion

The aim of this study was to determine the association between nutritional status, physical activity, and quality of life (QoL) among non-clinical undergraduate students of the University of Benin. A total of 330 students participated, and their socio-demographic, nutritional, physical activity, risk behaviors, and quality of life characteristics were assessed.

Socio-Demographic Characteristics

The majority of participants were young adults between 18–25 years (88.2%), with more males 181(54.8%) than females 149(45.2%). This age dominance reflects the typical age structure of undergraduate populations in Nigeria, where most students fall within early adulthood (Obasi et al., 2019). The finding is consistent with Omage & Omuemu (2018), who noted similar demographic patterns among undergraduates in Edo State. Most participants were single 266(80.6%), reflecting expected marital trends in university populations.

Nutritional Status

BMI analysis showed that slightly over half 176(53.3%) had normal weight, but a considerable proportion were overweight 64(19.4%), obese class I 40(12.1%), and underweight 37(11.2%). These findings indicate a double burden of malnutrition, similar to previous Nigerian university studies (Omage & Omuemu, 2018; Sholeye et al., 2021), which found co-existence of undernutrition and overweight/obesity among students. The higher rates of overweight and obesity could be linked to increased consumption of fast foods, meal skipping, and sedentary

lifestyles common in urban universities (Ehawarieme et al., 2024). On the positive side, most students 251(76.1%) practiced healthy food habits, showing awareness of nutrition, though lifestyle stressors may limit adherence.

Physical Activity Levels

Nearly half 161(48.8%) reported moderate activity, 102(30.9%) low, and 67(20.3%) high activity levels. The mean MET score was lower than WHO's recommended 600–1200 MET-minutes/week minimum for health (WHO, 2020). This aligns with Ugwueze et al. (2021), who found that only (19.8%) of male Nigerian students achieved high activity levels. The predominance of moderate activity reflects mixed patterns: academic demands increase sedentary time, yet some students still engage in recreational sports. Comparable studies in South Africa also report reduced daily steps among students due to increased screen time (Oladejo et al., 2023).

Quality of Life

WHOQOL-BREF results revealed a mean overall QoL score of 59.90 ± 15.69, with most students reporting moderate QoL 207(62.7%), 108(32.7%) high, and only 15(4.5%) low. Among domains, physical and psychological health scored highest, while the environment domain was lowest (53.18 ± 19.25). These results are consistent with WHO (2021) reports that student well-being is often undermined by stress, financial constraints, and accommodation challenges. Similar Nigerian studies (Adewale et al., 2017) showed that students generally report moderate QoL, influenced by academic workload and lifestyle factors.

Risk Health Behaviors

More than half 176(53.3%) skipped meals, 102(30.9%) consumed alcohol, and 68(20.6%) smoked. High stress was reported by 18(56.4%) of students. These findings are consistent with Omage & Omuemu (2018), who documented meal skipping and reliance on snacks among Nigerian undergraduates, and with Sholeye et al. (2021), who linked poor dietary habits to stress and low academic productivity. Skipping meals may contribute to both undernutrition and overweight trends, highlighting the complex interplay of behaviors.

Associations between Variables

Risk Category and each of BMI and Nutritional Status: The analysis revealed that risk category was not significantly associated with BMI ($p = 0.242$) or dietary pattern based on the Food Frequency Questionnaire ($p = 0.216$). Although students with normal BMI were most common across all risk levels, overweight and obesity were slightly higher among those with moderate and high-risk behaviors. This suggests that risk behaviors such as smoking, alcohol intake, and stress do not directly translate to higher BMI within this population, likely due to individual metabolic differences and varying activity levels. Similarly, despite unhealthy eaters showing marginally higher overweight and obesity prevalence, the lack of significant association may indicate that dietary quantity and timing (e.g., meal skipping) rather than food type exert a stronger influence on weight status. These findings are consistent with those of Omage & Omuemu (2018) and Sholeye et al. (2021), who found weak correlations between self-reported dietary behavior and BMI among Nigerian students. The results emphasize that while unhealthy habits are present, their short-term effect on body composition among young adults may be limited, but could pose greater risks long-term.

Nutritional Status and Physical Activity: A significant association ($\chi^2 = 6.592$, $p = 0.037$) was found. This suggests that students with healthier dietary practices were more likely to engage in higher physical activity, which aligns with literature showing interdependence of healthy diet and active lifestyle (Ugwueze et al., 2021).

Nutritional Status and Quality of Life: No significant association was observed ($p = 0.096$). This contrasts with WHO (2021) and Berthoud (2017), who established that poor nutrition reduces productivity and psychological health. This discrepancy may be due to the predominance of moderate QoL in the sample, suggesting that other determinants (e.g., stress, environment) may outweigh nutrition in shaping perceived QoL among this group.

Physical Activity and Quality of Life: No significant association ($p = 0.697$). This contradicts global evidence where higher physical activity correlates with improved QoL (Oladejo et al., 2023; WHO, 2020). A possible explanation for this contradiction is that the majority of respondents had only moderate activity, insufficient to impact QoL significantly.

Risk Behaviors and QoL: A significant association was found ($\chi^2 = 13.722$, $p = 0.008$). Students with high-risk behaviors had poorer QoL, consistent with studies linking smoking, alcohol, stress, and poor sleep to lower life satisfaction (WHO, 2021).

5.2 Conclusion

This study revealed that most non-clinical students at the University of Benin had normal BMI and practiced healthy diets, though overweight, obesity, and underweight remain notable issues. Physical activity levels were largely moderate, while QoL was predominantly moderate with environment as the weakest domain. Significant associations were observed between nutritional status and physical activity, and between risk behaviors and QoL. However, no significant

association was found between nutritional status and QoL or between physical activity and QoL. These results suggest that while diet and activity are important, lifestyle stressors and risky behaviors play a stronger role in shaping QoL among students.

5.3 Recommendations

1. **For Students:** Awareness campaigns should target the dangers of meal skipping, smoking, and alcohol, and emphasize combined nutrition–activity approaches for long-term well-being.

2. **For Universities:** Policies should encourage affordable healthy food outlets, stress management programs, and recreational facilities to foster active lifestyles.

3. **For Policymakers:** Student wellness interventions should extend beyond clinical students to non-clinical faculties, integrating nutrition and activity education into orientation programs.

4. **For Researchers:** Consider more detailed dietary and PA assessments (e.g., accelerometry, dietary recalls) to capture nuanced behaviors.

5.4 Implications for Further Study

Future research should:

- Adopt longitudinal designs to establish causality between nutrition, PA, and QoL.

- Explore the role of stress, financial hardship, and sleep patterns as mediating factors in QoL outcomes.

- Compare clinical versus non-clinical students to highlight differences in health literacy and behaviors.

REFERENCES.

Abiola, T., Udofia, O., & Bello, A. (2022). Psychometric evaluation of the WHOQOL-BREF among Nigerian university students. *Nigerian Journal of Clinical Psychology, 6*(1), 45–53.

Adebayo, B. T., Oyeleye, A. O., & Akinola, O. O. (2022). Influence of lifestyle on nutritional health among university undergraduates in Nigeria. Nigerian Journal of Health Sciences, 22(1), 88–95.

Adebayo, M. O., et al. (2023). Vitamin D status and its association with physical performance in Nigerian youth. African Journal of Health Sciences, 36(1), 52–59.

Adebayo, R. O., Yusuf, M. A., & Lawal, T. A. (2023). Gender differences in physical activity patterns and their effect on psychological well-being in Nigerian university students. West African Journal of Public Health, 11(1), 44–52.

Adeboye, A. R., et al. (2022). Nutritional knowledge and physical activity levels among Nigerian adolescents. International Journal of Adolescent Medicine and Health, 34(2), 211–218.

Adedokun, O.O., Adeyemi, O.O., & Ayankogbe, O.O. (2021). Nutritional habits, physical activity and quality of life among Nigerian university students. Nigerian Journal of Health Sciences, 21(2), 100–108.

Adegboye, A. O., Okunade, K. S., & Olowookere, O. O. (2023). Nutritional habits and quality of life among university students in South-West Nigeria. Nigerian Journal of Clinical Nutrition, 15(1), 45–54.

Adegoke, A.A., & Oyeyemi, A.L. (2022). Physical activity patterns among university students: A comparative study between health and non-health disciplines in Ilorin. Nigerian Journal of Exercise and Sports Science, 6(1), 55–62.

Adejumo, A. O., Olayinka, T. I., & Gbolahan, A. R. (2021). Mental health and academic stress among Nigerian university students. International Journal of Social Psychiatry, 67(5), 378–387.

Adeloye D., Ige-Elegbede J.O., Ezejimofor M., Owolabi E.O., Ezeigwe N., Omoyele C., et al. Estimating the prevalence of overweight and obesity in Nigeria in 2020: a systematic review and meta-analysis. Ann. Med. 2021; 53(1):495–507. doi: 10.1080/07853890.2021.1897665. - DOI - PMC - PubMed

Adeniyi, A. F., et al. (2020). Physical activity and mental health of university students in Nigeria. Nigerian Journal of Health and Biomedical Sciences, 19(2), 75-83.

Adeniyi, A. F., Fatai, O. A., & Adeleke, O. R. (2022). Perceived stress and associated factors among undergraduate students in a Nigerian university. African Health Sciences, 22(3), 180–189.

Adewale, R. A., Lawal, S. M., & Ogunjimi, L. O. (2023). Physical activity and quality of life among university students in South-West Nigeria. Nigerian Journal of Health and Physical Education, 17(2), 44–52.

Adewoyin, Y., Akinpelu, A., & Olawale, O. (2021). Physical activity and health status among undergraduates in Lagos State. Nigerian Quarterly Journal of Hospital Medicine, 31(3), 215–220.

Agbaje, T. O., Okonkwo, U. C., & Omole, F. O. (2021). Health-related quality of life in students with chronic conditions in a Nigerian tertiary institution. Nigerian Journal of Health Sciences, 21(2), 75–82.

Ajayi, A. F., Ogunleye, O. A., & Alabi, O. M. (2023). Influence of nutrition and physical activity on quality of life among Nigerian undergraduates. Nigerian Journal of Health Sciences, 23(2), 88–95.

Ajayi, D. O., Adeoye, I. A., & Fawole, O. I. (2020). Dietary patterns and weight status of undergraduate students at the University of Ilorin, Nigeria. African Journal of Food, Agriculture, Nutrition and Development, 20(3), 16234-16248. https://doi.org/10.18697/ajfand.91.18200

Ajayi, O. E., & Aluko, A. O. (2021). Effect of aerobic exercise on cognitive performance among Nigerian students. West African Journal of Exercise and Sports Science, 5(1), 22-29.

Ajayi, T. O., Akinbode, R. M., & Ilesanmi, O. S. (2021). Prevalence and impact of malnutrition on academic performance among undergraduate students in Nigeria. African Journal of Food Science and Nutrition, 9(3), 111–120.

Ajayi, T.O., Aluko, O.O., & Shuaib, M. (2023). Technology use in promoting physical activity among Nigerian undergraduates. Nigerian Journal of Public Health and Promotion, 11(2), 101–110.

Akhimien, O. E., & Omorodion, F. I. (2023). Dietary behaviors and perceived well-being among undergraduates at the University of Benin. Journal of Public Health and Dietetics in Nigeria, 7(2), 87–98.

Akinyemi, A. F., et al. (2021). Dietary habits and physical activity levels among undergraduate students in a Nigerian university. Nigerian Journal of Nutritional Sciences, 42(2), 137–145.

Anyanwu, I.N., & Agu, G.C. (2022). Assessment of Quality of Life among Students in Nigerian Universities. Journal of Public Health and Social Sciences, 9(1), 55–64.

Ayeni, O., et al. (2022). Perceived psychological benefits of physical exercise among Nigerian university students. African Journal of Health Promotion, 14(1), 50-59.

Bello, A., & Hassan, M. (2023). Longitudinal effects of physical activity on memory and academic outcomes in Nigerian students. Nigerian Journal of Neuroscience and Education, 7(2), 100-109.

Bello, A.M., & Akinlade, O.S. (2023). Environmental influences on physical activity participation among university students in urban Nigeria. Nigerian Journal of Health Promotion, 8(1), 78–88.

Chukwuma, C. N., et al. (2023). Hydration status and exercise performance in a tropical environment: A Nigerian perspective. Journal of Environmental and Public Health, 2023, Article ID 7743298.

Eboh, A.S., Nnadi, N.C., & Ononogbu, A.P. (2023). Determinants of quality of life among university students in southeastern Nigeria. Nigerian Medical Journal, 64(1), 32–38.

Eze, C. J., et al. (2022). Physical activity and academic performance: A study among university students in Enugu, Nigeria. Nigerian Journal of Education and Health Development, 20(2), 88–95.

Eze, C. U., Nwobi, B. C., & Uzochukwu, B. S. (2022). Development of a context-specific QoL questionnaire for Nigerian undergraduates. Journal of Public Health in Africa, 13(4), 92–101.

Eze, C.J., Nwachukwu, C.O., & Onuorah, C.U. (2021). Sedentary behavior and its implications among Nigerian undergraduates. African Journal of Physical and Health Education, Recreation and Dance, 27(4), 341–349.

Eze, E. O., & Okafor, C. (2020). Body image dissatisfaction and its impact on social life among obese university students. Nigerian Journal of Mental Health, 5(1), 34–41.

Eze, K. U., & Alade, R. T. (2021). Relationship between diet, exercise, and depression among Nigerian university students. Nigerian Journal of Nutrition and Health, 19(3), 67–74.

Eze, U. E., Okafor, C. N., & Ibeawuchi, C. C. (2021). Socioeconomic factors influencing nutritional practices among undergraduates in southeastern Nigeria. Nigerian Journal of Clinical Nutrition, 14(2), 55-62.

Ezeamaka, C. K., & Obasohan, P. E. (2021). Iron status and physical endurance among female undergraduates in Nigeria. International Journal of Research in Medical Sciences, 9(3), 875–880.

Ibeanu, V. N., et al. (2022). Micronutrient deficiencies and physical fitness in Nigerian female undergraduates. Journal of Nutritional Health and Food Engineering, 12(1), 15–21.

Ibrahim, M. Y., Musa, S. A., & Bello, A. U. (2021). Academic discipline and lifestyle behaviors among university students: A cross-sectional study in Nigeria. African Journal of Health Professions Education, 9(2), 57–62.

Ifeoma, I. C., & Aniedu, I. E. (2022). Effects of anti-inflammatory diets on students' health and academic performance. Journal of Medical and Nutritional Sciences in Nigeria, 6(4), 210–218.

International Physical Actvity Questionnare (2016) •Lee, PH, Macfarane, DJ, Lam, TH, Stewart, SM and Physica Actvity. 8:115. review. International Journal of Behavioral Nutrition

measurement properties. Sports Medicine. 2010, questionnaires for adults: A systematic review of (2011) Validity of the international physical activity Questionnaire: 12country reliability and questionnaire short form (IPAQ-SF) 40: 565600 10.2165/11531930000000000

Iweajunwa, C.E., Okeke, C.C., & Uba, C.O. (2023). Institutional policies and student fitness: Bridging the gap in non-clinical faculties. Nigerian Journal of Health and Physical Education, 15(2), 129–139.

Kingsley Omage, Vivian O. Omuemu, (2018). Assessment of dietary pattern and nutritional status of undergraduate students in a private university in southern Nigeria. Food and Science & Nutrition/ Volume 6, Issue 7/ p. 1890-1897.

Mohammed, A., Bala, S., & Lawan, A. (2022). Relationship between dietary patterns and quality of life among university students in Northern Nigeria. Nigerian Journal of Nutrition and Dietetics, 14(2), 102–110.

Nwachukwu, I. N., et al. (2022). Physical activity patterns and quality of life in Lagos-based university students. Nigerian Journal of Public Health, 31(3), 123-130.

Nwafor, N.J., Okoh, M.E., & Edokpayi, C.E. (2021). Barriers to physical activity among Nigerian university students: A case study of UNIBEN. Journal of Nigerian Physical Activity and Wellness, 3(1), 14–23.

Nwaneri, A. C., & Ibekwe, C. M. (2022). Obesity, self-esteem, and physical activity among Nigerian youths. Nigerian Journal of Clinical Practice, 25(5), 678–684.

Obadeji, A., Ogunlesi, A. O., & Adebowale, T. O. (2023). Academic pressure and depressive symptoms among medical students in Nigeria: A cross-sectional study. Journal of Neuroscience and Behavioral Health, 15(2), 62–68.

Ogunba, B. O., et al. (2020). Meal patterns, dietary quality and physical activity in Nigerian university students. African Journal of Food, Agriculture, Nutrition and Development, 20(4), 16377–16392.

Ogunba, B.O., Oyewole, O.E., & Oyeleye, O.A. (2020). Nutrition transition and public health implications in Nigeria: A review. Nigerian Journal of Nutritional Sciences, 41(1), 34–41.

Ogunbode, A. M., Oladeji, A. A., & Afolabi, W. A. O. (2021). Nutritional status and dietary diversity of undergraduates in a Nigerian public university. Nigerian Journal of Nutritional Sciences, 42(1), 35-44.

Ogunleye, O. O., et al. (2021). Comparative analysis of lifestyle behaviors among active and inactive Nigerian undergraduates. Nigerian Journal of Sports and Health Education, 23(1), 34-42.

Ogunsemi, O., Ajayi, O. B., & Ikuomola, D. S. (2022). Physical health and quality of life in Nigerian undergraduates: A cross-sectional study. Nigerian Journal of Physiological Sciences, 37(1), 30–36.

Ojo, T. A., & Adegboye, A. M. (2022). The impact of lifestyle behaviors on student wellness: Evidence from a Nigerian university. African Journal of Reproductive Health, 26(4), 110–120.

Ojofeitimi, E.O., Akinyele, I.O., & Olayiwola, I.O. (2021). Nutritional status of tertiary students: A Nigerian perspective. African Journal of Food, Agriculture, Nutrition and Development, 21(4), 17018–17033.

Okafor, P. N., et al. (2023). Sedentary lifestyles and dietary risks of metabolic disorders among undergraduates in Nigeria. Nigerian Journal of Medicine, 32(1), 39–47.

Okafor, U. A., & Mbada, C. E. (2021). Relationship between depression and physical activity in Nigerian undergraduates. Nigerian Medical Practitioner, 79(1), 12-18.

Okeke, M. N., & Ezeani, C. U. (2021). The influence of dietary habits on health and learning outcomes among university students. Nigerian Health Promotion Journal, 9(1), 56–65.

Okonkwo, J.N., & Bello, A.O. (2022). Physical activity and mental well-being among Nigerian university students. West African Journal of Health Psychology, 5(2), 44–52.

Okonkwo, U. C., & Nwachukwu, E. B. (2022). Age-related differences in lifestyle habits and quality of life among Nigerian tertiary students. Journal of Contemporary Medical Education, 10(3), 112–120.

Okonkwo, U. P., & Okafor, C. C. (2023). Nutrition knowledge and dietary behavior of non-medical university students in Nigeria. International Journal of Nutrition and Metabolism, 15(1), 12–20.

Okonkwo, U.A., Ibrahim, T.F., & Balogun, O.R. (2022). Correlates of physical activity and nutrition on academic performance and wellbeing among Nigerian students. West African Journal of Medicine, 39(2), 133–140.

Olawale, O. A., & Owoaje, E. T. (2021). Sleep quality and academic performance among university students in Southwest Nigeria. Annals of Nigerian Medicine, 15(1), 10–16.

Olayiwola, I. O., et al. (2021). Fast food consumption and sedentary behavior among university students in South-Western Nigeria. Nigerian Journal of Nutrition and Dietetics, 33(2), 120–128.

Olowookere, O. O., et al. (2021). Fast food consumption and sedentary behavior among university students in South-Western Nigeria. Nigerian Journal of Nutrition and Dietetics, 33(2), 120–128.

Olumakaiye, M. F., Adebimpe, O. A., & Adeniran, A. G. (2022). Iron deficiency anemia and its effects on academic performance among female students in Nigeria. African Journal of Reproductive Health, 26(4), 119-126.

Olumakaiye, M. F., et al. (2020). Food security and nutrient intake among undergraduate students in Nigeria. Nigerian Journal of Nutritional Sciences, 41(1), 55–62.

Olumide, A.O., Owoaje, E.T., & Adebayo, A.M. (2022). Sedentary lifestyle and health risks among Nigerian university students: A growing public health concern. Journal of Community Medicine and Primary Health Care, 34(2), 74–81.

Oluwole, O. F., Bamidele, J. O., & Oyebola, A. O. (2022). Nutritional intake and mental health among undergraduates in Ibadan, Nigeria. West African Journal of Health Sciences, 18(3), 198–207.

Oyeniyi, B.A., Adedayo, F.O., & Ibitoye, A.T. (2021). Assessment of physical activity levels among Nigerian undergraduates. Journal of Health and Kinesiology, 2(1), 88–95.

Sholeye, O.O., Taiwo, O.E., & Animasahun, V.J. (2021). Too Little for Comfort: Food Insecurity among Medical Students in Sagamu, Southwest Nigeria. African Health Sciences, 21(4), 1702-1710.

The WHOQOL GROUP. The World Health Organization Quality of life assessment (WHOQOL) position paper from the World Health Organization, Soc. Sci. Med. 41.1403,1995

Timothy Aghohgo Ehwarieme & Anwuli Emina (2024). Prevalence and Determinants of overnutrition and obesity among undergraduate students in a Tertiary institution, Benin city, Edo state, Nigeria. Afr J Biomed, Res vol.27, No(3). 177-186.

Uche, O.M., Ede, N.J., & Obasi, C.L. (2022). Effect of peer-led group workouts on physical activity adherence in Nigerian universities. Journal of Sports Science and Physical Activity, 9(1), 22–31.

Ugwueze, F.C., Agbaje, O.S., Umoke, P.C.I., & Ozoemena,E.L.(2021). Relationship between physical activity levels and psychological well-being among male university students in South East, Nigeria: A cross-sectional study. Journal of Primary Prevention , 42(3), 263-277.

Umeh, J. C., & Aigbokhaode, Q. A. (2023). Relationship between dietary intake and physical inactivity among Nigerian university students. Journal of Health Research and Reviews, 10(2), 100–107.

Uwakwe, R., Oladeji, B. D., & Adewuya, A. O. (2020). Environmental and social correlates of QoL among Nigerian university students. African Journal of Psychiatry, 23(3), 150–158.

Uwakwe, R., Onwumere, I. O., & Obasi, I. O. (2021). Relationship between dietary intake and emotional well-being in Nigerian university students. Annals of Nigerian Medicine, 15(2), 123–130.

World Health Organization. (2012). WHOQOL: Measuring Quality of Life. Retrieved from https://www.who.int/tools/whoqol

Yusuf, M. O., & Adebayo, K. (2023). Health risks of sedentary behavior in Nigerian tertiary students. West African Journal of Preventive Medicine, 18(1), 15-22.

APPENDIX I

INFORMED CONSENT FORM

My name is Ogwu Adaeze Nicole, a final year student of the Department of Physiotherapy, School of Basic Medical Sciences, University of Benin. I am conducting a study on "ASSOCIATION BETWEEN NUTRITIONAL STATUS, PHYSICAL ACTIVITY AND QUALITY OF LIFE AMONG NONCLINICAL STUDENTS IN THE UNIVERSITY OF BENIN". You are invited to participate in this research study. Before you decide, it is important you understand why the research is being done and what it will involve. Please take time to read the following information carefully.

Purpose of the Study:

This study aims to determine association between nutritional status, physical activity and quality of life among nonclinical students in the university of benin.

Voluntary Participation:

Your participation in this study is entirely voluntary. You may choose not to participate or to withdraw at any point without any consequences.

Procedures:

If you agree to participate, you will be asked to complete a short questionnaire. The questionnaire will take about 10–15 minutes. Additionally, participants will be taken to a private setting for anthropometric measurements, which is expected to last about 5-10 minutes. All

information collected will be kept strictly confidential and used only for academic purposes. Your sincere response to the questionnaire and/or interview will be most helpful.

Confidentiality:

All information collected will be kept strictly confidential and used only for academic purposes. No identifying information will be recorded. Your participation and responses will be appreciated and kept confidential.

Benefits and Risks:

There are no direct benefits to you, but your participation will offer the opportunity to gain valuable insight into your nutritional status, physical activity and perceived quality of life. There are no anticipated risks.

Consent Statement:

I have read and understood the purpose of this research and what it involves. I voluntarily agree to participate.

Signature of Participant: _____

Date: _____

APPENDIX II

Research Questionnaire

Topic: Association between Nutritional Status, Physical Activity and Quality of Life among Non-Clinical Students in the University of Benin.

INFORMED CONSENT

Dear respondent,

I am OGWU ADAEZE NICOLE, an undergraduate student in the Department of Physiotherapy. As part of the requirement for my undergraduate programme, I am conducting a research on ASSOCIATION BETWEEN NUTRITIONAL STATUS, PHYSICAL ACTIVITY AND QUALITY OF LIFE AMONG NONCLINICAL STUDENTS IN THE UNIVERSITY OF BENIN. In this regard, you have been randomly selected as a sample. I also wish to assure you that your answers will be treated in strict confidence and used solely for the stated academic purpose.

Thank you for your cooperation.

Do you voluntarily consent to participate in this study? _____

Section A: Socio-demographic Information

Please provide the following details:

1. Age: (a) 18-21[ ] (b) 22-25[ ] (c) 26-29[ ] (d) 30-35[ ]

2. Gender: (a) Male [ ] (b) Female [ ]

3. Level of Study: (a) 200[ ] (b) 300[ ] (c) 400[ ] (d) 500[ ]

4. Department: _____

5. Marital Status: (a) Single [ ] (b) Married [ ] (c) Others [ ]

6. Living Arrangement (a) Hostel [ ] (b) Off-campus [ ] (c) With Family [ ]

Section B: Nutritional Status (Food Frequency Questionnaire - FFQ)

How often do you consume the following items? (Tick as appropriate) | Food Item |1-3/month | 1/week | 2-4/week| Daily | Rarely/Never |

FOOD ITEM	1-3/month	1/week	2-4/week	Daily	Rarely/Never
Rice					
Beans					
Pasta (noodles, sphagetti)					
Potatoes (fried or boiled)					
Meat/Fish					
Dairy products (i.e. milk, cheese, butter)					
Eggs (fried, boiled)					
Vegetables					
Fruits					
Sweets (sugar, chocolates, cookies, cakes, pastries)					
Beverages (i.e.soda, fruit juices, beer, wine)					

Anthropometric Data

1. Weight in kilograms _____

2. Height in metres _____

Reference:

< 18.5 = Underweight, 18.5-24.9 = Normal, 25-29.9 = Overweight, >29.9 = Obese

Section C: INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE SHORT-FORM (IPAQ-SF).

Please answer the following questions and tick where necessary.

Think about all the vigorous activities that you did in the last **7 days. Vigorous** physical activities refer to activities that take hard physical effort and make you breathe harder than normal. Think only about those activities you did for at least 10 minutes at a time.

1. During the last **7 days**, how many days did you do vigorous physical activity (e.g., heavy lifting, digging, aerobics): _____ **days per week**

[ ] No vigorous physical activities **Skip to question 3**

2. How much time did you usually spend doing vigorous physical activities on one of those days?
_____hours/day
_____minutes/day

[ ] Don't know/Not sure

Think about all the **moderate** activities that you did in the last **7 days. Moderate** physical activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think only about those activities you did for at least 10 minutes at a time.

3. During the **last 7 days**, how many days did you do **moderate** physical activity (e.g., cycling, carrying light loads)
_____ days/week

[ ] No moderate physical activity

4. How much time did you usually spend doing moderate physical activities on one of those days?
_____hours/day
_____minutes/day

[ ] Don't know/Not sure **Skip to question 5**

Think about the time you spent **walking** in the last **7 days.** This includes in school and at home, and any other walking done solely for recreation, sport, exercise or leisure.

5. During the **last 7 days**, how many days did you walk for at least 10 mins at a time?
_____ days/week

[ ] No walking **Skip to question 7**

6. How much time did you usually spend walking on one of those days?
_____hours/day
_____minutes/day

[ ] Don't know/Not sure

The last question is about the time spent **sitting** on weekdays during the **last 7 days** includes in school, and at home or during leisure time.

7. During the **last 7 days**, how much time did you spend **sitting** on a weekday?
_____ hours/day
_____ minutes/day

[ ] Don't know/Not sure

Section D: Quality of Life (WHOQOL-BREF**)**

The following questions ask how you feel about your quality of life, health and other areas of life in last two weeks, please indicate how you feel about the following statements by choosing an answer that appears most appropriate (1 = Very poor, 2 = Poor, 3 = Neither poor nor good, 4 = Good, 5 = Very good):

1. How would you rate your quality of life? [1] [2] [3] [4] [5]

The following questions ask about how completely you experience or were able to do certain things in the last two weeks (1 = Not at all, 2 = A little, 3 = Moderately, 4 = Very much, 5 = Extremely):

2. To what extent do you feel that physical pain prevents you from doing what you need to do? [1] [2] [3] [4] [5]

3. How much do you need any medical treatment to function in your daily life? [1] [2] [3] [4] [5]

4. How much do you enjoy life? [1] [2] [3] [4] [5]

5. How well are you able to concentrate? [1] [2] [3] [4] [5]

6. How safe do you feel in your daily life? [1] [2] [3] [4] [5]

7. How healthy is your physical environment? [1] [2] [3] [4] [5]

The following questions ask about how completely you experience or were able to do certain things in the last two weeks. (1= Not at all, 2 = A little, 3 = Moderately, 4 = Mostly, 5 = Completely)

8. Do you have enough energy for everyday life? [1] [2] [3] [4] [5]

9. Are you able to accept your bodily appearance? [1] [2] [3] [4] [5]

10. Do you have enough money to meet your needs? [1] [2] [3] [4] [5]

11. How well are you able to get around? [1] [2] [3] [4] [5]

The following questions ask you to say how **good or satisfied** you have felt about various aspects of your life over the last two weeks. (1 = Very dissatisfied, 2 = Dissatisfied 3 = Neither satisfied nor dissatisfied, 4 = Satisfied, 5 = Very satisfied)

12. How satisfied are you with your sleep? [1] [2] [3] [4] [5]

13. How satisfied are you with your ability to perform daily activities? [1] [2] [3] [4] [5]

14. How satisfied are you with your capacity for work/ school? [1] [2] [3] [4] [5]

15. How satisfied are you with yourself? [1] [2] [3] [4] [5]

16. How satisfied are you with your personal relationships? [1] [2] [3] [4] [5]

17. How satisfied are you with your access to health services? [1] [2] [3] [4] [5]

Section E: Lifestyle and Health Habits (optional)

Answer the following questions by ticking as appropriate.

1. Do you smoke? Yes [ ] No [ ]

2. Do you consume alcohol? Yes [ ] No [ ]

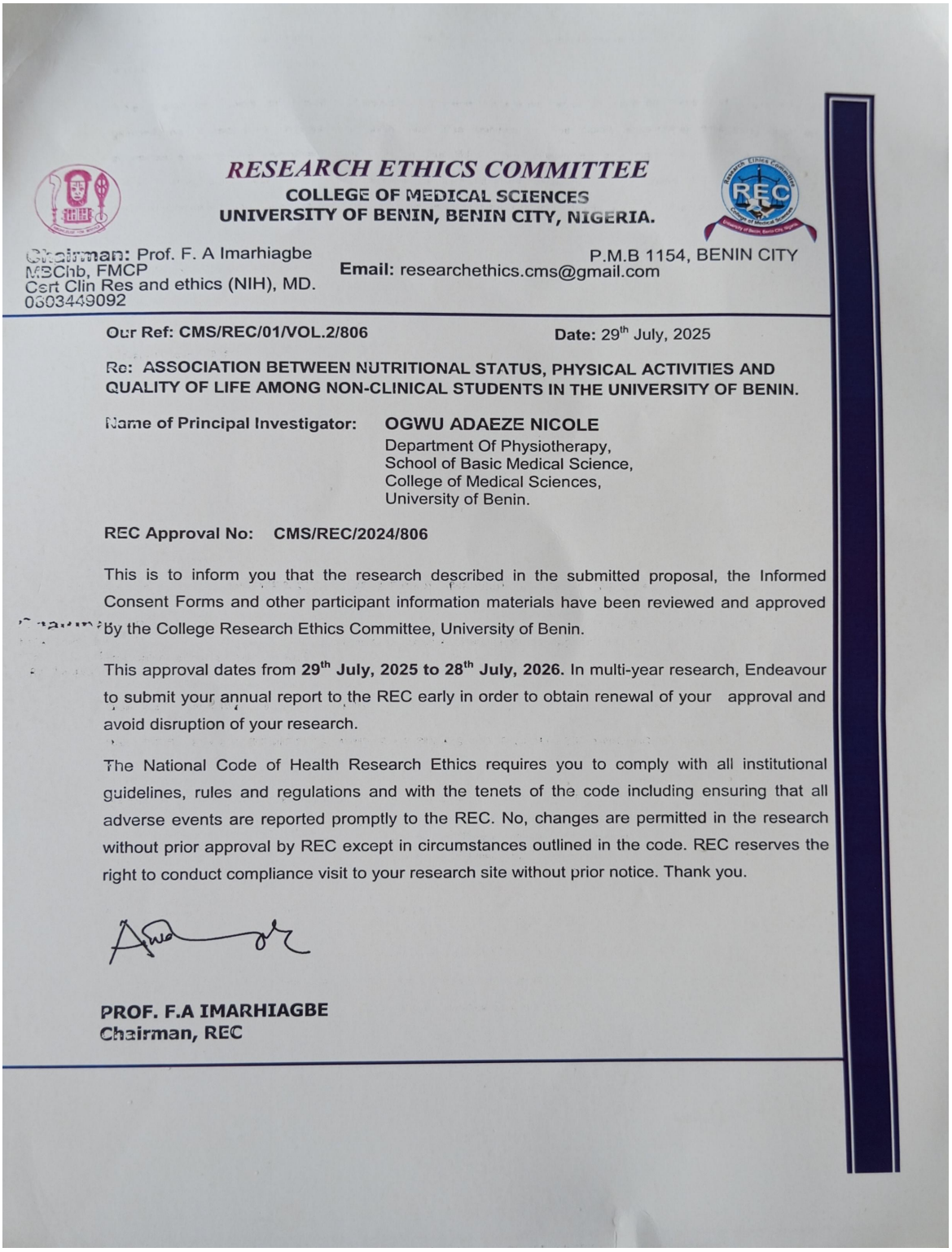
3. Do you take any dietary supplements? Yes [ ] No [ ]

4. Do you regularly skip meals? Yes [ ] No [ ]

5. Do you experience high levels of stress? Yes [ ] No [ ]

APPENDIX III

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.2/806 **Date:** 29th July, 2025

Re: **ASSOCIATION BETWEEN NUTRITIONAL STATUS, PHYSICAL ACTIVITIES AND QUALITY OF LIFE AMONG NON-CLINICAL STUDENTS IN THE UNIVERSITY OF BENIN.**

Name of Principal Investigator: **OGWU ADAEZE NICOLE**
Department Of Physiotherapy,
School of Basic Medical Science,
College of Medical Sciences,
University of Benin.

REC Approval No: CMS/REC/2024/806

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 **29th July, 2025 to 28th July, 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