Original Article

Examining the Mental Health Patterns Among Medical Science Students in Covid Era.

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Abstract:

This study examines the prevalence of stress, anxiety, and depression among medical science students at varying academic stages in Zambia. Using the Depression, Anxiety, and Stress Scale (DASS21) and the General Health Questionnaire (GHQ12), researcher analyzed mental health scores and explore associations with socioeconomic factors. Goal is to gain insight into potential trends and correlations within this population. This research aims to uncover trends and patterns in mental health scores in copperbelt region of Zambia and evaluate the significance of sociodemographic variables.

Keywords: Mental health, Medical students, Higher education

1. Introduction

Medical science education poses unique challenges that may lead to increased stress, distress, anxiety, and depression among students. Identifying these mental health issues across diverse academic years is essential for implementing effective intervention strategies. Moreover, understanding the link between socioeconomic factors and mental health outcomes can aid in tailored approaches to address disparities in student well-being. In recent years, the mental health of college and university students has become a central concern in the field of higher education (Ibrahim et al., 2013). Factors such as academic pressure, financial stress, and the demands of transitioning to adulthood can create a challenging environment for students' mental health. Because of their demanding curriculum and exposure to pain and illness, medical science programs provide a special set of pressures and challenges within the larger field of higher education, due to the expectations placed on future healthcare professionals (Dahlin et al., 2005; Guthrie et al., 1998). Like many other nations, Zambia is seeing an increase in the number of students enrolled in medical science programs due to the growing need for healthcare workers. Nonetheless, little study has been done expressly on the mental health of medical science students in this particular setting (Mutale et al., 2019; Siziya et al., 2013). To address this gap in knowledge, this study adopted a quantitative approach, utilizing validated questionnaires to assess mental health and exploring the associations between mental health scores and various socio-economic and socio-demographic factors during the Covid-19 pandemic.

2. Literature

Medical students face struggles and challenges in their academic journey-

Medical students confront rigorous academic demands, complex clinical training, and the weight of shaping the future of healthcare (Dyrbye et al., 2006). Their mental well-being is intricately connected to their academic success, their capacity to provide high-quality patient care, and the physical and psychological health preservation. Neglecting their mental health can result in adverse outcomes such

as burnout, reduced empathy, diminished academic performance, and potential attrition from medical programs (Rotenstein et al., 2016).

A multidisciplinary approach to understanding student mental health-
Understanding the mental health of medical science students requires a multidisciplinary approach, drawing from key psychological and sociological theories that illuminate the intricate web of factors influencing their well-being. Here is a theoretical framework particularly relevant to this study:

Stress and Coping Theory: Rooted in psychology, the Stress and Coping Theory by Folkman and Lazarus (1984) is highly pertinent to understanding student mental health. This theory posits that individuals' psychological well-being is shaped by their appraisal of stressors and their coping strategies. For medical science students, who encounter a multitude of academic and clinical stressors, this framework sheds light on how their perception of stress and their choice of coping mechanisms affect their mental health outcomes. The theory emphasizes that the way students appraise and cope with stressors can significantly impact their overall well-being.

Epidemiology of Stress, Anxiety, and Depression Among University Students Worldwide-
The global landscape of higher education is marked by the growing concern surrounding the mental health of university students. Numerous studies conducted on a worldwide scale have revealed a disquieting picture of the prevalence of stress, anxiety, and depression among this demographic (Ngwa et al., 2024). The epidemiological data underscores the pervasive nature of these mental health challenges, affecting students from various cultural, social, and academic backgrounds. Recent meta-analyses and systematic reviews (Auerbach et al., 2018; Ibrahim et al., 2013; Ngwa et al., 2024) have drawn attention to the alarming rates of these conditions, with some studies reporting prevalence rates well above the national averages.

The relevance of global perspectives to the Zambian context underscores the necessity of international dialogue and knowledge sharing in addressing student mental health concerns. By drawing from global research and adapting it to the Zambian context, this study contributes to the existing body of knowledge and advances the understanding of student mental health, offering insights and recommendations that can positively impact the well-being of medical science students in Zambia. The role of educational institutions in addressing student mental health is pivotal. Academic institutions are increasingly recognizing their responsibility to foster students' mental well-being and implementing initiatives such as counseling services, mental health education, and anti-stigma campaigns (Kadison & DiGeronimo, 2004; University of Cambridge, 2019). Policy approaches and guidelines have emerged at both national and international levels, emphasizing the importance of a comprehensive framework for mental health support in educational settings (SAMHSA, 2019; WHO, 1998). Successful interventions in different contexts, including peer support, city-wide programs, and curriculum integration, have demonstrated the potential to improve mental well-being among students (ThriveNYC, 2015; Ministry of Health, Zambia, 2018).

The presence of gaps and limitations in existing research have been identified, including the need for more detailed studies on the experiences of medical science students, exploration of the Zambian context, and the influence of digital technology. Additionally, the study recognizes the limitations associated with self-report data, making a case for methodological enhancements (Eisenberg et al., 2009; Driscoll et al., 2017; Ngwa et al., 2023).

Objectives
To assess the prevalence of stress, anxiety, and depression among medical science students in different academic years in Zambia.
To examine the association between socioeconomic factors and mental health scores/outcomes among medical science students in Zambia.
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3. Materials and Methods

A cross-sectional survey was conducted among medical science students enrolled in Zambian higher education institution over six consecutive academic years. Participants belonged to Michael Chilufya Sata School of Medicine at Copperbelt University in Ndola, who completed self-reported measures of stress, anxiety, and depression via the DASS21 and GHQ12 questionnaires. Sociodemographic data, including family and employment status, were also gathered.

Research Paradigm
The research paradigm employed in this study is mainly quantitative positivism, with the primary goal being to gather data through standardized questionnaires and statistical techniques to analyze mental health issues among medical science students. In this context, the use of quantitative positivist

paradigm aims to provide insights into stress, anxiety, and depression prevalence and their correlation with various socio-economic and socio-demographic factors.

In the quantitative positivist paradigm, it is assumed that there are objective realities that can be systematically examined and analyzed. The primary objective is to identify patterns, relationships, and generalizable findings through statistical analysis. Regression analysis and other statistical methods help test hypotheses and reach help in testing hypotheses and reach conclusions based on empirical evidence. While the research predominantly follows the quantitative positivist paradigm, it is important to note that other paradigms are often integrated to address different aspects of the research questions and goals.

Further, it's crucial to interpret the study results while considering the limitations of the chosen paradigm, as quantitative methods may not fully capture the complexity of individual experiences. This approach demonstrates the importance of considering multiple perspectives in research and using various methodologies to comprehensively understand the phenomena being studied.

Research Methods Justification

The research methods employed in this study consist of quantitative data collection using established questionnaires, namely the Depression, Anxiety, and Stress Scale (DASS21) and the General Health Questionnaire (GHQ12). These methods are justified based on their appropriateness for addressing the research objectives and the nature of the data being sought (Creswell & Creswell, 2017).

The Depression, Anxiety, and Stress Scale (DASS21) is chosen as a validated tool for assessing the levels of depression, anxiety, and stress among the participants (Lovibond & Lovibond, 1995). Its established reliability and validity make it well-suited for measuring mental health indicators, aligning with the study's focus on assessing the prevalence of these conditions.

The General Health Questionnaire (GHQ12) is selected to evaluate the general mental health status of the participants (Goldberg & Williams, 1988). It provides a broader perspective on overall psychological well-being, which is essential for a comprehensive analysis of mental health among medical science students.

The justification for employing these methods lies in their ability to yield standardized, quantifiable data, which is crucial for statistical analysis and addressing the research questions. These questionnaires are widely accepted in the field of mental health research and have been used in various studies to assess mental health outcomes.

Population of the study and unit of analysis

The population of this study comprises medical science students from various academic years within a specific educational institution or institutions. It represents the entire group of students who meet the inclusion criteria, such as enrollment in a medical science program (Creswell & Creswell, 2017).

The unit of analysis for this study is the individual student participant. Each student who completes the Depression, Anxiety, and Stress Scale (DASS21) and the General Health Questionnaire (GHQ12) questionnaires constitutes a single unit of analysis. The collected data from each participant be used to analyze the prevalence of stress, anxiety, and depression and to explore the relationships with socio-economic and socio-demographic factors.

This choice of the population and unit of analysis aligns with the research objectives, aiming to understand mental health issues among individual medical science students and investigate the factors contributing to these issues. Analyzing data at the individual level allows for a detailed examination of each participant's specific experiences and characteristics (Leedy and Ormrod, 2021., Neuman, 2013., Sekaran and Bougie, 2016).

Sampling Technique

The sampling technique employed in this study is stratified random sampling. This method is justified for its ability to ensure a representative sample of medical science students across different academic years and to enhance the generalizability of the study's findings (Creswell & Creswell, 2017).

Stratified random sampling comprises dividing the population (in this situation, medical science students) into different segments or strata based on a specific characteristic (like academic year) and then randomly selecting participants from each segment. This method guarantees that each subgroup is proportionally represented in the sample, making it more reflective of the entire population. The rationale behind stratified random sampling is in its ability to incorporate students from different academic years, thus capturing a wide range of experiences and potential differences in mental health. Through adequate representation from each stratum, the research can make more sound conclusions regarding the prevalence of stress, anxiety, and depression among medical science students at various academic stages. Moreover, this sampling method increases the applicability of the results.

Applicability refers to how broadly the findings of the study can be applied to a larger population. By employing stratified random sampling to establish a representative sample, the research heightens the chances that its conclusions can be extended to a wider group of medical science students, possibly beyond the specific institution(s) in question. Consequently, stratified random sampling is justified for its capacity to offer a well-rounded sample and improve the applicability of the study's findings, enabling a more comprehensive understanding of the mental well-being of medical science students.

Sample Size

Sample size determined by fixing an error estimate at 5% with 95% as the level of confidence, the sample size calculated using Raosoft sample size calculator (Raosoft, Inc. 2017).

x = Z(c/100)2r(100-r)
n = N x/((N-1)E2 + x)
E = Sqrt[(N - n)x/n(N-1)]

where N is the population size, r is the fraction of responses that you are interested in, and Z(c/100) is the critical value for the confidence level c

The total sample calculated size is 362.

In practical, a total of 363 respondents selected from the student population of MCS-SOM-CBU, using a simple/stratified random sampling procedure.

Simple random sampling is a method of selecting a subset of individuals from a larger population in such a way that each member of the population has an equal chance of being chosen. Here, 363 respondents from a student population participated using simple random sampling. Here are the following steps:

Numbering the Population: Assigned a unique identifier (usually a number or code) to each of the students in population. This ensured that every student can be uniquely identified.

Determine Sample Size: A sample size of 362 respondents has already been determined.

Random Number Generator: Use a random number generator or a random number table to generate 362 random numbers. These random numbers correspond to the unique identifiers assigned to each student.

Selecting the Sample: Match each of the random numbers to the unique identifiers in population. The students whose identifiers match the randomly generated numbers are the selected sample. Here's a step-by-step breakdown of the process: For example, let's say use a random number generator and it generates the following numbers: 204, 308, 512, 1001, 4502, and so on. Then look up the students with those unique identifiers in population list. In this example, student #204, #308, #512, #1001, #4502, and so on would be part of randomly selected sample of 362 respondents. It's crucial to note that the key to simple random sampling is that each student in population has an equal chance of being selected, and the selection process is entirely based on chance

This sample size provides a reasonable representation of the population while maintaining a 5% margin of error, which is a common level of precision used in survey research.

Inclusion Criteria

Participants must be currently enrolled in a medical science program.
Participants should provide informed consent to participate in the study.

Exclusion Criteria

Individuals not enrolled in a medical science program.
Participants unwilling to provide informed consent.

Data collection methods aligned with the specified research objectives:

a) Objective: To assess the prevalence of stress, anxiety, and depression among different academic year medical science students in Zambia, using the DASS21 and GHQ12 questionnaires.

Data Collection Method: A cross-sectional survey design using the DASS21 and GHQ12 questionnaires aligns with this objective. These standardized questionnaires are well-suited for assessing mental health indicators and can be administered to students across different academic years, providing a comprehensive snapshot of mental health prevalence.

b) Objective: To examine the association between socio-economic factors and mental health scores/outcomes among medical science students in Zambia.

Data Collection Method: In addition to the DASS21 and GHQ12 questionnaires, collected socio-economic information through a survey that includes questions about family income and employment status. Utilizing regression analysis aligns with this objective as it allows for exploring the associations between socio-economic factors and mental health scores.

Two established questionnaires were used for data collection in this study. The GHQ12 questionnaire, which is used in Zambia before, to screen for mental health problems, has been shown to be a reliable and valid tool for detecting psychiatric morbidity (Mwape et al., 2019). Similarly, the DASS21, which assesses symptoms of depression, anxiety, and stress, has been validated in the Zambian context and has been found to have good psychometric properties (Mwape et al., 2021).

Data Analysis Tools and Techniques
Data analysis was done through SPSS (version 23.0). In this study on the mental health of medical science students in Zambia, several data analysis tools and techniques are employed to analyze the collected data and address the research objectives effectively.

Descriptive Statistics:
Descriptive statistics, such as mean, median, standard deviation, and frequency distributions, are used to summarize and present key characteristics of the data, including the prevalence rates of stress, anxiety, and depression among different academic year students (Trochim & Donnelly, 2008).

Inferential Statistics

Inferential statistics, including chi-square tests were applied to examine associations and differences among various groups. For instance, chi-square tests used to assess gender-based differences in the prevalence of mental health issues (Field, 2013).

This research study proposal titled as "Comparing Mental Health Scores of Graduate Medical Science Students: Rethinking Higher Education by a Cross-Sectional Investigation Across Academic Years" as part of dissertation submission for Masters in Education program, obtained ethical clearance from Tropical Diseases Research Center (TDRC) (reference number: TDREC 138/11/23) and study permission from the National Health Research Authority (reference number: NHRA00015/07/11/2023).This study adhered to ethical guidelines for research involving human participants from among the medical students at Copperbelt University. Data was collected during period from Nov 2023 to Feb 2024, kept confidential and anonymized to ensure the privacy and confidentiality of participants. Informed consent obtained from all participants, and they were informed of their right to withdraw from the study at any time without consequence.

4. Results
The prevalence rates of stress, anxiety, and depression are quantified based on the responses of our participants. Furthermore, the data have been processed, organized, and analyzed using appropriate statistical techniques, including chi square test analysis, to examine the relationships between mental health scores and various factors such as prevalence, across different academic years. With these data preliminaries in place, we embark on the task of presenting the empirical findings that will not only illuminate the current state of student mental health but also serve as the foundation for the subsequent discussions and conclusions.

Data Screening, Testing, and Cleaning
The integrity and reliability of our study's results hinge on a robust data screening, testing, and cleaning process. The empirical data collected from the DASS21 and GHQ12 questionnaires underwent meticulous scrutiny to ensure its quality and accuracy. Data screening began with a comprehensive review of the collected responses to identify any missing, incomplete, or inconsistent entries. These discrepancies were addressed through data imputation techniques that maintained the dataset's integrity. The next step involved rigorous data testing to assess the validity of responses and identify potential outliers. This entailed using established statistical tests to verify the data's conformity our analytical models' assumptions. Data cleaning procedures were implemented to rectify any inconsistencies or anomalies. This involved cross-referencing data entries and verifying responses for accuracy. The thoroughness of this process reflects the dedication to producing reliable and trustworthy findings that will underpin our subsequent analyses and discussions. Osman et al. (2012), highlighted that rigorous data screening and cleaning are indispensable steps in ensuring that our research results accurately reflect the mental health parameters of the studied population, thereby fortifying the reliability and validity of our conclusions.

Descriptive Statistics of Study Variables
A comprehensive examination of the study variables through descriptive statistics provides valuable insights into the mental health landscape of medical science students in Zambia. The empirical data encompass a diverse array of parameters, including stress, anxiety, and depression scores derived from the Depression, Anxiety, and Stress Scale (DASS21), as well as socio-economic and socio-demographic factors such as partnership, age and gender. Descriptive statistics unveil the central

tendencies and dispersion of these variables. Measures such as means, standard deviations, medians, and interquartile ranges offer a snapshot of the typical mental health scores, while frequency distributions reveal the distribution of categorical variables. These statistics empower us to discern the average levels of stress, anxiety, and depression among the participants, as well as the variability within these scores. They shed light on the socio-economic and socio-demographic profiles of the student population, allowing for a nuanced understanding of the factors that influence their mental well-being. Since the data collected using the Likert scales was ordinal, the normality test is irrelevant for this large sample size. As we delve into these descriptive statistics, we equip ourselves with the essential foundation for a detailed and data-driven discussion of our study findings.

Results of the Tests and Their Relation to Research Questions

The analysis of our data yields compelling results that bear a direct relationship to our research questions. To begin, the prevalence rates of stress, anxiety, and depression among medical science students in Zambia are substantiated through our analysis of the Depression, Anxiety, and Stress Scale (DASS21) scores.

	N	Minimum	Maximum	Mean	Std. Deviation
Level_of_Depression	72	0	1	.29	.458
Level_of_Anxiety	72	0	1	.04	.201
Level_of_Stress	72	0	1	.04	.201
Level_of_Distress	72	0	3	1.03	.822
Valid N (listwise)	72				

Table 1 Descriptive data for year2

For year 2 students as shown in table 1, the sample, on average, reports relatively low levels of depression, anxiety, and stress. The overall distress level is somewhat higher, with a moderate degree of variability.

	N	Minimum	Maximum	Mean	Std. Deviation
Level_of_Depression	72	0	2	.97	.649
Level_of_Anxiety	72	0	2	.86	.698
Level_of_Stress	72	0	2	.97	.649
Level_of_Distress	72	0	2	.87	.838
Valid N (listwise)	72				

Table 2 Descriptive data for Year 3

For Year 3 students as shown in table 2, the average Level_of_Depression score is approximately 0.97, suggesting a moderate level of depression on average. The average Level_of_Anxiety score is 0.86, indicating a moderate level of anxiety on average. The average Level_of_Stress score is 0.97, reflecting a moderate level of stress on average. The average Level_of_Distress score is 0.87, indicating a moderate level of overall distress on average. The standard deviation for Level_of_Distress (0.838) is relatively higher compared to the other variables, suggesting greater variability in distress scores among Year 3 students.

	N	Minimum	Maximum	Mean	Std. Deviation
Level_of_Depression	72	0	1	.31	.464
Level_of_Anxiety	72	0	1	.06	.231
Level_of_Stress	72	0	1	.04	.201
Level_of_Distress	72	0	3	1.04	.911

Valid N (listwise)	72

Table 3 Descriptive data for year 4

For Year 4 students as shown in table 3, the sample, on average, reports low to moderate levels of depression, anxiety, and stress. The overall distress level is moderate, with a notable degree of variability. Compared to the previous set of results provided, the mean values have changed slightly, particularly for anxiety and distress.

	N	Minimum	Maximum	Mean	Std. Deviation
Level_of_Depression	74	0	1	.31	.466
Level_of_Anxiety	74	0	1	.08	.275
Level_of_Stress	74	0	1	.04	.199
Level_of_Distress	74	0	3	1.04	.867
Valid N (listwise)	74				

Table 4 descriptive data for year 5

For Year 5 students as shown in table 4, on average, report low to moderate levels of depression, anxiety, and stress. The overall distress level is moderate, with a notable degree of variability. Compared to the previous set of results, the mean values for anxiety and distress have increased slightly among Year 5 students.

	N	Minimum	Maximum	Mean	Std. Deviation
Level_of_Depression	73	0	1	.33	.473
Level_of_Anxiety	73	0	1	.05	.229
Level_of_Stress	73	0	1	.03	.164
Level_of_Distress	73	0	3	1.07	.855
Valid N (listwise)	73				

Table 5 Descriptive data for year 6

For Year 6 students as shown in table 5, on average, report low levels of depression, anxiety, and stress. The overall distress level is moderate, with a notable degree of variability.
The following are the prevalence rates of whole sample for study variables of depression, anxiety, stress and distress:

Variable tested	Normal %	Mild %	Moderate %	Severe %	Total
Depression	59.8	36.4	3.9	0	363
Anxiety	81.8	14.6	3.6	0	363
Stress	81.5	14.6	3.9	0	363
Distress	30.3	44.1	19.8	5.8	363

Table 5.1 Prevalence rates for whole sample

The following are the prevalence rates in age group of 22-23 years that corresponds to academic year 3, for study variables of depression, anxiety, stress and distress:

Variable tested	Normal %	Mild %	Moderate %	Total
Depression	22.2	58.3	19.4	363
Anxiety	31.9	50.0	18.1	363
Stress	22.2	58.3	19.4	363
Distress	41.7	29.2	29.2	363

Table 5.2 Prevalence rates for academic year 3

Our findings indicate that, on average, the study participants of whole sample exhibit moderate levels of stress, mild levels of anxiety, and mild levels of depression. These scores are reflective of the mental health landscape within this academic cohort.

In line with our first research question, these results illuminate the mean scores for stress, anxiety, and depression among students across different academic years as indicated by tables 1 to 5. Table 5.1 indicates the prevalence rates of depression, anxiety, stress and distress for whole sample, that shows that the mild depression levels were shown by nearly 36.4% study subjects and moderate distress levels were shown by 19.8 % of subjects which is quite alarming. Table 5.2 indicates the prevalence rates of depression, anxiety, stress and distress for academic year 3, that indicates that the mild depression levels were shown by nearly 58.3% study subjects and moderate distress levels were shown by 29.2 % of subjects which is quite alarming. These results in tables 1 to 5.2 are aligning with the research question one. Mean scores were higher for group-2, which was made up of year3 students, compared to the other groups. Hence the mental health scores indicate that year 3 students are at risk.

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	4.845a	4	.304
Likelihood Ratio	5.729	4	.220
Linear-by-Linear Association	.623	1	.430
N of Valid Cases	363		

a. 3 cells (33.3%) have expected count less than 5. The minimum expected count is .46.

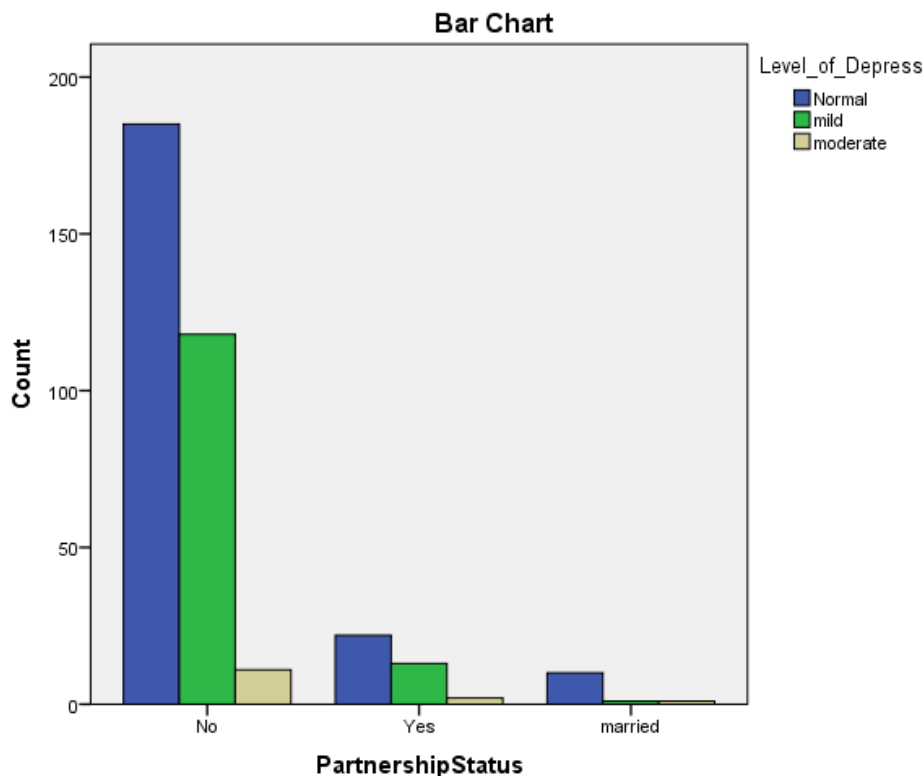*Table 6 Chi Square Test for partnership and level of depression*

Figure 1 Partnership and Depression level

Here, chi square tests are used since it shows relation between the categorical variables by testing the hypothesis. Chi square test assumptions are violated, since point a) is >20%.
Since the likelihood ratio and Significance is >0.05, So accept Null hypothesis. No association between level of depression and the partnership status for the whole sample.

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.899[a]	4	.575
Likelihood Ratio	4.444	4	.349
Linear-by-Linear Association	.286	1	.593
N of Valid Cases	363		

a. 3 cells (33.3%) have expected count less than 5. The minimum expected count is .43.

Table 7 Chi square test for Partnership and level of anxiety
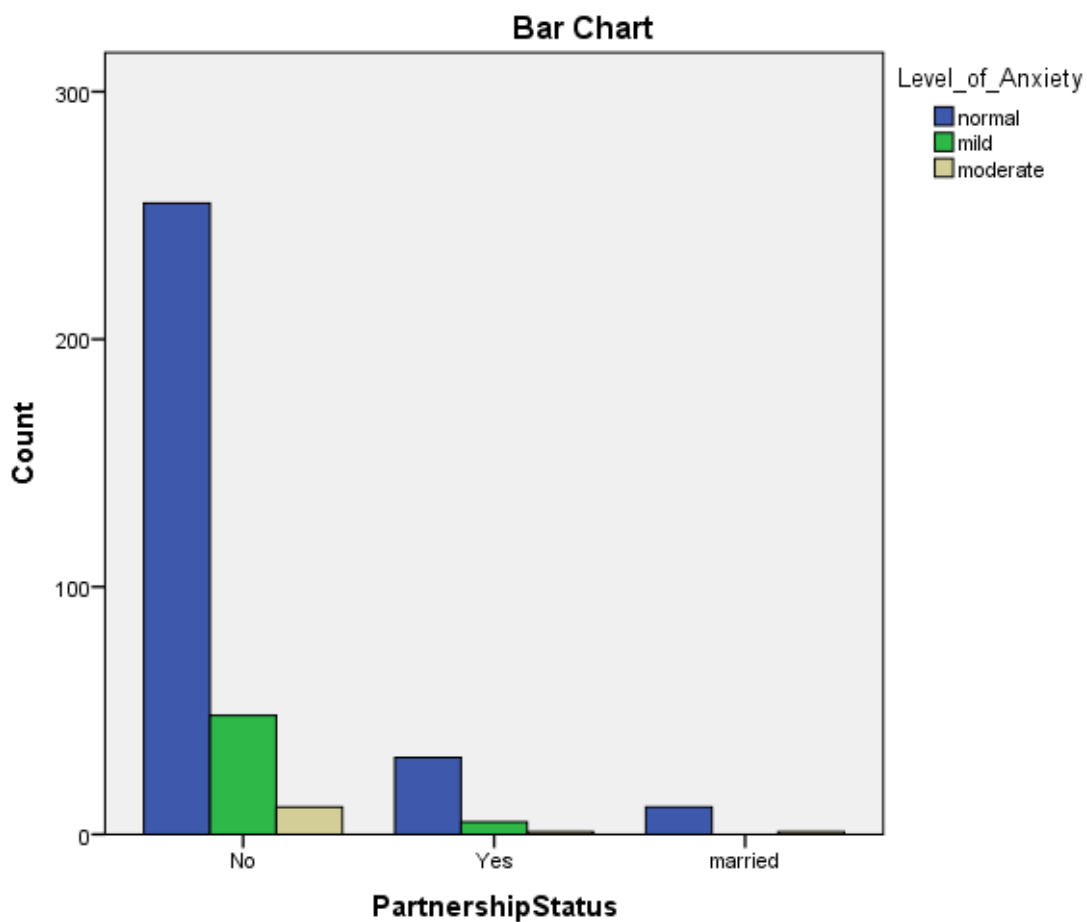
Figure 2 Partnership and Anxiety level

Here, chi square test assumptions are violated, since point a) is >20%.
Since the likelihood ratio and Significance is >0.05, So accept Null hypothesis. No association between level of anxiety and the partnership status for the whole sample.

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.167[a]	4	.705
Likelihood Ratio	2.839	4	.585
Linear-by-Linear Association	1.133	1	.287

N of Valid Cases	363

a. 3 cells (33.3%) have expected count less than 5. The minimum expected count is .46.

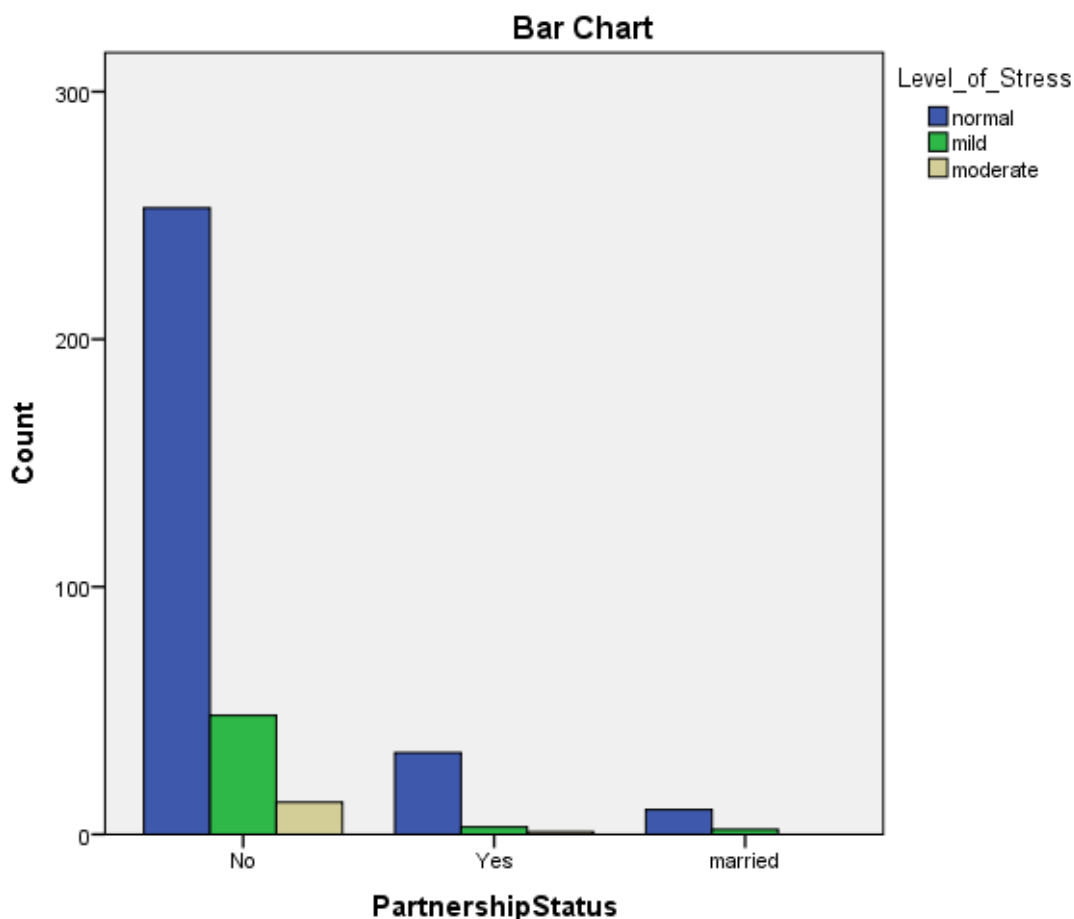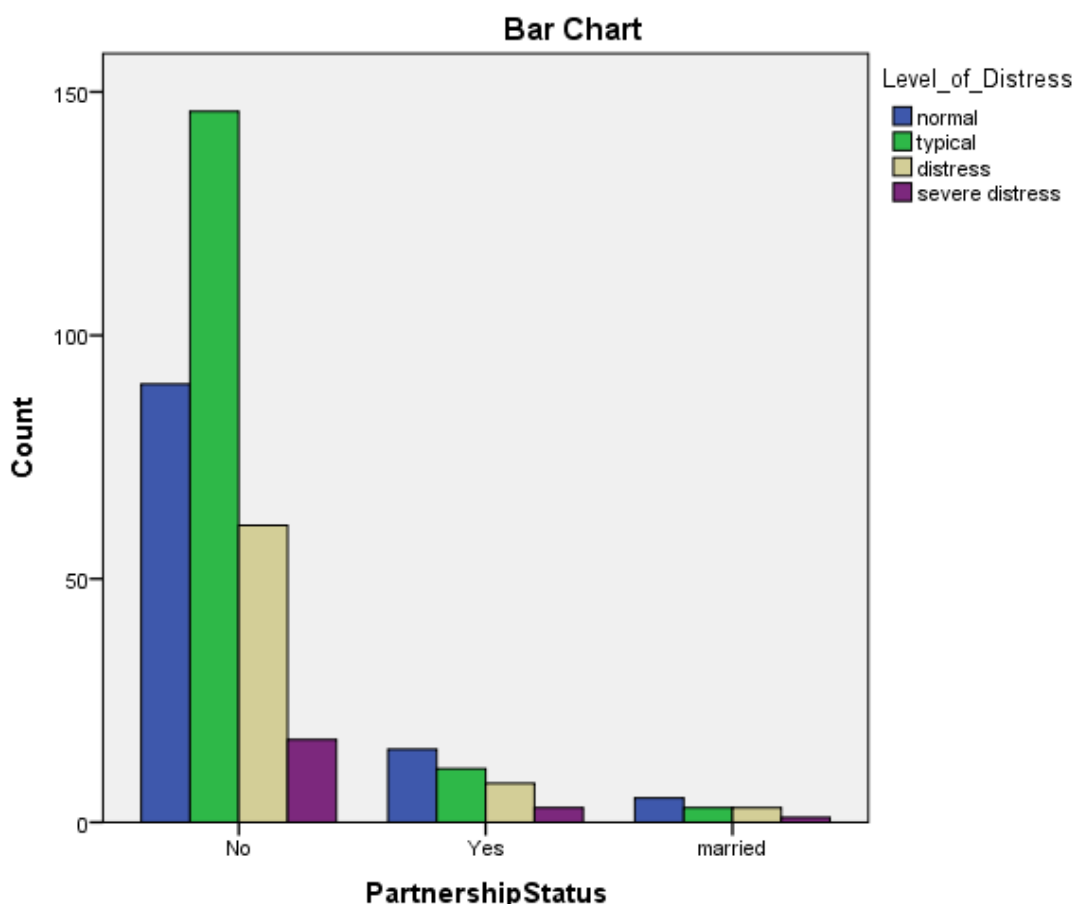*Table 8 Chi square test for Partnership and level of stress*

Figure 3 Partnership and stress level

Here, chi square test assumptions are violated, since point a) is >20%.
Since the likelihood ratio and Significance is >0.05, So accept Null hypothesis. No association between level of stress and the partnership status for the whole sample.

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.008[a]	6	.422
Likelihood Ratio	6.171	6	.404
Linear-by-Linear Association	.051	1	.821
N of Valid Cases	363		

4 cells (33.3%) have expected count less than 5.
Table 9 Chi square test for Partnership and level of distress

Figure 4 Partnership and distress level

Here, chi square test assumptions are violated, since point a) is >20%.
Since the likelihood ratio and Significance is >0.05, So accept Null hypothesis. No association between level of distress and the partnership status for the whole sample.
Our findings indicate that, on average, the study participants exhibit no associations of partnership status between the levels of stress, levels of anxiety, and levels of depression or distress. These scores are reflective of the mental health landscape within this academic cohort.
   In line with our second research question, these results illuminate the scores and charts for distress, stress, anxiety, and depression among students across different academic years as indicated by tables 6 to 9. Hence the data analysis using chi square tests indicated no association between socio-economic factors such as partnership status and mental health scores.
Our preliminary analysis reveals significantly moderate levels of depression, anxiety, stress and distress levels among third-year students compared to other groups ($p < .05$). Similarly, anxiety scores decrease progressively through the academic years 4,5 and 6 ($p > .05$). However, no consistent pattern emerged in relation to body mass index levels. Regarding socioeconomic factors, our initial findings indicate no relationship between partnership and mental health scores; (all $p > .05$).

5. Discussion
The findings on the mean scores of stress, anxiety, and depression among students in different academic years underline a noteworthy trend. As reflected in our results, students across academic year three, exhibited moderate levels of stress and mild levels of anxiety and depression, on average which is greater than any other academic years in our study (Table 1 to 5.2). These statistics provide a comprehensive overview of the mental health landscape among medical science students, aligning with our first research question. This objective has been achieved by quantifying the prevalence of stress, anxiety, and depression through the DASS21 and GHQ12 questionnaires (Osman et al., 2012). Our study highlights a critical dimension of the relationship between socio-economic factors and mental health scores. Notably, the participants did not respond much on family income and financial stress. Hence these factors have not surfaced as determinants of stress, anxiety, and depression among medical science students. The data elucidates the non significance of partner support

structures in mitigating the impact of stressors and enhancing mental well-being (Table 6 to 9). In line with our second research question and objective, our findings affirm that socio-economic factors play a minimal/negligible role (Figure 1 to 4) in shaping mental health outcomes as opposed to the study done by Osman et al., 2012 and other previous study in Lusaka, Zambia (Simbeza et al., 2023).

The findings of this study hold profound significance, transcending the confines of academic research to impact the real lives of medical science students in Zambia and potentially, students in similar contexts. The prevalence rates of stress, anxiety, and depression presented in our study serve as a clarion call for academic institutions and policymakers to recognize the pressing need for mental health support systems within higher education tuned to the needed groups among medical students (Hunt & Eisenberg, 2010). By quantifying the mental health landscape, we shed light on student's collective experiences, providing a statistical basis for tailored interventions and support mechanisms.

These findings highlight the need for early intervention programs targeting third-year students at MCS-SOM-CBU, who are experiencing heightened stress and anxiety. As students advance academically, they appear to develop coping mechanisms and resilience against psychological distress.

6. Conclusions

Our examination of the mental well-being of medical science students in Zambia has uncovered a complex situation with a variety of obstacles and possible solutions. We noted different levels of distress, stress, anxiety, and depression among different academic years and age groups, showing that the mental health challenges faced by these students change as they advance through their studies. Socioeconomic elements like partnership assistance did not significantly correlate with mental health results, emphasizing the minimal impact of partnership welfare. This study offers empirical data on the occurrence of stress, distress, anxiety, and depression among medical science students in Zambia and their connection to socioeconomic elements, adding to the existing knowledge on mental health in sub-Saharan Africa. This data forms a basis for prospective research endeavors directed at creating tailored interventions to enhance mental health among medical science students and enhance educational achievements.

7. Implications of Study

Research on the mental well-being of medical science students in Zambia has theoretical and practical implications. The audience targeted by these implications encompasses academic institutions, policymakers, mental health professionals, and the students themselves.

Theoretical Implications:

Adding to Existing Knowledge: This study actively contributes to the current theoretical framework concerning student mental health (Osman et al., 2012). It emphasizes the evolving nature of mental health struggles among medical science students as they advance through their academic years. This perspective can enhance and enrich the broader spectrum of mental health research, providing a nuanced view of student well-being's progression.

Practical Implications

Customized Support Programs: Academic institutions can utilize our results to devise and execute personalized support programs tailored to the distinct requirements of medical science students at various academic stages. These programs can offer resources and interventions to tackle the changing mental health obstacles encountered by students.

Student Well-being Initiatives: Students themselves can profit from our research by becoming more conscious of the obstacles they might confront at different points in their academic voyage. This awareness can empower them to seek assistance and adopt self-care strategies to preserve their mental health.

Implications of Depression on Future Career Prospects of Medical Students:

The repercussions of depression on the future career prospects of medical students are substantial and diverse. Depression among medical students can influence their future career in the following manners:

Academic Performance: Depression can result in decreased academic performance, potentially impacting their competitiveness for residency programs and future career openings (Moir et al., 2018; Silva et al., 2017).

Professional Conduct and Patient Care: Depression can affect professional behavior, empathy, and patient care, which are fundamental for a successful medical vocation (Gold et al., 2019).

Risk of Burnout: Medical students suffering from depression face a higher risk of burnout, which can detrimentally affect their well-being and professional satisfaction in their careers (Green et al., 2022)..

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