

**KNOWLEDGE, PATTERNS, AND DETERMINANTS OF DEPRESSION AMONG
UNDERGRADUATE STUDENTS OF THE UNIVERSITY OF BENIN, SOUTH-SOUTH
NIGERIA**

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**A ONE-YEAR PROJECT PRESENTED TO THE DEPARTMENT OF PUBLIC HEALTH
AND COMMUNITY MEDICINE, COLLEGE OF MEDICINE, UNIVERSITY OF BENIN,
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FEBRUARY 2024

DECLARATION

We do hereby affirm that this project titled “**KNOWLEDGE, PATTERNS AND DETERMINANTS OF DEPRESSION AMONG UNDERGRADUATE STUDENTS OF UNIVERSITY OF BENIN, SOUTH-SOUTH NIGERIA**” is an original work of ours and has not been submitted to anybody for publication.

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CERTIFICATION

This is to certify that the study titled **KNOWLEDGE, PATTERNS AND DETERMINANTS OF DEPRESSION AMONG UNDERGRADUATE STUDENTS OF UNIVERSITY OF BENIN, SOUTH-SOUTH NIGERIA** was carried out in the Department of Public Health and Community Medicine, College of Medicine, University of Benin, Benin City, Edo State, Nigeria as part of the requirements for the award of Bachelor of Medicine, Bachelor of Surgery (MBBS).

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DEDICATION

We dedicate this work to God Almighty, our creator for the grace and mercy, he granted us from the beginning of this project work till its end and to our families, friends, and colleagues.

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We would like to express our deepest gratitude to God almighty for preserving us and seeing us throughout this project and to Professor Antoinette Ofili for her invaluable support and guidance throughout this project. Her guidance has been instrumental in its success. To Dr. K.O Oderinde we say thank you for your guidance.

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Thank you all for being a part of this journey!"

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LIST OF ABBREVIATION

- BDI:** Becks Depression Inventory
- CBT:** Cognitive and Behavioral Therapy
- CESD-R:** Center for Epidemiologic Studies Depression Scale Revised
- DASS:** Depression Anxiety Stress Scales
- DSM-V:** Diagnostic and statistical manual of mental disorders
- IPT:** Interpersonal Therapy
- PHQ-9:** Patient Healthcare Questionnaire-9
- SDGs:** Sustainable Development Goals

DEFINITION OF TERMS

- DEPRESSION:** A state of feeling sad or a psychiatric disorder characterized by an inability to concentrate, insomnia, loss of appetite, anhedonia, feelings of extreme sadness, guilt, helplessness, and hopelessness.
- MENTAL DISORDERS:** Medical conditions that affect a person's cognitive, emotional, or psychological functioning, often resulting in disturbances in thought processes, mood, or behavior.
- MENTAL HEALTH:** The psychological and emotional well-being of an individual, including the ability to cope with stress, maintain fulfilling relationships, work productively, and make sound decisions.
- STRESS:** The process by which we perceive and respond to certain events, called stressors, which we appraise as threatening or challenging
- SUICIDAL IDEATION:** Thoughts of taking one's own life or considering suicide as a potential course of action, often an indication of emotional or psychological distress.
- SUICIDE:** The act of intentionally causing one's death, often due to extreme emotional or psychological distress.
- TALKING THERAPIES:** Psychological treatments that involve talking to a trained therapist, aimed at addressing emotional and psychological challenges and promoting mental well-being.

ABSTRACT

Background: The prevalence of mental health disorders is on the rise, significantly impacting health, social dynamics, and human rights, and causing substantial consequences globally. Among these mental health challenges, depression stands out as a pervasive issue, especially affecting university students.

Purpose: This study aims to evaluate the knowledge, prevalence, and influencing factors related to depression among undergraduate students at the University of Benin in South-South Nigeria.

Material and Methods: This cross-sectional study, conducted at the University of Benin, Nigeria, aimed to assess depression among full-time undergraduate students. Utilizing a multi-stage sampling technique, 460 students were selected. Data collection involved a structured questionnaire covering socio-demographics, knowledge of depression, prevalence (using PHQ-9), and associated factors. Ethical considerations were addressed, including confidentiality measures. Results will contribute to understanding the prevalence of depression and associated factors among university students.

Results: The ages of respondents were between 15-39 years and 269 (58.5%) of respondents were within the age group of 20-24 with the mean age being 23.5. More than half 253(55.0%) of the respondents were females while males constituted 207 (45.0%) of the respondents. Among the respondents, 104 (22.6%) were in 200L, 120 (26.1%) in 300L, 119 (25.6%) in 400L, 78 (17.0%) in 500L and 39 (8.5%) in 600L.

Overall knowledge score for depression was good (66%). There was a significant relationship between knowledge of depression and study level ($\chi^2 = 9.533$, $p = 0.048$) of the respondents. The prevalence of depression among the respondents was 239 (52%). The risk factors that were

significantly related were alcoholism, use of psychoactive drugs, heartbreak, sexual abuse, poor interpersonal relationships with colleagues, financial problems, and death of a loved one, as well as long stay in school, previous personal and family history of depression, and failed examinations.

Conclusion: The knowledge of depression among undergraduates is notably high, with a disturbing prevalence, with risk factors ranging from environmental, socioeconomic, medical, psychological, academic, and familial factors.

CHAPTER ONE

1.0 INTRODUCTION

1.1 BACKGROUND

Depression, a pervasive mental health disorder characterized by persistent feelings of sadness, hopelessness, and a loss of interest or pleasure in once-enjoyable activities, significantly impairs a person's daily life, including their capacity to function, interact with others, and experience well-being; it extends beyond typical sadness, with deeper underlying causes and management modalities, and is more prevalent among young adults, especially university attendees, due to the unique challenges they face at this crucial stage of life¹.

Mental health extends beyond depression, encompassing various conditions such as anxiety, suicidal ideation, and others, affecting approximately 13% (over 500 million) of individuals at some point in their lives, contributing to one in five years lived with disability.^{1,2}

About 75% of mental health disorders manifests their onset during the period of early adulthood, with the mid-20s representing a pivotal stage, while mental health challenges among the young population frequently evade detection, thereby triggering deleterious effects¹. These implications extend beyond just academics, affecting productivity levels, general health status, and interpersonal relationships.

A significant proportion (20%), of university students' deal with mental disorders every year, ranging from depression, schizophrenia, and suicidal ideations, emphasizing the ubiquity of mental health challenges within university systems¹.

The significance of good mental health is currently experiencing a surge in awareness and acknowledgment, underscoring its status as a foundational prerequisite for overall individual well-being. This emergent understanding of the pivotal role that mental health assumes is notably reflected in its recent inclusion in the list of Sustainable Development Goals (SDGs)^{3,4}. This inclusion not only underscores the growing recognition of mental health's multifaceted impact but also signifies an important step towards fostering a global commitment to prioritize and address mental well-being as an essential component of human development.

While avoidance of precipitating factors has always played a major role in warding off depression, depression has various modalities of treatment, including medications, although currently, the most common method of treating depression includes talking therapies, such as cognitive behavioral therapy (CBT), interpersonal therapy (IPT) and psychodynamic therapy⁵

Although providing prompt and effective treatment is essential, the demand for treatment among students dealing with these disorders greatly surpasses the capacities of many counseling centers. This mismatch results in a significant gap in meeting the treatment needs for mental disorders among college students⁶.

1.2 STATEMENT OF PROBLEM

In recent years, a concerning surge in mental health challenges among university students worldwide has become evident, with students facing depression levels 9% higher than the general population⁷. This surge not only affects the affected individuals but also has far-reaching consequences on their physical and sexual health, leading to increased mortality rates due to suicide, self-inflicted injuries, and accidental harm⁸⁻¹⁰

Studies have yielded insights into the prevalence of depression among the university student population. These investigations have consistently indicated an upsurge in depressive symptoms, with some studies reporting up to 30.6% prevalence rate of depression among university students. This percentage markedly surpasses the general population's depression rate, which stands at 21.6%. Of even greater concern is the observed trend of a notable 1.7% year-on-year increase in the manifestation of depression symptoms within the undergraduate demographic, particularly in specific academic institutions².

The collective impact of these mental health challenges permeates the academic environment, disrupting classroom dynamics, negatively impacting collaboration, learning, and overall performance among students, with eventual severe consequences to the society, affecting proper functioning of workers who would contribute to economic growth^{4,7}. Faculty members, too, grapple with the challenge of effectively engaging students and adapting their teaching methods to cater to diverse emotional needs⁷.

Increased suicide rates are also noted among the university population, suicides ranking between the first and third most common causes of death among university students⁸, with an overall annual suicide rate of 7.5 per 100,000 and studies showing up to 10% of students had seriously considered attempting suicide over a 12-month period⁹

Additionally, a significant problem lies in the low mental health literacy prevalent in society, perpetuating stigmatization towards those seeking mental health services and hindering the creation of supportive environments that can prevent depression and ensure timely treatment for those in need, resulting in further reluctance to seek help, as demonstrated by a study where 59.6% of individuals with mental health challenges refrained from seeking mental care, closely linked to the level of stigma¹¹.

1.3 JUSTIFICATION OF STUDY

The critical issue of depression among university students has become increasingly relevant due to numerous factors. The inadequate allocation of resources in these regions often hampers effective mental health support, as financial assistance specifically dedicated to mental health accounts for barely 0.3% of all healthcare development assistance¹², further accentuating the pressing need to address this challenge.

One of the salient concerns is the noticeable absence of knowledge and understanding surrounding the topic of student depression. In many developing nations, awareness about mental health issues, particularly among young adults, remains basic. This lack of insight compounds the difficulties in identifying and addressing depression among university students, requiring improved effort to increase awareness and education. This study will thereby be of importance by contributing to the body of knowledge.

Furthermore, the issue of stigmatization looms large as a formidable barrier to addressing depression. In the context of developing countries, cultural norms and societal attitudes often contribute to the marginalization of mental health concerns, relegating them to the periphery of public discourse, and medical conditions often written off to spiritual causes. This stigma exacerbates the struggles faced by affected students, making it hard for them to seek help or openly discuss their challenges¹¹.

This study will aid in shedding light on the above-mentioned problems, adding to the body of knowledge, which will be of help in strategic planning and policy implementation in the management and improvement of mental health.

1.4 GENERAL OBJECTIVE

To assess the knowledge, pattern, and determinants of depression amongst undergraduate students of the University of Benin, South-South Nigeria.

1.5 SPECIFIC OBJECTIVES

- To ascertain the knowledge of depression amongst students of the University of Benin
- To determine the pattern and prevalence of depression amongst students of the University of Benin
- To evaluate the factors related to depression amongst students of the University of Benin.

1.6 RESEARCH QUESTIONS

- What is the knowledge of depression amongst undergraduates of the University of Benin?
- What is the prevalence of depression among students of the University of Benin?
- What are the factors associated with depression among students of the University of Benin?

CHAPTER TWO

2.0 LITERATURE REVIEW

Universities globally are facing an escalating challenge as rates of mental disorders among students continue to rise. Depression rates are higher amongst the university population¹³, and in numerous instances, the demand for on-campus mental health services surpasses the resources available to address this pressing issue.

University education and schedules come with increased stress levels, and factors such as competition for merits in exams, increased workload, poor social functioning, exam failures may serve as precipitating factors for previously underlying pathologies¹⁴.

2.1 Knowledge of depression amongst undergraduates

knowledge and perception of major depression amongst 275 undergraduate clinical students.

The study was done using a validated structured questionnaire, made up of 18 questions, 12 of which assessed the knowledge of definitions, causes, diagnosis, symptoms, and management of major depression. A cross sectional study to determine the awareness of undergraduates on depression was done in Saveetha University, India, amongst 100 students using a self-administered questionnaire.

Seventy- one percent (71%) of participants agreed that depression may lead to suicide, 70% agreed that depression is a mental health disorder characterized by depressed mood, 64% agreed that depression affects memory, while 34% of participants identified behavioral changes as symptoms of depression.

When asked on methods of managing depression, 52% stated that medications can be used in treating depression, 33% agreed that social company was helpful in overcoming depression.

However, 22% stated sleep can be used to managing depression, while 19% mentioned social media as a method of managing depression¹⁵.

A cross sectional study was conducted in Zaria, Nigeria on 365 undergraduate students of Ahmadu Bello University, to assess the knowledge and attitude of undergraduate students towards depression. The study showed that insomnia was identified as the most common symptom of depression (29.0%). Others were lack of concentration (17.2%) and fatigue (15%), while the least identified symptom was weight loss (4.1%).

When asked if they would go for help, 93.4% affirmed that they would seek help, with 33.1% saying they would seek help from friends, 30.7% from professionals and 28.4% from family.

The study's findings indicated that most participants were unable to recognize essential symptoms of depression or correctly identify a character as experiencing depression¹⁶.

A cross-sectional study was conducted amongst 269 undergraduates to explore the relationship between knowledge, attitude, and perception of depression and its potential role as a predictor of suicidal ideation among at Babcock University. The study showed that 71.4% of the respondents were aware that depression can lead to suicide, while 28.6% were unaware. Regarding causes of depression, excessive stress (67.7%) and lack of sleep (48.3%) were picked as the most common causes of depression and suicidal ideation, while social withdrawal (69.9%) and poor concentration (65.4%) were identified as the most common symptoms of depression. The knowledge of depression, suicidal ideation and symptoms of depression was relatively poor amongst the undergraduate students¹⁷.

To investigate the prevalence and knowledge of depression among medical students, a cross-sectional descriptive study was conducted involving 305 individuals from the College of Medicine, University of Port Harcourt, Nigeria. Of the 305 respondents, 271 (88.8%) were found to have good knowledge of depression, 32 (10.5%) were found to have average knowledge of depression and 2(0.7%) had poor knowledge of depression. This was assessed using a well-structured open-ended self-administered questionnaire. Questions were posed to evaluate the participants' knowledge of depression, and it was categorized as follows: proficient ($\geq 70\%$), moderate (69-50%), and limited ($\leq 49\%$).

The limitation of this study, however, is that it was conducted amongst medical students, and so there is a chance of higher knowledge levels when compared to the general population¹⁸.

A cross-sectional study carried out in the University of Benin, Nigeria, was done to assess the

About 66.5% of respondents correctly identified that that major depression is characterized by severe hopelessness, inadequacy, lethargy, and loss of interest. 75.8% were of the opinion that major depression could present as severe depression, and 85.9% believed that it is a curable condition.

Nevertheless, regarding the factors contributing to major depression, 43.5% concurred that it could arise as a result of chronic medical conditions like heart failure or cancer. A majority of 62.5% recognized recreational drugs as a potential cause, while 56.5% acknowledged genetics as a contributing factor. When considering treatment options, 68.7% identified a combination of psychotherapy and drug therapy as effective approaches, whereas only 17.8% attributed a role to diet in managing major depression.

This study showed that knowledge of symptoms of depression was high, but knowledge of causative factors was intermediate, even amongst clinical students¹⁹.

2.3 Prevalence of depression amongst Undergraduates

Depression is on the increase worldwide, with students of universities experiencing up to 9% higher levels of diagnosed depression^{7,13}, and the prevalence is also thought to be under-reported, due to the associated fear of stigmata and lack of proper facilities^{6,11}.

A cross sectional study done in the University of Malaysia on 175 undergraduates, to determine the prevalence of depression amongst university students, showed that out of the total respondents (175) who participated in the survey, 41 students, accounting for 23.43%, reported experiencing depression. Among the individuals with depression, 7.31% (equivalent to 1.71% of all participants) exhibited mild depression, 39.02% (9.14% of all participants) showed moderate depression and moderately severe depression, while 14.63% (3.43% of all participants) presented with severe depression according to the assessment using the Patient Health Questionnaire (PHQ-9) scale.

The study also showed a higher proportion of depression among female respondents (80.49%) as opposed to male respondents (19.51%). This result may be deceiving however, as the disproportionate number of female participants in the study might have skewed the results, making it appear as though depression was more prevalent among females when, in fact, the sample was not representative of the overall population's gender distribution.²⁰

Another cross-sectional study done in Gulu University, Uganda, utilizing a self-administered questionnaire, aiming to assess the prevalence of depression and its associated factors amongst 452 undergraduates, 141(31.2%) recorded symptoms indicative of depressive diseases, using the Centre for Epidemiological Studies Depression-Revised version questionnaire (CESD-R), which assessed factors using the American Psychiatric Association Diagnostic and Statistical Manual 5th edition (DSM-V) criteria. The indicators encompassed by the questionnaire include feelings of sadness, diminished interest, changes in appetite and sleep patterns, difficulties in concentration, a sense of worthlessness, fatigue, agitation, and contemplation of suicide. The total score aggregates across the 20 items, with a potential range of 0 to 60, and an internal validity Cronbach's alpha score of 0.89.

The study also employed logistic regression to analyze factors associated with depression, revealing that faculty (Odds Ratio [OR]=1.162, $p=0.009$), year of study (OR=0.773, $p=0.016$), satisfaction with academic performance (OR=0.463, $p<0.001$), and satisfaction with the course being studied (OR=0.504, $p=0.029$) were significant determinants of depression among students²¹.

University course of study has also been highlighted as a significant factor, with medical courses having the average highest level of depression recorded on a departmental level, showing medical school to be emotionally, and mentally tasking, as well as time intensive.^{22,23}

These studies are similar to a cross-sectional survey done in the University of Benin, Nigeria, to assess the prevalence and risk factors of depression amongst 300 undergraduate medical students.

The study revealed that 96 (32.0%) of respondents had symptoms indicative of depression, ranging from mild through severe. Among these individuals, 59 (19.0%) exhibited mild

depression, while 4 (1.3%) demonstrated signs of severe depression. Additionally, the breakdown revealed that 53 (39.3%) were categorized as pre-clinical students, and 43 (26.1%) were identified as clinical students. Notably, emotional problems (odds ratio [OR] 2.205, 95% confidence interval [CI] 1.122 – 3.749, $p = 0.020$), financial challenges (OR 3.971, 95% CI 2.170 – 7.269, $p < 0.001$), and smoking (OR 6.877, 95% CI 1.731 – 27.327, $p = 0.006$) emerged as substantial and independent predictors of depression²⁴

A systematic review and meta-analysis were conducted, utilizing extracted data from 18 studies, aiming to evaluate the prevalence of depression among Nigerian students pursuing higher education. Based on a random effects model, the combined prevalence of depression among Nigerian post-secondary studies was 26%. Upon conducting subgroup analyses according to Nigerian geographic regions, variations were observed. Notably, the Northwestern region exhibited the highest prevalence of depression at 45.9%, trailed by the South-South region at 33%, the Southeastern region at 22.1%, and the Southwestern region at 18.1%. It is worth noting, however, that these disparities did not yield statistically significant differences²⁵.

There were some limitations to the study however, as among the studies examined, 13 had a sample size below 500 participants. Non-random sampling methods were employed in 9 of the studies. Geographically, the research encompassed only 4 of the 6 Nigerian regions, specifically the northwest, south-south, southeast, and southwest.

2.4 Factors associated with depression among students.

The quantity of research on depressive symptoms among undergraduates has witnessed rapid growth, with a predominant emphasis on prevalence rates. Among the published studies that have delved into the determinants, some have identified influencing factors such as sociodemographic variables (like gender, ethnicity, nationality), psychological factors (including negative coping, attributional style, and self-esteem), and negative experiences^{14,26}.

These findings were further explored in a systematic review aiming to assess the influencing factors of depressive symptoms amongst undergraduates, conducted among 73 cohort studies involving 46,362 undergraduates from 11 countries.

Seventy (70) influencing factors for depression were identified, and the significant protective influencing factors included good parent/Caregiver-child relationships, social support, and good personality traits. The significant negative traits included negative coping (B = 0.98, 95% CI: 0.22–1.74), rumination (B = 0.06, 95%CI: 0.01–0.11), stress (OR = 0.22, 95% CI: 0.16–0.28), and childhood abuse (B = 0.42, 95% CI: 0.13–0.71). Across three studies, a consistent and notable connection was established between gender (female) and the manifestation of depressive symptoms. Additionally, two studies unveiled a connection between ethnicity and the presence of depressive symptoms. Furthermore, a single study highlighted sexual harassment as a pertinent influencer of depressive symptoms, while alcohol consumption emerged as a significant predictor of such symptoms²⁶. This study has a few limitations, as different scales of measurement were used in the study, and some of the study methods used were not adequately adapted for undergraduate studies.

A cross-sectional study done in 3 universities in Brazil, utilizing a structured questionnaire among 571 undergraduates to ascertain the factors related to depressive symptoms in university students, the study primarily aimed to identify health related precipitants for depression.

Significant variables were obesity($p=0.05$), excessive consumption of sugars and sweets($p=0.02$) and reduced physical activity($p=0.05$). There were no significant associations between gender and depressive symptoms²⁷.

A cross-sectional study, conducted amongst 750 respondents of two Lagos based universities, Nigeria, was done to assess factors related to depression and suicidality in tertiary institutions, showed that the prevalence of depression and suicidal ideation in this study was 22.5% and 21.6% in the two institutions. Risk factors that exhibited statistically significant correlations with depression and suicidal ideation encompassed low self-esteem ($p < .001$), recreational drug use ($p < .001$), alcohol dependence ($p < .001$), and a positive history of bullying ($p < .001$). Poor academic performance was statistically significantly associated with suicidal ideation, as well as romantic break-ups²⁸.

In a cross-sectional study aimed at identifying the sociodemographic correlates of depression among 240 medical students at the University of Lagos, it was found that the participants, with an average age of 25 ± 4.5 , predominantly fell within the age range of 25 to 34 years, with 50% being females, a mere 3.75% being married, and a significant majority, 95.4%, being single. A limited proportion of respondents, 3.8%, reported smoking cigarettes, and 14.2% acknowledged alcohol consumption as factors linked to depression. The analysis of the Depression, Anxiety,

and Stress Scale (DASS) demonstrated that 6.3%, 9.5%, and 61.6% of participants encountered symptoms of depression, anxiety, and stress, respectively.

A strong relationship was also found between depression and suicidal ideation indicating that people with depression are at a high risk of having suicidal ideation²⁹.

CHAPTER THREE

3.0 MATERIAL AND METHODS

3.1 STUDY AREA

This study was conducted among students at the University of Benin, situated in Benin City, Edo State, Nigeria. Benin City finds its place within the South-South geopolitical zone of Nigeria and encompasses an expansive land area of approximately 19,743 square kilometers. It shares its borders with Delta State to the South, Ondo State to the West, Kogi State to the North, and Kogi State and Anambra State to the East. The state's establishment in 1991 stemmed from the division of the former Bendel State, later leading to the creation of both Edo State and Delta State in 1976. Edo State is characterized by an amalgamation of diverse ethnic groups, including Benin, Esan, Etsako, Owan, and several smaller tribes, as well as an array of other tribes coexisting within its boundaries.

Edo State is host to seven universities, comprising one federal university, two state universities, and four privately-owned universities. Within this educational landscape, Benin City holds the status of a metropolitan hub, positioned between latitudes 6°06'N and 6°30'N and longitudes 5°30'E and 5°45'E of the Greenwich meridian. The city is situated approximately 200 miles by

road to the east of Lagos and 25 miles north of the Benin River. With a recorded population of 1,147,188 during the 2006 census, the city is projected to house around 1,745,976 individuals in 2021. Benin City comprises three primary local government areas out of the eighteen in Edo State: Oredo, Egor, and Ikpoba-Okha. The city's dominant ethnic group is the Benin people, with their language being Benin. The city's economic landscape encompasses various activities, including transportation, petty trading, and the presence of industries such as brewing, petroleum storage, oil pipelines, battery assembly, and small-scale pharmaceutical production.

Benin City is a center of higher education in Nigeria, housing institutions such as the University of Benin, College of Education Ekiadolor, Igbinedion University Okada, and Benson Idahosa University. Founded in 1970, the University of Benin started as an institute of technology before attaining full-fledged university status on July 1, 1971, under the recognition of the National Universities Commission. Accredited by the same commission, the university offers a diverse range of courses at various levels, including postgraduate, undergraduate, diploma, and certificate programs. With a student enrollment spanning between 40,000 and 44,999, the university accommodates both full-time and part-time students, while its academic staff ranges from 4,000 to 4,499. The university comprises faculties such as Agriculture, Arts, Education, Engineering, Law, Life Science, Management, Pharmacy, Physical Science, Social Science, Veterinary Medicine, and a College of Medical Sciences, encompassing the School of Medicine, Dentistry, and Basic Medical Science.

3.2 STUDY DESIGN

A descriptive cross-sectional study design was used for this study.

3.3 STUDY POPULATION

The study was carried out among undergraduate students in the University of Benin, Benin City, Edo State.

3.4 SELECTION CRITERIA

Inclusion Criteria

- I. Full-time undergraduate students.
- II. Undergraduate students who give consent to the study.
- III. Students who have spent at least one year in school.

3.4.2 Exclusion Criteria

- I. Part-time Undergraduate students of the University of Benin were excluded from the study.
- II. Students who are in 100 level.

3.5 STUDY DURATION

- The study was conducted between 2023 and 2024. This is the breakdown:
- Conceptualization and initial drafting: 3 months
- Data collection phase: 3-months
- Data entry and analytical phase: 3 months

- Completion of final write-up: 3 months

3.6 SAMPLE SIZE DETERMINATION

This was calculated using Cochran's formula in which a design effect was factored in, taking into consideration the sampling method (multi-stage sampling technique) used in the study^{30,31}

$$n = \frac{Z^2 pq x deff}{d^2}$$

Where:

n = Minimum Sample Size.

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

p = Prevalence rate of a particular characteristic of the target population from a previous study.

q = 1-p

d = Degree of Precision set at 0.05

deff = Design effect (multi-stage technique is 1.5), which is estimated to compensate for deviation from simple random sampling procedure.

Deleted[ndu]: gree of
Deleted[ndu]: p

From a study carried out to assess the prevalence of depression among university students in Malaysia, 23.4% of university students experienced depression.²⁰

Therefore, p=23.7% = 23.4/100

p= 0.234

q= 1- 0.234=0.766

$$\text{thus, } n = \frac{Z^2 pq x deff}{d^2}$$

$$n = \frac{1.96 \times 1.96 \times 0.237 \times 0.766 \times 1.5}{0.05 \times 0.05}$$

$$n = 413.15 \approx 413$$

10% non-response rate will be accounted for; thus, the sample size becomes:

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

n = Minimum sample size = 413

Deleted[Gloria Okparanta]: size =

nr = non-response rate = 10% = 0.10

Deleted[Gloria Okparanta]: rate =

n_f = Final minimum sample size

$$= 413 / 1 - 0.10$$

$$= 413 / 0.90 = 458.9 \approx 459$$

However, for this study, a sample size of 460 was used.

3.7 SAMPLING TECHNIQUE

Sampling Method

In this study, a multi-stage sampling technique was employed to select the respondents. The process involved four distinct stages, ultimately resulting in a sample size of 460 respondents. Questionnaires was distributed to students across various departments who meet the inclusion criteria, with consecutive selection until the desired sample size was achieved.

Stage 1: Campus Selection

To begin, the study focused on the two campuses of the University of Benin – Ugbowo and Ekehuan. The Ugbowo campus was chosen through a simple random sampling method involving balloting.

Stage 2: Faculty Selection

Among the 15 faculties located in the Ugbowo campus, eight faculties were randomly selected using a similar simple random sampling by balloting technique. The chosen faculties included Education, Arts, Dentistry, Engineering, Nursing Sciences, Medicine, Pharmacy, and Law.

Stage 3: Department Selection

Within the selected faculties, comprising a total of 39 departments, eight departments were randomly chosen, with one department representing each selected faculty. This selection process was conducted through simple random sampling via balloting. The departments that were ultimately chosen included Philosophy, Dentistry, Nursing Science, Agricultural Engineering, Educational evaluation and counselling psychology, Medicine, Pharmacy, and Law.

Stage 4: Selection of Respondents

A random sampling approach was implemented to select undergraduate students using balloting.

The number of respondents per department was first calculated by proportional allocation:

Proportionate allocation =

Where;

Population size = Total number of students across the selected departments, 5321.

Minimum sample size = 460

(See Appendix for proportionate allocation)

The number of levels in each department was used to divide the department into strata.

A systematic sampling technique was used to select students in each level.

The number of participants per class was obtained by dividing the number of students in each department with the number of levels in the department.

Sampling interval was computed for each level using;

(See Appendix for sampling interval)

The class list for each level was utilized as a sampling frame from which students were selected using a systematic sampling technique.

The first student was selected by simple random sampling using a table of random numbers and after which, systematic sampling interval was used to select subsequent students.

3.8 DATA MANAGEMENT

3.8.1 TOOLS FOR DATA COLLECTION

For data collection to address the study's objectives, a quantitative instrument in the form of a descriptive questionnaire was employed. This questionnaire was carefully crafted to align with the study's goals, encompassing a combination of open-ended and closed-ended questions. The questionnaire was designed to ensure standardization in its approach and content.

The questionnaire was generally divided into 5 sections.

Section A: Sociodemographic Profile

This section was meticulously crafted to capture sociodemographic data and provide insights into the respondents' backgrounds. It aimed to elicit responses related to the respondent's age in years (as of their last birthday), gender, religious affiliation, ethnic background, educational level, marital status, living arrangement, and financial responsibility.

Section B: Knowledge of Depression

The evaluation of knowledge encompassed three distinct variables: definition, risk factors, and treatment of depression. Participants were prompted to respond using the options 'Yes,' 'No,' or 'I don't know' for each item. Correct responses were awarded a score of 1, while incorrect responses received a score of 0. The cumulative scores for each variable were tallied, and individuals responding accurately to a minimum of 60% of the questions were classified as

possessing a good understanding. The amalgamation of scores across all three variables contributed to the overall knowledge score.

Section C: Prevalence of Depression

This section incorporated the adapted Patient Health Questionnaire 9 (PHQ-9), a multipurpose tool designed for the screening and diagnosis of depressive disorders, used to assess the prevalence of depression among students at the University of Benin. The PHQ-9, consisting of 9 items, probes into various dimensions of depressive symptoms, classifying depression into 4 levels based on the total score. Each point had a minimum score of 0 and a maximum score of 3, with a total possible score of 27³²

Testing of the PHQ-9 questionnaire showed a sensitivity of 88% and a specificity of 88% for diagnosing major depression.³²

Scoring and Categorization of Depression Severity

Depression severity was determined through scoring based on a specified range:

- A score of 0-4 indicated the absence of depression.
- Scores falling between 5 and 9 indicated mild depression.
- Scores between 10 and 14 indicated moderate depression.
- Those with scores from 15 to 19 were categorized as moderately severe depression.
- Scores ranging from 20 to 27 were indicative of severe depression.

Overall, the prevalence of depression was divided into two categories: individuals without depression (scoring 0-4) and those experiencing depression (scoring 5 and above).

Section D: Factors Associated with Depression

Structured to uncover factors linked to depression among University of Benin students, this segment explored diverse sides, including social, economic, psychological, financial, family-related, medical, and academic factors, that unraveled potential contributors to depressive experiences.

3.8.2 METHOD OF DATA COLLECTION

A standardized semi-structured self-administered questionnaire was used. Respondents were assured of confidentiality and informed consent was obtained from them.

3.8.3 PRETEST

A preliminary testing of the questionnaire was conducted among undergraduate students of Benson Idahosa University located in Benin City, Edo State. A subset comprising 10% (50) of the intended sample size was engaged in this pretest phase. The primary objective was to evaluate the questionnaire's accuracy and the respondents' comprehension to facilitate precise data collection. Any necessary adjustments to the questionnaire were introduced based on the feedback received during the pretest, ensuring its appropriateness and effectiveness prior to the formal survey initiation.

3.8.4 DATA ANALYSIS

Upon data collection, a careful collation process was done. Subsequently, the dataset was inspected for completeness to ensure that no vital data points are missing. The entered data were sequentially input into IBM SPSS version 27.0 software for systematic analysis. Statistical significance was determined at a predefined threshold of $p < 0.05$, alongside a confidence interval of 95%.

To comprehend the frequency distribution of variables, univariate analysis was deployed. The outcomes were presented in organized frequency tables, providing insights into the occurrence of each variable.

Bivariate analysis was used to ascertain the association between selected sociodemographic data and factors such as knowledge, prevalence, and risk factors of undergraduate students concerning mental health and depression at the University of Benin. This analytical method enabled the identification of relationships between variables of interest.

The utilization of binary logistic regression within multivariate analysis enabled the identification of significant predictors for outcome variables.

3.8.5 DATA PRESENTATION

Results obtained were presented using prose, frequency tables and charts.

3.9 ETHICAL CONSIDERATIONS

Prior to conducting the study, ethical approval was secured from the Ethics and Research Committee of the University of Benin Teaching Hospital. Additionally, informed consent was obtained from all participating respondents before the administration of the questionnaires. Measures were taken to ensure that the confidentiality of individuals was upheld, and any identifying information such as names and addresses were deliberately excluded.

3.10 LIMITATIONS OF THE STUDY

It was important to acknowledge potential limitations inherent to the study. The information collected relies on self-reporting from participants, thus introducing the possibility of information bias. To mitigate this potential bias, strict measures were implemented to assure participants of complete confidentiality in their responses.

RESULTS

We had a total of 460 respondents from the 200-600 level classes of the various age groups, ethnicities, religions, genders, and backgrounds.

The results will be represented in different sections according to specific objectives.

SECTION A; SOCIODEMOGRAPHIC CHARACTERISTICS

SECTION B; KNOWLEDGE OF DEPRESSION

SECTION C: PATTERNS OF DEPRESSION

SECTION D: DETERMINANTS OF DEPRESSION

SECTION A:
SOCIODEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS.

TABLE 1a: SOCIODEMOGRAPHIC CHARACTERISTICS OF STUDENTS

VARIABLE	FREQUENCY (n= 460)	PERCENT
Age Group (years)		
15-19	39	8.5
20-24	269	58.5
25-29	134	29.1
>29	18	3.9
Mean ± SD (23.53± 3.5)		
Sex		
Female	253	55.0
Male	207	45.0
Marital Status		
Single	436	94.8
Married	16	3.5
Separated	1	0.2
Widowed	0	0.0
Cohabiting	7	1.5
Religion		
Christianity	431	93.1
Islam	17	3.7
African Traditionalists	7	1.5
Atheist	4	0.9
Study Level		
200	104	22.6
300	120	26.1
400	119	25.9
500	78	17.0
600	39	8.5
Where Respondents Stay		
Hostels	227	49.3
Off-campus	166	36.1
At home	65	14.1
Staff Quarters	2	0.4

Who Respondents Reside With

Alone	145	31.5
With roommates	196	42.6
With parents	84	18.3
With relatives	35	7.6

A higher percentage of respondents, 269 (58.5%), fell within the age group of 20-24, while the age group over 29 years comprised the smallest proportion, with only 18 (3.9%) respondents.

The mean age of the respondents was 23.5 years, with a standard deviation of ± 3.5 .

In terms of gender distribution, more than half of the respondents, 253 (55.0%), were females, while males constituted 207 (45.0%) of the respondents.

Regarding marital status, almost all respondents, 436 (94.8%), were single, 16 (3.5%) were married, 7 (1.5%) were cohabiting, and 1 (0.2%) was separated.

The majority of respondents, 431 (93.1%), identified as Christians, while 17 (3.7%) were Muslim, 7(1.5%) were African Traditionalists, and 4(0.9%) identified as atheists.

Among the respondents, the distribution across academic levels was as follows: 104 (22.6%) in 200L, 120 (26.1%) in 300L, 119 (24.9%) in 400L, 78 (17.0%) in 500L, and 39 (8.5%) in 600L.

In terms of residence, approximately half of the respondents, 227 (49.3%), lived within hostels, while 166 (36.1%) resided off-campus, and 65 (14.1%) stayed at home. Nearly half, 196 (42.6%), of the respondents shared accommodation with roommates, with 145 (31.5%) living alone, 84 (18.3%) with their parents, and 35 (7.6%) residing with relatives.

TABLE 1b: ETHNICITY OF RESPONDENTS

ETHNICITY	FREQUENCY (n= 460)	PERCENT
Benin	152	33.0
Igbo	74	16.1
Esan	49	10.7
Yoruba	49	10.7
Uhrobo	29	6.3
Ijaw	12	2.6
Etsako	11	2.4
Isoko	10	2.2
Delta	7	1.5
Hausa	7	1.5
Itsekiri	7	1.5
Owan	6	1.3
Ibibio	5	1.1
Ika	5	1.1
*Others	27	8.0

* Afemai, Idoma, Agbor, Anaang, Enwan, Fulani, Igbanke, Ado-Ekiti, Akoko Edo, Ebir, Eket, Emai, Igala, Igede, Ikwerre, Izon, Jukun, Okpella, Tiv

Notably, the largest ethnic group is Benin, comprising 152 individuals (33.0%). Following closely is the Igbo ethnic group, representing 74 individuals (16.1%). Additional significant ethnicities include Esan and Yoruba, each contributing around 49 respondents (10.7%) to the total respondents, with the Urhobo making up 29(6.3%). The remaining ethnic groups, such as Ijaw, Etsako, Isoko, Delta, Hausa, Itsekiri, Owan, Ibibio, and Ika, as well as others, collectively make up percentages ranging from 8.0% to 1.1% of the overall respondent population.

SECTION B:
KNOWLEDGE OF DEPRESSION AMONG RESPONDENTS

TABLE 2: KNOWLEDGE OF DEPRESSION AMONG RESPONDENTS

VARIABLE	CORRECT RESPONSE(n=460)	PERCENT
Abnormalities in the level of brain chemicals can lead to Depression	352	76.5
Life events cannot cause depression	362	78.7
Medical illness can cause Depression	419	91.1
Some medications have depression as a side effect	369	80.2
Family History of depression is a risk factor for depression	343	74.6
Men experience depression more than women	88	19.1
Increased energy and activity are symptoms of depression	293	63.7
Anhedonia is not a symptom of depression	226	49.1
Symptoms must last for at least 1month to diagnose depression	97	21.1
Treatment of depression involves the use of medication only	387	84.1
Treatment of depression involves counseling and psychotherapy only	284	61.7
Depression can be fully cured	250	54.3

A substantial majority of respondents, comprising 352 individuals (76.5%), recognized the role of abnormalities in brain chemicals as potential contributors to depression. Similarly, 362 respondents (78.7%) correctly acknowledged that life events may trigger depression.

An overwhelming majority, represented by 419 respondents (91.1%), correctly identified medical illness as a potential cause of depression. Additionally, 369 participants (80.2%) were aware that certain medications could have depression as a side effect.

Concerning familial factors, 343 respondents (74.6%) understood that having a family history of depression elevates the risk of experiencing depression.

In terms of gender-related perceptions, only a minority of respondents, specifically 88 individuals (19.1%), correctly recognized that women experience depression more frequently than men.

Regarding symptoms, 293 participants (63.7%) accurately identified increased energy and activity are not indicative of depression, while 226 respondents (49.1%) recognized that anhedonia as a symptom of depression.

On the duration required for diagnosis, 97 respondents (21.1%) correctly noted that symptoms must persist for 2 weeks, and not at least one month for a depression diagnosis.

In terms of treatment awareness, 387 individuals (84.1%) were cognizant that the treatment of depression does not involve only medication. Additionally, 284 participants (61.7%) correctly understood that counseling and psychotherapy not the only treatments for depression.

When it comes to the outlook on recovery, slightly more than half of the respondents, 250 individuals (54.3%), believed that depression can be fully cured.

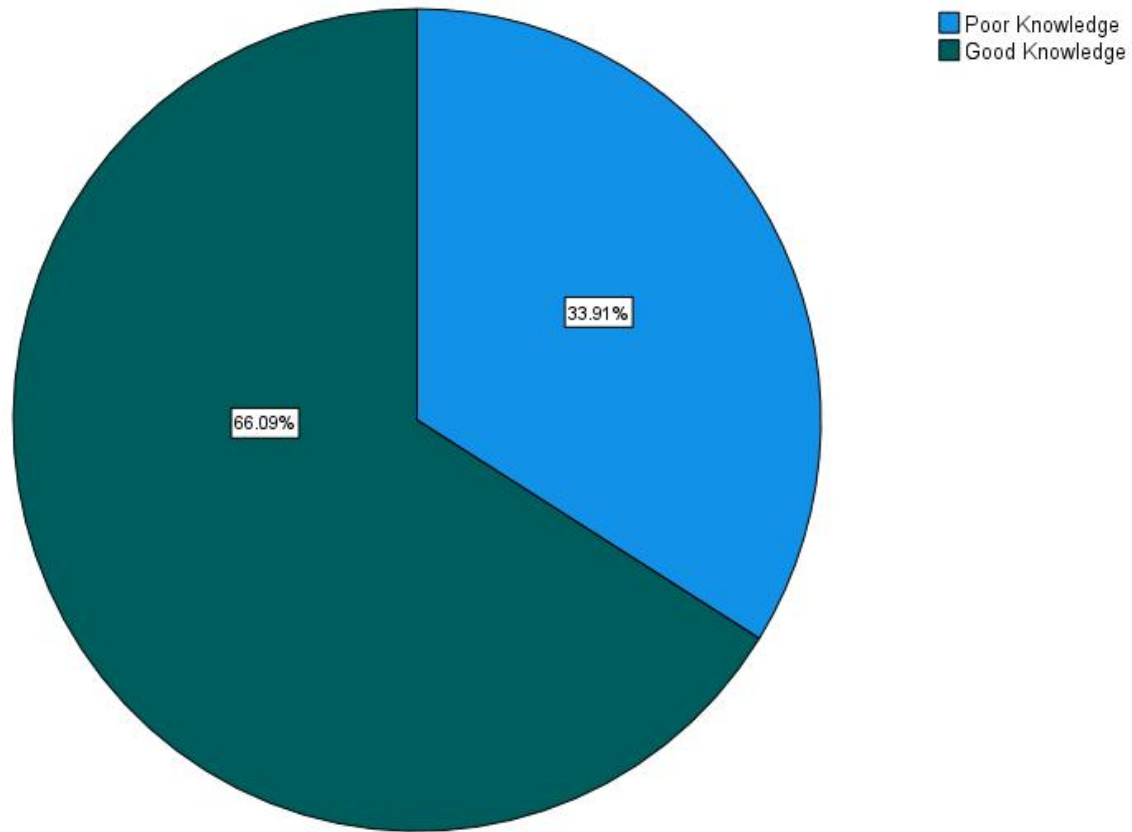


Figure 1. Overall knowledge of respondents on Depression.

Three hundred and four, (66.1%) respondents had a good knowledge of depression, while 156, (33.9%) had poor knowledge.

TABLE 3: SOCIO-DEMOGRAPHIC CHARACTERISTICS AND OVERALL, KNOWLEDGE OF DEPRESSION AMONG RESPONDENTS

Variable	Knowledge of Depression		Test Statistics (Fischer exact)	p-value
	Good	Poor		
	(n=304) Frequency (%)	(n=156) Frequency (%)		
Age (Years)				
15-19	19(48.7)	20(51.3)	6.321	0.097
20-24	185(68.8)	84(31.2)		
25-29	89(66.4)	45(33.6)		
>29	11(61.1)	7(38.9)		
Sex				
Male	138(66.7)	69(33.3)	0.056	0.843
Female	166(65.6)	87(34.4)		
Study level				
200	63(60.6)	41(39.4)	9.533	0.048*
300	73(60.8)	47(39.2)		
400	79(66.4)	40(33.6)		
500	57(73.1)	21(26.9)		
600	32(82.1)	7(17.9)		
Marital Status				
Single	295(67.7)	141(32.3)	9.526+	0.112
Married	6(37.5)	10(62.5)		
Cohabiting	3(42.9)	4(57.1)		
Separated	0(0.0)	1(100.0)		

*Statistically significant

Respondents aged 20-24 exhibited the highest level of knowledge about depression, with 185 individuals (68.8%) having good knowledge. In comparison, 84 individuals (31.2%) in the same age group had poor knowledge. Those aged 15-19 also showed good knowledge (48.7%), while those above 29 had a slightly lower percentage (61.1%) with good knowledge. Overall, the differences in knowledge across age groups were not statistically significant (p-value = 0.097).

Among females, 166 individuals (65.6%) demonstrated good knowledge, while among males, 138 individuals (66.7%) showed good knowledge. The difference in knowledge between males and females was not statistically significant (p-value = 0.843).

Knowledge about depression tended to increase with higher study levels. For instance, in the 6001 study level, 32 individuals (82.1%) had good knowledge, while in the 2001 study level, 63 individuals (60.6%) demonstrated good knowledge. The differences in knowledge across study levels were statistically significant (p-value = 0.048).

Single respondents exhibited a higher level of good knowledge (67.7%) compared to married respondents (32.3%). The differences in knowledge across marital status were not statistically significant (p-value = 0.11).

SECTION C:
PATTERNS OF DEPRESSION

TABLE 4: PREVALENCE OF DEPRESSION AMONG RESPONDENTS USING PHQ-9

VARIABLES	SCORES(n=460)			
	FREQUENCY (%)			
	0	1	2	3
Little interest or pleasure in doing things	198(43.0)	175(38.0)	61(13.3)	26(5.7)
Feeling down, depressed, or hopeless	234(50.9)	163(35.4)	48(10.4)	15(3.3)
Trouble falling asleep, staying asleep, or sleeping too much	232(50.2)	139(30.2)	57(12.4)	32(7.0)
Feeling tired or having little energy	157(34.1)	192(41.7)	79(17.2)	32(7.0)
Poor appetite or overeating	231(50.2)	138(30.0)	61(13.3)	30(6.5)
Feeling bad about yourself - or that you're a failure or have let yourself or your family down	267(58.0)	124(27.0)	48(10.4)	21(4.6)
Trouble concentrating on things, such as reading the newspaper or watching television	237(51.5)	145(31.5)	47(10.2)	31(6.7)
Moving or speaking so slowly that other people could have noticed. Or the opposite - being so fidgety or restless that you have been moving around a lot more than usual	332(72.2)	94(20.4)	31(6.7)	3(0.7)
Thoughts that you would be better off dead or hurting yourself in some way	355(77.2)	69(15.0)	26(5.7)	10(2.2)

The PHQ-9 assessment of 460 respondents reveals diverse levels of depression symptoms.

Predominantly, a majority reported minimal or no symptoms across domains, ranging from

34.1% to 77.2%, while notable percentages experienced mild to severe symptoms.

TABLE 5: PREVALENCE OF DEPRESSION AMONG RESPONDENTS

VARIABLE	FREQUENCY (n=460)	PERCENT
None	221	48.0
Mild	146	31.7
Moderate	52	11.3
Moderately Severe	26	5.7
Severe	15	3.3

Two hundred and twenty-one respondents (48.0%) reported no symptoms of depression, while 146 respondents (31.7%) described mild depressive symptoms, indicating a presence of symptoms but at a lower intensity. Fifty-two respondents (11.3%) reported moderate depression, and 15 respondents (3.3%) indicated severe depression.

TABLE 6: OVERALL PREVALENCE OF DEPRESSION AMONG RESPONDENCE

VARIABLE	FREQUENCY (n=460)	PERCENTAGE
NOT DEPRESSED	221	48.0
DEPRESSED	239	52.0

A significant proportion of respondents, totaling 221 (48.0%), reported no signs of depression. The remaining 239 respondents (52.0%) acknowledged experiencing varying degrees of depression.

SECTION D:
DETERMINANTS OF DEPRESSION AMONG RESPONDENTS.

TABLE 7a: SOCIODEMOGRAPHIC CHARACTERISTICS AND PREVALENCE OF DEPRESSION

Variable	Prevalence of Depression		Test statistics (Fischer exact)	p-value
	Depressed (n=239) Frequency (%)	Not depressed (n=221) Frequency (%)		
Age (years)				
15-19	27(69.2)	12(30.8)	5.508	0.138
20-24	137(50.9)	132(49.1)		
25-29	65(48.5)	69(51.5)		
>29	10(55.6)	8(44.4)		
Sex				
Male	98(47.3)	109(52.7)	3.209	0.076
Female	141(55.7)	112(44.3)		
Study level				
200	51(49.0)	53(51.0)	5.499	0.241
300	67(55.8)	53(44.2)		
400	53(44.5)	66(55.5)		
500	45(57.7)	33(42.3)		
600	23(59.0)	16(41.0)		
Marital status				
Ever married.	7(41.2)	10(58.8)	0.822	0.460
Never married.	232(52.4)	211(47.6)		
Disability				
Yes	8(50.0)	8(50.0)	0.873	1.000
No	231(52.0)	213(48.0)		

Individuals aged 15-19 reveal a substantial 69.2% prevalence of depression, with 27 individuals affected.

Females report a significantly higher prevalence of 141 (55.7%) than males, 98 (47.3%).

Depression peaks among the 600 level respondents, with 23 individuals, (59.0%) being affected.

None of these relationships were statistically significant.

TABLE 7b: SOCIODEMOGRAPHIC CHARACTERISTICS AND PREVALENCE OF DEPRESSION CONTD.

Variable	Prevalence of Depression		Test statistics (Fischer exact)	p-value
	Depressed (n=239) Frequency (%)	Not depressed (n=221) Frequency (%)		
Agric Engineering	6(50.0)	6(50.0)	1.987	0.962
Dentistry	8(57.1)	6(42.9)		
Education/Psychology	23(51.1)	22(48.9)		
Law	49(51.6)	46(48.4)		
Medicine	38(46.3)	44(53.7)		
Nursing	37(56.1)	29(43.9)		
Pharmacy	62(54.4)	52(45.6)		
Philosophy	16(50.0)	16(50.0)		

Most departments had almost equal distribution of depressed and non-depressed individuals, and the relationship between department and depression was not statistically significant.

TABLE 8: RESIDENCY OF RESPONDENTS AND PREVALENCE OF DEPRESSION

Variable	Prevalence of Depression		Test statistics (Fischer exact)	p-value
	Depressed (n=239) Frequency (%)	Not depressed (n=221) Frequency (%)		
Where respondents reside				
At home	37(15.6)	28(12.7)	2.560+	0.470
Off-campus	87(36.4)	79(35.7)		
Hostels	113(47.3)	114(51.7)		
Staff Quarters	2(0.7)	2(0.9)		
Who respondents live with				
With relatives	20(8.4)	15(6.8)	1.373	0.714
With parents	41(17.2)	43(19.5)		
Alone	72(30.1)	73(33.0)		
With roommates	106(44.3)	90(40.7)		

Among those with depression, 37 (15.6%) resided at home, 87(36.4%) resided off campus, 113(47.3%) resided in hostels, and a minority, 2(0.7%) resided in staff quarters.

Regarding whom the respondents lived with, the majority of depressed individuals, 106(44.3%) lived with roommates, while 72(30.1%) lived alone. A smaller amount, 41(17.2%) lived with their parents, while the minority, 20(8.4%) lived with relatives. These relationships were not statistically significant.

TABLE 9: DETERMINANTS OF DEPRESSION AMONG RESPONDENTS

VARIABLE	FREQUENCY (n=460)	PERCENT
Family History	64	13.9
Previous Diagnosis	30	6.5
Past Events*		
Verbal harassment/public embarrassment by lecturers	165	35.9
Death of a loved one	126	27.4
Examination failure	59	12.8
Heartbreak	73	15.9
Chronic illness	31	6.7
Sexual abuse	106	23.0
Physical abuse	21	4.6
Current Events*		
Financial problems	240	52.2
Academic stress	158	34.3
Poor interpersonal relationship with a colleague	70	15.2
Use of psychoactive substances	64	13.9
Future Events*		
Repeating a class	306	66.5
Long stay in school	230	50.0
Sleep pattern	143	31.1
Inadequate accommodation	135	29.3
Long travel time from hostel to learning area	53	11.5

* Multiple response

Family history of depression was found to have affected 64 individuals (13.9%), with 30 individuals (6.5%) reporting a previous diagnosis of depression themselves. Verbal harassment or public embarrassment by lecturers impacted 165 individuals (35.9%). Financial problems were prevalent, influencing 240 individuals (52.2%).

TABLE 10: DETERMINANTS AND PREVALENCE OF DEPRESSION AMONG RESPONDENTS

Determinants	Prevalence of Depression		χ^2	p-value
	Depressed (n=239) Frequency (%)	Not depressed (n=221) Frequency (%)		
Social/ economic factors				
Alcoholism	85(35.6)	55(24.9)	8.449+	0.014*
Use of psychoactive substances	46(19.2)	18(8.1)	11.816	<0.001*
Poor interpersonal relationships with colleagues	45(18.8)	25(11.3)	25.002	<0.001*
Financial problems	146(61.1)	94(42.5)	16.515+	<0.001*
Inadequate accommodation	64(26.8)	71(32.1)	1.584	0.220
Psychological/medical factors				
Verbal harassment/public embarrassment by lecturers.	94(39.3)	71(32.1)	2.827	0.190
Heartbreak	57(25.8)	16(7.2)	23.726	<0.001*
Sexual abuse	70(29.3)	36(16.3)	12.156+	0.001*
Physical abuse	13(5.4)	3(1.4)	5.699	0.014*
Sleeping pattern	89(37.2)	54(24.4)	8.787	0.002*
Family/medical factors				
Death of a loved one	79(33.1)	47(21.3)	8.825+	0.007*
Previous history of depression	23(9.6)	7(3.2)	7.850	0.004*
Family history of depression	46(19.2)	18(8.1)	11.816	<0.001*
Chronic illness	20(8.4)	11(5.0)	2.655	0.291
Academic factors				
Examination failure	130(54.4)	89(40.3)	4.421	0.046*
Repeating a class	148(61.9)	158(71.5)	4.721	0.038*
Long stay in school	107(44.8)	123(55.7)	5.442	0.025*
Academic stress	120(50.2)	38(17.2)	55.501	<0.001*
Long travel from hostel to learning area	29(12.1)	24(10.9)	0.183	0.770

Multiple Response

*Statistically significant

** cannabis, cigarette, weed, cocaine, tramadol, codeine

Alcoholism showed a statistically significant association with depression, with 85(35.6%) depressed individuals compared to 55(24.9%) non-depressed individuals ($\chi^2 = 8.449$, $p = 0.014$).

The use of psychoactive substances exhibited a strong association with depression, where 46(19.2%) depressed individuals reported its use compared to 18(8.1%) of non-depressed individuals ($\chi^2 = 11.816$, $p < 0.001$).

Poor interpersonal relationships with colleagues were significantly linked to depression, with a prevalence of 45 individuals (18.8%) among depressed individuals compared to 18 individuals (11.3%) among non-depressed individuals ($\chi^2 = 25.002$, $p < 0.001$).

Financial problems were significantly associated with depression, affecting 146(61.1%) of depressed individuals compared to 94(42.5%) of non-depressed individuals ($\chi^2 = 16.515$, $p < 0.001$).

Inadequate accommodation did not show a statistically significant association with depression ($\chi^2 = 1.584$, $p = 0.220$).

Heartbreak significantly correlated with depression, with 25.8 prevalence among depressed individuals compared to 7.2% among non-depressed individuals ($\chi^2 = 23.726$, $p < 0.001$).

Sexual abuse was strongly associated with depression, affecting 29.3% of depressed individuals compared to 16.3% of non-depressed individuals ($\chi^2 = 12.156$, $p = 0.001$).

Physical abuse exhibited a statistically significant association with depression, with 5.4% prevalence among depressed individuals compared to 1.4% among non-depressed individuals ($\chi^2 = 5.699$, $p = 0.014$).

Sleeping pattern significantly correlated with depression, affecting 37.2% of depressed individuals compared to 24.4% of non-depressed individuals ($\chi^2 = 8.787$, $p = 0.002$).

The death of a loved one showed a significant association with depression, with 33.1% prevalence among depressed individuals compared to 21.3% among non-depressed individuals ($\chi^2 = 8.825$, $p = 0.007$).

Previous history of depression significantly correlated with depression, affecting 9.6% of depressed individuals compared to 3.2% of non-depressed individuals ($\chi^2 = 7.850$, $p = 0.004$). Family history of depression was strongly associated with depression, with 19.2% prevalence among depressed individuals compared to 8.1% among non-depressed individuals ($\chi^2 = 11.816$, $p < 0.001$).

Chronic illness did not show a statistically significant association with depression ($\chi^2 = 2.655$, $p = 0.291$).

Examination failure, specifically repeating a class, exhibited a statistically significant association with depression, affecting 54.4% of depressed individuals compared to 40.3% of non-depressed individuals ($\chi^2 = 4.721$, $p = 0.038$).

Long stay in school was significantly associated with depression, with 44.8% prevalence among depressed individuals compared to 55.7% among non-depressed individuals ($\chi^2 = 5.442$, $p = 0.025$).

Academic stress was strongly correlated with depression, affecting 50.2% of depressed individuals compared to 17.2% of non-depressed individuals ($\chi^2 = 55.501$, $p < 0.001$)

CHAPTER FIVE

DISCUSSION

The overall knowledge score for depression was moderately high, at 66%, and a majority of them were aware of the requirement of various treatment options, the potential causes, and triggers.

Less than half of them had a good knowledge of the symptoms, however, and barely a fifth knew the required time to make a diagnosis of depression. Also, about a fifth of respondents were aware that females experienced depression more than their male counterparts.

This was similar to a study conducted in Nsukka, Nigeria in 2022³³, which showed the average knowledge of university students on depression was about 60%, similar to our study's findings.

It also showed that little over a quarter of students knew that females were at a greater risk of depression than males, which is in congruence with our findings as well.

This was in contrast with another study carried out in Imo, Nigeria³⁴, which showed that barely 10% of respondents were well informed about depression and its associated factors.

Our study revealed that the study level of the respondents had a significant relationship with the knowledge of depression. The older and more advanced in class one gets, the higher the level of knowledge. This finding is similar to a cross-sectional study on Prevalence and Factors of Depression among medical students in a Nigerian University in 2018²⁴ which showed a significant and positive relationship between study level and knowledge of depression.

This may be due to increased exposure to bodies of information, and libraries, as well as improved health-seeking behavior for personal purposes as well, as they may have experienced situations that would have made them search for more knowledge on the topics of mental health and depression. They were in dissonance with another study carried out in Delhi, Philippines which showed that there were no significant differences in knowledge of depression in relation to the age and educational level of students³⁶.

In our study, we noted that little over half of our respondents were depressed, with 32% of the depressed individuals having mild depression, 11% having moderate depression, 6% having moderately severe depression, and 3% having severe depression. This is similar to a study carried out in Imo, Nigeria³⁴, which showed the level of depression to be around 42%, and a similar breakdown of the various severities of depressive illness. It contrasts with studies done in Kampala, Uganda^{35,36} to assess depression and its associated factors, which showed that the prevalence of depression in the studied universities was as low as 16% and 21% among the study populations.

There was no notable relationship between marital status and the level of depression among the studied populations, which is similar to a study conducted in Port Harcourt in 2019¹⁸, showing that marital status had no discernable effect on the level of depression of studied undergraduates.

Our study showed no association between location of stay and depression. A study conducted in China, however, showed the effect of isolation and solitary stay on the development of depressive students in colleges, with students staying alone being highly more at risk for developing depression and depressive symptoms³⁷.

Our study also revealed a strong correlation between social isolation, that is, reduced communication with peers, and the development of depression.

This is similar to many studies conducted^{38,39,22,40}, which show direct links between social isolation, emotional dysregulation, depression, as well as severe mental disorders, usually necessitating interventions. Isolation can contribute to depression due to the lack of social connection and support, leading to feelings of loneliness and alienation. The absence of meaningful interpersonal relationships and shared experiences may result in a decline in mental well-being. Additionally, prolonged isolation can disrupt routine, hinder coping mechanisms, and exacerbate negative thought patterns, further impacting mental health.

Drug abuse and the use of psychoactive substances were also highlighted as significant precipitants of depression. This is in keeping with findings from a study done in India on the effect of depression on substance abuse, which showed that drug abuse and the use of psychoactive substances, even on a recreational level, have a strong link to the development of depression. Worse still, studies done on university students on Brazilian students⁴², and meta-analysis done on various universities in the United States⁴³ showed the increasing significance between drug use and depression, as well as the potentiating effect of depression on drug use, creating a vicious cycle.

Poor finances were shown to have a significant negative impact on the mental health of college students. This could be because of the strain it places on them while compromising other aspects of their life, such as feeding, good accommodation, and their ability to focus on their studies.

This is further discussed in a study done on American University students in 2021⁴⁴, which shows up to a 23% increase in the risk of depression, suicidal ideations, and mental health

anomalies in individuals who fall into the bottom quartile of financial status. This study also links poor finances to an increment in working hours, thus worsening sleep, and potentiating the factors which may worsen depressive diseases. Poverty can be linked to lack of sleep and depression through various mechanisms. Economic hardship may lead to unstable living conditions, stressors, and inadequate access to healthcare, contributing to sleep disturbances. The resulting chronic sleep deprivation can then heighten vulnerability to depressive symptoms, forming a cyclical relationship where poverty and sleep deficits reinforce each other, negatively impacting mental health.

A study done on 30,374 college students across China in 2021⁴⁵, showed a 20% increased risk of depression in individuals who had experienced emotional or physical trauma, identifying it as one of the strongest risk factors for depression. These findings may have been overstated, however, as they explored both college-related and childhood emotional abuse.

Our study showed strong relationships between a family history of depression, a previous diagnosis of depression, and the development of a new episode of depressive diseases. A family history of depression and a previous diagnosis of depression can interplay in fostering an increased susceptibility to depressive symptoms. Genetic predispositions within families may contribute to a higher likelihood of experiencing depression, while a personal history of being diagnosed may indicate an ongoing vulnerability. These factors, when combined, may create a cumulative risk, amplifying the likelihood of recurrent or persistent depressive episodes.

This was similar to findings done in research on the family history of college students with depression in Bangladesh⁴⁶ in 2023, and the United States and Canada in 2021⁴⁷ to map the effects of family-related mental illnesses on the development of psychological disorders.

The studies showed that apart from direct genetic factors, other factors such as personality types of family members, esteem and self-confidence, and low family income may all serve as ‘familial’ factors which may trigger or potentiate depressive episodes.

Failing exams and experiencing school-related stress can be interconnected with depression. Academic setbacks, such as exam failure, may evoke feelings of inadequacy and self-doubt. Simultaneously, chronic school stress can create a persistent state of anxiety, overwhelming individuals and contributing to the development or exacerbation of depressive symptoms. The combined impact of academic challenges and heightened stress levels in an educational environment can significantly elevate the risk of depression.

Our study linked long school stays, failing exams, and repeating years in school to depression.

These findings are buttressed by studies done in Korea in 2021, which showed that apart from failing exams, which significantly contributes to depression in undergraduates, the fear of failing exams serves as a significant stressor for the development of depression, further reducing their ability to focus on the exams at hand.

Another study showed the significance of failure and poor performance to be <0.001 when related to the development of mental strain and depression among undergraduates in the United States⁴⁷

CONCLUSION

About two-thirds of respondents in this study had good knowledge of depression, ranging from its definition, its treatment, and symptoms.

A little under half of respondents were depressed, with varying intensities from mild to severe.

Multiple factors were found to be associated with depression among the respondents, such as the use of alcohol and other psychoactive drugs, poor interpersonal relationships, financial constraints, the death of a loved one, heartbreaks, and sexual and physical abuse.

Others such as poor sleeping patterns, previous personal and family history of depression, exam failure, repeating a class, and other forms of academic stress were also implicated in depression.

RECOMMENDATIONS

TO THE GOVERNMENT:

1. **Mental Health Education Programs:** Implement comprehensive mental health education programs in collaboration with educational institutions to raise awareness about depression, its signs, and coping mechanisms. This should be integrated into school curricula and orientation programs for incoming students.
2. **Mental Health Support Services:** Allocate resources to establish and enhance mental health support services on university campuses. This includes counseling centers with qualified professionals, helplines, and peer support programs to provide timely assistance to students experiencing mental health challenges.
3. **Policy Development:** Formulate and enforce mental health policies within the education system. These policies should address the reduction of academic stressors, promote a supportive environment, and establish mechanisms to identify and assist students with mental health issues.

TO THE UNIVERSITY MANAGEMENT:

1. **Enhanced Counseling Services:** Strengthen existing counseling services by increasing the number of qualified mental health professionals and providing continuous training. Ensure that counseling services are widely accessible, confidential, and destigmatized.

2. Inclusive Supportive Environment: Foster a supportive and inclusive environment on campus. This involves organizing mental health awareness campaigns, workshops, and seminars to reduce the stigma associated with seeking help for mental health issues.

3. Academic Stress Management: Collaborate with faculty to develop strategies for managing academic stress. This includes reviewing curriculum structures, providing stress coping workshops, and establishing mentorship programs to assist students in navigating academic challenges.

RECOMMENDATIONS TO STUDENTS:

1. Self-awareness and Advocacy: Foster a culture of self-awareness regarding mental health. Encourage fellow students to openly discuss mental health issues, advocate for their own wellbeing, and seek help when needed.

2. Utilize Support Services: Actively utilize the mental health support services available on campus. This includes seeking counseling, participating in support groups, and accessing resources that promote mental wellbeing.

3. Balanced Lifestyle: Prioritize a balanced lifestyle by managing academic pressures alongside personal and social activities. Develop healthy coping mechanisms, such as regular physical exercise, mindfulness practices, and maintaining a strong social support network.

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APPENDIX I

PROPORTIONAL ALLOCATION PER DEPARTMENT

1. Department of Medicine: $460/4263 \times 759 = 82$
2. Department of Dentistry: $460/4263 \times 127 = 14$
3. Department of Agricultural Engineering: $460/4263 \times 107 = 12$
4. Department of Law: $460/4263 \times 885 = 95$
5. Department of Pharmacy: $460/4263 \times 885 = 95$
6. Department of Nursing: $460/4263 \times 612 = 66$
7. Department of Philosophy: $460/4263 \times 612 = 66$
8. Department of Educational evaluation and counseling psychology: $460/4263 \times 416 = 45$

PROPORTIONAL ALLOCATION PER LEVEL

Proportional allocation =

1. Department of Medicine:

$$200l: 156/759 \times 82 = 17$$

$$300l: 157/759 \times 82 = 17$$

$$400l: 161/759 \times 82 = 17$$

$$500l: 161/759 \times 82 = 17$$

$$600l: 124/759 \times 82 = 14$$

2. Department of Dentistry:

$$200l: 27/127 \times 14 = 3$$

$$300l: 30/127 \times 14 = 3$$

400l: $19/127 \times 14 = 2$

500l: $30/127 \times 14 = 3$

600l: $21/127 \times 14 = 3$

3. Department of Agricultural Engineering

200l: $4/107 \times 12 = 1$

300l: $20/107 \times 12 = 2$

400l: $40/107 \times 12 = 4$

500l: $43/107 \times 12 = 5$

4. Department of Law:

200l: $201/885 \times 95 = 22$

300l: $215/885 \times 95 = 23$

400l: $251/885 \times 95 = 27$

500l: $218/885 \times 95 = 23$

5. Department of Pharmacy:

200l: $230/1061 \times 114 = 25$

300l: $260/1061 \times 114 = 28$

400l: $180/1061 \times 114 = 19$

500l: $190/1061 \times 114 = 20$

600l: $201/1061 \times 114 = 22$

6. Department of Nursing:

$$2001: 190/612 \times 66 = 20$$

$$3001: 186/612 \times 66 = 20$$

$$4001: 151/612 \times 66 = 16$$

$$5001: 85/612 \times 66 = 10$$

7. Department of Philosophy:

$$2001: 99/296 \times 32 = 11$$

$$3001: 110/296 \times 32 = 11$$

$$4001: 87/296 \times 32 = 10$$

8. Department of Educational evaluation and counseling psychology:

$$2001: 49/416 \times 45 = 5$$

$$3001: 147/416 \times 45 = 16$$

$$4001: 220/416 \times 45 = 24$$

APPENDIX II

INFORMED CONSENT FORM

TITLE OF STUDY: KNOWLEDGE, PATTERNS, AND DETERMINANTS OF DEPRESSION AMONG UNDERGRADUATE STUDENTS OF UNIVERSITY OF BENIN, SOUTH-SOUTH NIGERIA

INSTITUTION: University of Benin, Benin city, Edo state.

PRINCIPAL INVESTIGATOR: ADUWA-OGIEGBAEN ULAMEN AND HIGO
ALEXANDER AFEKHUAI

PARTICIPATION: Participation in this study is voluntary. Refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled. You may discontinue your participation at any time without penalty or loss of benefits. The principal investigator may decide to withdraw you from the study if we are unable to obtain the necessary information.

INTRODUCTION: I'm interested in assessing the knowledge, patterns, and determinants of depression among undergraduate students of the University of Benin, Benin and only questions relating to this will be asked.

PROCEDURES TO BE FOLLOWED:

QUESTIONNAIRE: If you agree to participate, I will ask you questions about your age, sex, marital status, Religion, Occupation, Ethnicity, and Education.

BENEFITS: To be able to shed light on and add to the body of knowledge and help in strategic planning and policy implementation in the management and improvement of mental health

COMPENSATION: There is no compensation to volunteers for their participation.

DURATION OF PARTICIPATION: This study only requires the questionnaire, there is no follow-up or further information needed.

WHO CAN PARTICIPATE IN THIS STUDY: Fulltime undergraduate students and students who have spent at least one year in the university.

ASSURANCE OF CONFIDENTIALITY OF VOLUNTEER'S IDENTITY: Records relating to your participation in the study will remain confidential. Your name will not be used in any report in this study.

PERSONS AND PLACES FOR ANSWERS REGARDING YOUR RIGHTS AS A RESEARCH SUBJECT: If during the course of this study you have questions concerning the nature of the research or you believe you have sustained a research-related injury or assault; you should contact.

Department of medicine and surgery

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Edo state, Nigeria.

Phone number: 08026272995

Email: aduwaumen37@gmail.com

Ethics and Research Committee,

University of Benin Teaching Hospital

Phone: 07063331337

CERTIFICATION OF CONSENT

I have read the above statement about the research. I fully understand the reason for the research.

I also understand my participation is voluntary. I know enough about the purpose, methods, risks, and benefits of the research study. I am willing to take part. I understand that I may freely option-out of this study at any time.

Subject's Signature: _____ Date: _____

Witness's Signature: _____ Date: _____

APPENDIX III
QUESTIONNAIRE

DEPARTMENT OF PUBLIC HEALTH AND COMMUNITY MEDICINE, COLLEGE OF MEDICINE, UNIVERSITY OF BENIN

KNOWLEDGE, PATTERNS, AND DETERMINANTS OF DEPRESSION AMONG UNDERGRADUATE STUDENTS OF THE UNIVERSITY OF BENIN, SOUTH-SOUTH NIGERIA.

We are 600-level medical students of the University of Benin, Benin City. This questionnaire is designed to assess the knowledge, prevalence, and determinants of depression among undergraduate students at the University of Benin. All information given is confidential.

Thank you for participating in this survey.

SECTION A: SOCIO-DEMOGRAPHIC DATA

1. Age: Under 18 18-24 25-30 31-40 Over 40
2. Sex: Male Female
3. Ethnicity: _____
4. Study Course: Medicine Pharmacy Other: _____
5. Level: 200 300 400 500 600
6. Residence: School Hostel Off-Campus Home Other: _____
7. Living status: Alone With parents Family members Fellow students
8. Marital Status: Single Married Cohabiting Separated Divorced
9. Any disability or chronic disease? Yes No
10. Family type: Monogamous Polygamous
11. Birth position: 1st 2nd 3rd 4th 5th Others _____
12. Who raised you: Parents Guardian Others _____
13. Has any member of your family been diagnosed with depression? - Yes - No

SECTION B: KNOWLEDGE OF DEPRESSION AMONG UNDERGRADUATE STUDENTS

	YES	NO	I DON'T KNOW
14. Abnormal brain chemicals can lead to Depression			
15. Life events can cause depression			
16. Medical illness can cause Depression			
17. Some medications have 'depression' as a side effect			
18. A family history of depression is a risk factor for having depression			
19. Men may experience depression more than women			
20. Persistent low mood is a symptom of depression			
21. Increased energy and activity is a symptom of depression			
22. Anhedonia is a symptom of depression			
23. Symptoms must last for at least 1 month to meet the diagnosis of depression			
24. Treatment of depression involves the use of medication only			
25. Treatment of depression involves counseling and psychotherapy only			
26. Depression can be fully cured			
27. Abnormal brain chemicals can lead to Depression			

SECTION C: PREVALENCE OF DEPRESSION AMONG UNDERGRADUATE STUDENTS

Over the last 2 weeks, how often have you been bothered by any of the following problems?

(Tick to indicate your answer)

	NOT AT ALL	SEVERAL DAYS	MORE THAN HALF OF THE DAYS	NEARLY EVERYDAY
28. Little interest or pleasure in doing things				
29. Feeling down, depressed, or hopeless				
30. Trouble falling or staying asleep, or sleeping too much				
31. Feeling tired or having little energy				
32. Poor appetite or overeating				
33. Feeling bad about yourself or that you are a failure or have let yourself or your family down				
34. Trouble concentrating on things, such as reading or watching television				
35. moving or speaking so slowly that other people could have noticed. Or the opposite being so fidgety or restless that you have been moving around a lot more than usual				
36. Thoughts that you would be better off dead or hurting yourself				

SECTION D: DETERMINANTS OF DEPRESSION AMONG UNDERGRADUATE STUDENTS

37. Has any member of your family been diagnosed with depression? Yes No
38. Have you encountered any traumatic event recently? Yes No
39. If yes to question 45, specify (Multiple answers): Examination failure Heartbreak
Sexual abuse Physical abuse Chronic illness Other: _____
40. Which of these is/are a major challenge(s) to you that can lead to depression? (Check all that apply): Repeating a class Long travel time from hostels to learning areas Long stay in medical school Inadequate accommodation Sleeping patterns Other: _____
41. Are you going through any financial problems? Yes No
42. Have you been verbally attacked or publicly embarrassed by your superiors/lecturers? Yes
No
43. Have you been sexually harassed? Yes No
44. Do you have any chronic illness? Yes No
45. Have you lost anyone close to you recently? Yes No
46. Any history of Alcohol use problems that has in any way affected your academic performance? Yes No
47. Do you take any other substance of abuse? Yes No
48. If yes to question 68, which of these? (Multiple answers): Cannabis Cigarette Cocaine
Tramadol Codeine Other: _____

Thank you for completing the questionnaire. Your participation is valuable for our research.

APPENDIX IV

ETHICAL CLEARANCE



**UNIVERSITY OF BENIN
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DIRECTOR OF ADMINISTRATION: JIM UWADIE, Esq

HEALTH RESEARCH ETHICS COMMITTEE APPROVAL

PROTOCOL NUMBER: ADM/E 22/A/VOL.VII/148301235

PROPOSAL TITLE: "KNOWLEDGE, PATTERNS AND DETERMINANTS OF DEPRESSION AMONG UNDERGRADUATE STUDENTS OF UNIVERSITY OF BENIN, SOUTH-SOUTH NIGERIA"

PRINCIPAL INVESTIGATOR(S): ADUWA-OGIEGBAEN ULAMEN, HIGO ALEXANDER AFEKHUAI

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

DATE CONSIDERED: NOVEMBER 16TH, 2023

DECISION OF THE COMMITTEE: APPROVED

*THIS APPROVAL DATES 06/11/2023 TO 05/11/2024. IF THERE IS DELAY IN STARTING THE RESEARCH, PLEASE
INFORM THE HREC SO THAT THE DATES OF APPROVAL CAN BE ADJUSTED ACCORDINGLY*
REMARK:

CHAIRMAN: PROF. (MRS) A.N. OFILI

SIGNATURE & DATE

SUPERVISOR (S): PROF. (MRS.) A.N. OFILI, DR. K.O. ODERINDE

DECLARATION BY INVESTIGATOR(S):

PROTOCOL NUMBER (please quote in all enquiries)

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

Signature & Date.....*[Signature]* 23/11/2023

