# Prevalence and predictors of depression among pharmacy, medical and veterinary students in a Nigerian university

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*Abstract:*
*Background: Depression is a major contributor to suicide deaths. This study evaluated the prevalence and predictors of depression among pharmacy, medical and veterinary students in a top Nigerian university.*
*Methods: For this cross-sectional survey, data were collected with a 29-item structured self-administered questionnaire that encompassed the Patient Health Questionnaire (PHQ-9). Depression severity was classified as minimal, mild, moderate, moderately severe or severe. Descriptive statistics, Chi-Square test and regression were used for data analysis, with statistical significance set as P < 0.05.*
*Results: Majority of the respondents had no family history of depression (n = 1411, 95.2%). About two-thirds (n = 964, 65.0%) had minimal/mild depression. More medical students (n = 47, 10.5%) had moderately severe depression compared to pharmacy (n = 51, 6.1%) and veterinary (n = 12, 6.0%) students ($\chi^2$ = 21.906, P = 0.016). Female gender (B = 0.163), family history of depression (B = 0.554), cigarette smoking (B = 0.444), increased academic workload (B = 0.332) were significant predictors for depression (P < 0.05).*
*Conclusion: The findings reveal commonality in minimal and mild depression among the students. Female gender, family history of depression, cigarette smoking and high academic load were significant predictors for depression.*
*Key Words: Depression; Prevalence; Predictors; Students; University.*

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## I. Introduction

Numerous studies have reported a higher prevalence for depression among medical and veterinary students than the general population[1,2,3].Depression could influence professional practice negatively[4,5]. Students in health professional disciplines experience high admission requirements and intense academic workload[5,6,7]. There is a high prevalence of burnout among medical students, resident doctors, and veterinarians[2,4].

The worst complication of depression is suicide[8]. Depression has been reported among students of Nigerian universities[9,10]. There were 42 reported cases of suicide in Nigeria between January and June 2019 with 11 of the victims being students in different higher institutions of which two were of the University of Nigeria Nsukka (UNN)[11]. Elsewhere, a third-year medical student of Niger Delta University (NDU), Bayelsa State, Nigeria committed suicide when he realized that he was to be withdrawn from the College of Medicine[11].

UNN, a first-generation university in Nigeria, runs degree programmes in pharmacy, veterinary medicine and medicine/surgery. These disciplines are known for their voluminous workload, series of academic evaluations, fierce academic competition, lack of leisure time, insufficient time to seek treatment for health challenges, and short holidays. These factors might contribute to depression. More studies are needed in this subject area as depression among these students could affect the care services they render when they graduate[12]. In addition, there is no specific journal article that addresses depression among pharmacy students in Nigeria[13]. This study sought to explore the prevalence and predictors of depression among pharmacy, medical and veterinary students in a top Nigerian university.

## II. Methods

This cross-sectional survey was conducted in the University of Nigeria Nsukka (UNN) between 2 May 2019 and 20 August 2019. UNN, located in Enugu State, South-East Nigeria, has two major campuses: Nsukka Campus and Enugu Campus. The study was conducted in the Faculty of Pharmaceutical Sciences (Nsukka Campus), Faculty of Veterinary Medicine (Nsukka Campus) and the College of Medicine (Enugu Campus). The University of Nigeria Nsukka, founded in 1960, is the first indigenous University in Nigeria. A total of 1482

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students who were second to final year students of pharmacy, medicine/surgery and veterinary medicine, participated in this study.

**Study Design:** Cross-sectional survey.

**Study Location**: University of Nigeria Nsukka.

**Study Duration:** May 2019 to August 2019.

**Sample size:** Minimum required sample size – 336 students. We conveniently sampled 1482 students.

**Sample size calculation:** The Raosoft® Sample Size Calculator was used to determine the minimum sample size required for the study. With the student population within the eligibility criteria at 2637, a 5% error margin, assuming 50% participation rate, the minimum sample size required was 336 students.

**Subjects & selection method**: Considering the busy schedule of these students and desire for active participation, all the students who were eligible were approached when they had a compulsory lecture and those who gave their consent for participation were included.

**Eligibility criteria:**

The study participants were conveniently drawn from second to final year pharmacy, medicine/surgery and veterinary medicine students of UNN for the 2018/19 Session. Pharmacy was a 5-year programme as of the time this study was conducted while medicine/surgery and veterinary medicine were both 6-year programmes. Willingness to participate was taken as consent.

**Data collection**

The study protocol was approved by the Health Research and Ethics Committee (HREC) of UNTH, Ituku-Ozalla, Enugu State (NHREC/05/01/2008B-FWA00002458-1RB00002323), dated 20 June 2019. Thus, the study was conducted in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments. Students who agreed to participate, provided oral and written informed consent.

The study instrument was a 29-item structured self-administered questionnaire divided into three domains: personal details, Patient Health Questionnaire and open-ended questions. The Patient Health Questionnaire (PHQ-9) is a 9-item questionnaire[14]. The three open-ended questions were to provide the opinions of the students on the roles their Faculties/College can play in helping depressed students. It also sought to explore the feelings of students who had failed.

The questionnaire was content-validated by eight Clinical Pharmacists of the Department of Clinical Pharmacy and Pharmacy Management, UNN and a Psychiatrist at University of Nigeria Teaching Hospital (UNTH). A pilot study was conducted with 14 students, two students from each study year. These students were who were excluded from the main study. The content-validity and pilot test were to eliminate all ambiguities and irrelevances. Confidentiality was maintained throughout the study. The participants dropped their filled questionnaire in a general envelope.

**Data analysis**

Data were analyzed using the IBM SPSS Version 25.0. Descriptive statistics were used to summarize data. Inferential statistics such as Pearson's Chi-Square test and multiple linear regression were utilized, with statistical significance set as $P < 0.05$. For the PHQ-9 domain, the total score was obtained from the sum of the individual items. The severity of depression was classified as minimal depression (1 - 4), mild depression (5 - 9), moderate depression (10 - 14), moderately severe depression (15 - 19) and severe depression (20 - 27). Those with a total score of zero (0) were classified as having no depression. The open-ended questions utilized thematic analysis. Two independent researchers closely examined the data to identify common themes, using the inductive approach such that there were no preconceived themes. The approach was also semantic as the explicit content of the data were analyzed with interests in the students' opinions. Questionnaires that were incompletely filled were discarded and not analysed.

## III. Results

Two thousand six hundred and thirty-seven students were eligible. A total of 1482 questionnaires were completed filled, representing an overall participation rate of 56.2% (1482/2637). Twenty-seven questionnaires were discarded for incompleteness. Individually, the participation rate was: pharmacy - 60.4% (833/1380); medicine/surgery - 47.0% (449/955); veterinary medicine - 66.2% (200/302).

Most of the students were between 18 to 23 years old (n = 1096, 73.9%), single (n = 1420, 95.8%) and without a family history of depression (n = 1411, 95.2%) (Tables 1a and Table 1b).

**Table 1a:** Demographic information, N = 1482

| Variables | n (%) |
|---|---|
| **Age (in years)** | |
| <18 | 24 (1.6) |
| 18 – 20 | 472 (31.8) |
| 21 – 23 | 624 (42.1) |
| 24 – 26 | 258 (17.4) |
| 27 – 29 | 69 (4.7) |
| >29 | 35 (2.4) |
| **Gender** | |
| Male | 678 (45.7) |
| Female | 804 (54.3) |
| **Faculty** | |
| Pharmacy | 833 (56.2) |
| Medicine & Surgery | 449 (30.3) |
| Veterinary Medicine | 200 (13.5) |
| **Year of Study** | |
| Second Year | 463 (31.2) |
| Third Year | 298 (20.1) |
| Fourth Year | 426 (28.7) |
| Fifth Year | 240 (16.2) |
| Sixth Year | 55 (3.7) |
| **Marital Status** | |
| Single | 1420 (95.8) |
| Married | 41 (2.8) |
| Separated | 16 (1.1) |
| Divorced | 5 (0.3) |
| **I have a family history of depression** | 71 (4.8) |
| **How often do you drink alcohol?** | |
| Daily | 29 (2.0) |
| Weekly | 62 (4.2) |
| Monthly | 86 (5.8) |
| Not at all | 651 (43.9) |
| Once in a while | 654 (44.1) |
| **Have you smoked at least one stick of cigarette in the last 30 days?** | |
| Yes | 79 (5.3) |
| No | 484 (32.7) |
| I don't smoke at all | 919 (62.0) |
| **Place of upbringing** | |
| Urban | 1111 (75.0) |
| Rural | 371 (25.0) |

**Table 1b:** Demographic information, N = 1482

| Variables | n (%) |
|---|---|
| **How financially stable are you in school?** | |
| I don't have enough | 554 (37.4) |
| I have enough | 866 (58.4) |
| I have more than enough | 62 (4.2) |
| **I am currently studying my dream course** | 1230 (83.0) |
| **How would you classify your academic performance?** | |
| Excellent | 226 (15.2) |
| Good | 970 (65.5) |
| Fair | 254 (17.1) |
| Poor | 32 (2.2) |
| **How would you classify your academic curriculum/workload** | |
| Heavy | 1176 (79.4) |
| Normal | 306 (20.6) |
| **People consider me a perfectionist** | 507 (34.2) |
| **I have previously written a resit examination in my faculty** | 387 (26.1) |
| **I have previously repeated a class in my faculty** | 225 (15.2) |

About one-third of the students (n = 575, 38.8%) were anhedonic on several days (Table 2).

**Table 2:** Patient Health Questionnaire (PHQ-9), N = 1482

| Items | Not at all n (%) | Several days n (%) | More than half the days n (%) | Nearly everyday n (%) |
|---|---|---|---|---|
| 1. Little interest or pleasure in doing things | 490 (33.1) | 575 (38.8) | 218 (14.7) | 199 (13.4) |

| | | | |
|---|---|---|---|
| 2. Feeling down, depressed, or hopeless | 836 (56.4) | 418 (28.2) | 153 (10.3) | 75 (5.1) |
| 3. Trouble falling or staying asleep, or sleeping too much | 602 (40.6) | 459 (31.0) | 224 (15.1) | 197 (13.3) |
| 4. Feeling tired or having little energy | 367 (24.8) | 601 (40.6) | 304 (20.5) | 210 (14.2) |
| 5. Poor appetite or over eating | 689 (46.5) | 423 (28.5) | 229 (15.5) | 141 (9.5) |
| 6. Feeling bad about yourself –or that you are a failure or have let yourself or your family down | 991 (66.9) | 283 (19.1) | 135 (9.1) | 73 (4.9) |
| 7. Trouble concentrating on things, such as reading the newspaper or watching television | 708 (47.8) | 477 (32.2) | 196 (13.2) | 101 (6.8) |
| 8. 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 | 979 (66.1) | 310 (20.9) | 121 (8.2) | 72 (4.9) |
| 9. Thoughts that you would be better off dead or of hurting yourself in some way | 1267 (85.5) | 124 (8.4) | 52 (3.5) | 39 (2.6) |

About half of the students (n = 791, 53.4%) struggled to complete routine tasks due to the problem(s) checked in the PHQ-9 (Figure 1).
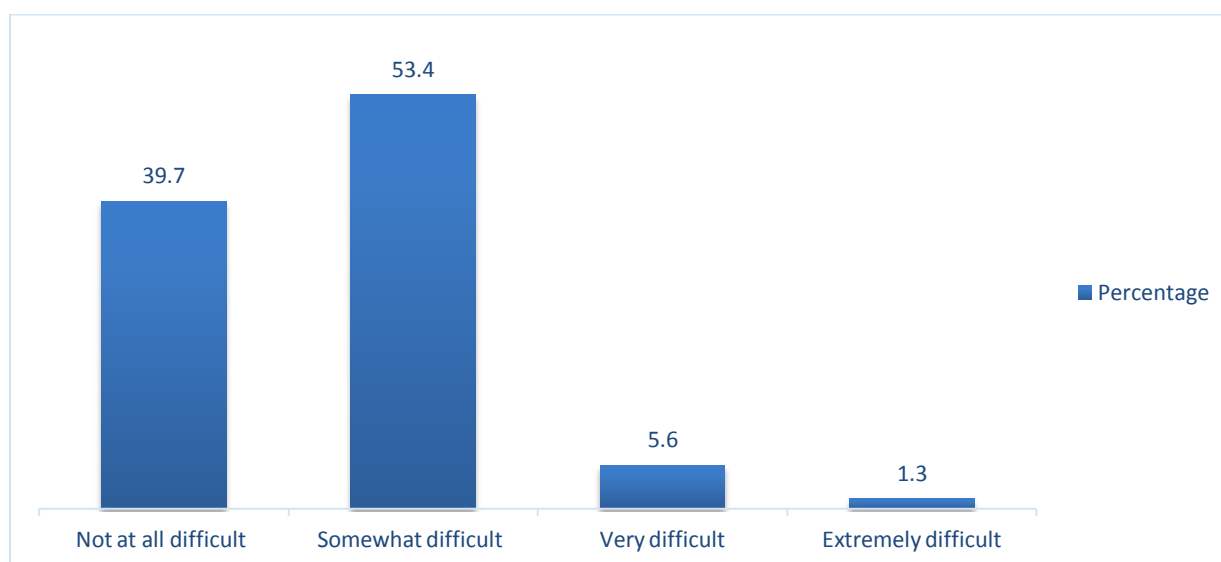


**Figure 1:** Difficulty in doing work, taking care of things at home or getting along with other people, N = 1482

About two-thirds of the students (n = 964, 65.0%) had minimal and mild depression while few students (n = 37, 2.5%) had severe depression (Table 3).

**Table 3:** Depression severity, N = 1482

| Depression severity | n (%) |
|---|---|
| No depression | 118 (8.0) |
| Minimal depression | 454 (30.6) |
| Mild depression | 510 (34.4) |
| Moderate depression | 253 (17.1) |
| Moderately severe depression | 110 (7.4) |
| Severe depression | 37 (2.5) |

About a quarter of the students that responded (n = 265, 24.3%) opined that reducing the academic workload is a suitable measure for reducing depression (Table 4). See excerpts of suggestions from the respondents:
*"Ensure the examination timetable is well-spaced with enough time for revisions before examination." [4th Year Pharmacy Student]*
*"Plan the curriculum to accommodate free periods so students can read to understand not just be pressurized to read to pass." [4th Year Medicine and Surgery Student]*
*"Stop threatening students that they are in a weeding class and could repeat or be withdrawn." [2nd Year Pharmacy Student]*
*"Reduce the workload." [5th Year Veterinary Medicine Student]*
*"Have a Guidance and Counselling Unit. Refer depressed students to Psychologists." [6th Year Veterinary Medicine Student]*

*"Healthy lecturer-student relationship."* [3rd Year Medicine and Surgery Student]

Three hundred and twelve (312) students filled the section on students' emotional states within two weeks of being informed they had resit examinations. More than half of the students that responded (n = 223, 71.4%) were in a depressed mood. Less than a fifth reported that they felt OK (n = 76, 24.4%). Few students reported being challenged (n = 13, 4.2%).

One hundred and eighty-four (184) students filled the section on students' emotional states within two weeks of being informed they were to repeat a class. More than four-fifths of the students that responded (n = 158, 85.8%) were suicidal, depressed or emotionally upset. Close to a tenth (n = 15, 8.2%) felt like dropping out of school or changing department but were encouraged by family members. Few students were OK with the results (n = 11, 5.9%).

See excerpts from the filled questionnaires of students who had resit examinations or were to repeat a class:

*"Sad but more determined to pass. I didn't want to disappoint my family."* [2nd Year Pharmacy Student who had a Resit]

*"So depressed. I thought I couldn't survive it."* [3rd Year Pharmacy Student who repeated a class]

*"Withdrawn and disconnected from others."* [5th Year Medicine & Surgery Student who repeated a class]

*"Suicidal."* [4th Year Veterinary Medicine Student who repeated a class]

*"I blamed my parents for making me do a change of programme into Medicine & Surgery."* [4th Year Medicine and Surgery Student who repeated a class]

**Table 4:** Opinions on Faculty responsibilities towards depressed students, N = 1131

| Variables | n (%) |
|---|---|
| Give concessions to students who have repeated a class | 6 (0.5) |
| Proper assessment should be made before admission | 10 (0.9) |
| Teach well | 14 (1.2) |
| Spiritual orientation | 14 (1.2) |
| Nothing | 27 (2.4) |
| Allow more study time before assessment | 27 (2.4) |
| By identifying them (responsibility of lecturers and fellow students) | 32 (2.8) |
| Sensitize students on the need for a social life/creation of social events | 36 (3.2) |
| Offer professional assistance | 81 (7.2) |
| Financial aid/better living conditions | 103 (9.1) |
| Awareness on depression and coping strategies | 146 (12.9) |
| Carry out enlightenment programmes on self-appraisal and self-love/counselling sessions | 146 (12.9) |
| Being affectionate and giving words of encouragement/close lecturer-students relationship | 214 (18.9) |
| Reduce workload | 275 (24.3) |

Table 5ashows that more Medicine and Surgery students (n = 47, 10.5%) had moderately severe depression compared to students in Pharmacy (n = 51, 6.1%) and Veterinary Medicine (n = 12, 6.0%), ($x^2$ = 21.906, df = 2, P = 0.016).

**Table 5a:** Association between the demographics/experiential factors and depression severity, N = 1482

| VARIABLES | DEPRESSION SEVERITY | | | | | | TOTAL n (%) | CHI-SQUARE ($x^2$) |
|---|---|---|---|---|---|---|---|---|
| | None n (%) | Minimal depression n (%) | Mild depression n (%) | Moderate depression n (%) | Moderately severe depression n (%) | Severe depression n (%) | | |
| **Age** | | | | | | | | 70.338** |
| <18 | 5 (20.8) | 1 (4.2) | 7 (29.2) | 5 (20.8) | 4 (16.7) | 2 (8.3) | 24 (1.6) | |
| 18 – 20 | 24 (5.1) | 118 (25.0) | 181 (38.3) | 96 (20.3) | 37 (7.8) | 16 (3.4) | 472 (31.8) | |
| 21 – 23 | 39 (6.3) | 207 (33.2) | 219 (35.1) | 104 (16.7) | 40 (6.4) | 15 (2.4) | 624 (42.1) | |
| 24 – 26 | 36 (14.0) | 91 (35.3) | 72 (27.9) | 34 (13.2) | 22 (8.5) | 3 (1.2) | 258 (17.4) | |
| 27 - 29 | 8 (11.6) | 28 (40.6) | 20 (29.0) | 8 (11.6) | 5 (7.2) | 0 0.0) | 69 (4.7) | |
| >29 | 6 (17.1) | 9 (25.7) | 11 (31.4) | 6 (17.1) | 2 (5.7) | 1 (2.9) | 35 (2.4) | |
| **Gender** | | | | | | | | 13.776* |
| Male | 57 (8.4) | 233 (34.4) | 220 (32.4) | 113 (16.7) | 45 (6.6.) | 10 (1.5) | 678 (45.7) | |
| Female | 61 (7.6) | 221 (27.5) | 290 (36.1) | 140 17.4) | 65 (8.1) | 27 (3.4) | 804 (54.3) | |
| **Department** | | | | | | | | 21.906** |
| Pharmacy | 71 (8.5) | 268 32.2) | 274 (32.9) | 143 (17.2) | 51 (6.1) | 26 (3.1) | 833 (56.2) | |
| Medicine and surgery | 29 (6.5) | 125 (27.8) | 168 (37.4) | 69 (15.4) | 47 (10.5) | 11 (2.4) | 449 (30.3) | |
| Veterinary medicine | 18 (9.0) | 61 (30.5) | 68 (34.0) | 41 (20.5) | 12 (6.0) | 0 (0.0) | 200 (13.5) | |
| **Year of study** | | | | | | | | 74.884** |
| 2nd year | 28 (5.0) | 125 (27.0) | 160 (34.6) | 90 (19.4) | 44 (9.5) | 16 (3.5) | 463 (31.2) | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 3rd year | 15 (5.0) | 82 (27.5) | 110 (36.9) | 62 (20.8) | 19 (6.4) | 10 (3.4) | 298 (20.1) |
| 4th year | 37 (8.7) | 122 (28.6) | 160 (37.6) | 69 (16.2) | 29 (6.8) | 9 (2.1) | 426 (28.7) |
| 5th year | 25 (10.4) | 98 (40.8) | 73 (30.4) | 26 (10.8) | 16 (6.7) | 2 (0.8) | 240 (16.2) |
| 6th year | 13 (23.6) | 27 (49.1) | 7 (12.7) | 6 (10.9) | 2 (3.6) | 0 (0.0) | 55 (3.7) |

* P < 0.05; ** P < 0.001

Table 5bshows that more students who had a family history of depression (n = 8, 11.3%) had severe depression compared to those with none (n = 29, 2.1%), ($\square^2$ = 43.857, df = 1, P < 0.001).

**Table 5b:** Association between the demographics/experiential factors and depression severity, N = 1482

| VARIABLES | DEPRESSION SEVERITY | | | | | | TOTAL n (%) | CHI-SQUARE ($\square^2$) |
|---|---|---|---|---|---|---|---|---|
| | None n (%) | Minimal depression n (%) | Mild depression n (%) | Moderate depression n (%) | Moderately severe depression n (%) | Severe depression n (%) | | |
| **Marital status** | | | | | | | | 66.693** |
| Single | 111 (7.8) | 438 (30.8) | 495 (34.9) | 245 (17.3) | 98 (6.9) | 33 (2.3) | 1420 (95.8) | |
| Married | 4 (9.8) | 12 (29.3) | 14 (34.1) | 6 (14.6) | 4 (9.8) | 1 (2.4) | 41 (2.8) | |
| Separated | 2 (12.5) | 4 (25.0) | 1 (6.3) | 2 (12.5) | 6 (37.5) | 1 (6.3) | 16 (1.1) | |
| Divorced | 1 (20.0) | 0 (0.0) | 0 (0.0) | 0 (0.0) | 2 (40.0) | 2 (40.0) | 5 (0.3) | |
| **A6** | | | | | | | | 43.857** |
| Yes | 3 (4.2) | 14 (19.7) | 24 (33.8) | 8 (11.3) | 14 (19.7) | 8 (11.3) | 71 (4.8) | |
| No | 115 (8.2) | 440 (31.2) | 486 (34.4) | 245 (17.4) | 96 (6.8) | 29 (2.1) | 1411 (95.2) | |
| **A7** | | | | | | | | 58.374** |
| Daily | 2 (6.9) | 10 (34.5) | 5 (7.2) | 1 (3.4) | 7 (24.1) | 4 (13.8) | 29 (2.0) | |
| Weekly | 2 (3.2) | 23 (37.1) | 18 (29.0) | 10 (16.1) | 4 (6.5) | 5 (8.1) | 62 (4.2) | |
| Monthly | 4 (4.7) | 22 (25.6) | 30 (34.9) | 17 (19.8) | 10 (11.6) | 3 (3.5) | 86 (5.8) | |
| Not at all | 61 (9.4) | 216 (33.2) | 220 (33.8) | 99 (15.2) | 42 (6.5) | 13 (2.0) | 651 (43.9) | |
| Once in a while | 49 (7.5) | 183 (28.0) | 237 (36.2) | 126 (19.3) | 47 (7.2) | 12 (1.8) | 654 (44.1) | |
| **A8** | | | | | | | | 60.980** |
| Yes | 5 (6.3) | 14 (17.7) | 21 (26.6) | 17 (21.5) | 12 (15.2) | 10 (12.7) | 79 (5.3) | |
| No | 27 (5.6) | 149 (30.8) | 182 (37.6) | 90 (18.6) | 25 (5.2) | 11 (2.3) | 484 (32.7) | |
| I don't smoke at all | 86 (9.4) | 291 (31.7) | 307 (33.4) | 146 (15.9) | 73 (7.9) | 16 (1.7) | 919 (62.0) | |
| **A9** | | | | | | | | 4.396 |
| Urban | 86 (7.7) | 350 (31.5) | 388 (34.9) | 182 (16.4) | 77 (6.9) | 28 (2.5) | 1111 (75.0) | |
| Rural | 32 (8.6) | 104 (28.0) | 122 (32.9) | 71 (19.1) | 33 (8.9) | 9 (2.4) | 371 (25.0) | |

* P < 0.05; ** P < 0.001; A6 – Immediate family history of depression; A7 – Frequency of alcohol intake; A8 – Smoking of at least one stick of cigarette in the past month; A9 – Place of upbringing

Table 5c (Supplementary Information) shows that more students who reported having heavy academic workload (n = 422, 35.9%) had mild depression compared to those who reported having normal academic workload (n = 88, 28.8%), ($\square^2$ = 31.964, df = 1, P < 0.001).

**Table 5c:** Association between the demographics/experiential factors and depression severity, N = 1482

| VARIABLES | DEPRESSION SEVERITY | | | | | | TOTAL n (%) | CHI-SQUARE ($\square^2$) |
|---|---|---|---|---|---|---|---|---|
| | None n (%) | Minimal depression n (%) | Mild depression n (%) | Moderate depression n (%) | Moderately severe depression n (%) | Severe depression n (%) | | |
| **A10** | | | | | | | | 29.451* |
| I don't have enough | 35 (6.3) | 143 (25.8) | 200 (36.1) | 104 (18.8) | 54 (9.7) | 18 (3.2) | 554 (37.4) | |
| I have enough | 74 (8.5) | 292 (33.7) | 290 (33.5) | 141 (16.3) | 54 (6.2) | 15 (1.7) | 866 (58.4) | |
| I have more than enough | 9 (14.5) | 19 (30.6) | 20 (32.3) | 8 (12.9) | 2 (3.2) | 4 (6.5) | 62 (4.2) | |
| **A11** | | | | | | | | 44.936** |
| Yes | 100 (8.1) | 407 (33.1) | 428 (34.8) | 190 (15.4) | 83 (6.7) | 22 (1.8) | 1230 (83.0) | |
| No | 18 (7.1) | 47 (18.7) | 82 (32.5) | 63 (25.0) | 27 (10.7) | 15 (6.0) | 252 (17.0) | |
| **A12** | | | | | | | | 133.760** |
| Excellent | 30 (13.3) | 77 (34.1) | 77 (34.1) | 28 (12.4) | 7 (3.1) | 7 (3.1) | 226 (15.2) | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Good | 74 (7.5) | 315 (32.5) | 349 (36.0) | 163 (16.8) | 60 (6.2) | 9 (0.9) | 970 (65.5) | |
| Fair | 13 (5.1) | 59 (23.2) | 80 (31.5) | 54 (21.3) | 33 (13.0) | 15 (5.9) | 254 (17.1) | |
| Poor | 1 (3.1) | 3 (9.4) | 4 (12.5) | 8 (25.0) | 10 (31.3) | 6 (18.8) | 32 (2.2) | |
| **A13** | | | | | | | | 31.964** |
| Heavy | 79 (6.7) | 335 (28.5) | 422 (35.9) | 212 (18.0) | 97 (8.2) | 31 (2.6) | 1176 (79.4) | |
| Normal | 39 (12.7) | 119 (38.9) | 88 (28.8) | 41 (13.4) | 13 (4.2) | 6 (2.0) | 306 (20.6) | |
| **A14** | | | | | | | | 6.962 |
| Yes | 44 (8.7) | 165 (32.5) | 153 (30.2) | 94 (18.5) | 40 (7.9) | 11 (2.2) | 507 (34.2) | |
| No | 74 (7.6) | 289 (29.6) | 357 (36.6) | 159 (16.3) | 70 (7.2) | 26 (2.7) | 975 (65.8) | |
| **A15** | | | | | | | | 1.893 |
| Yes | 28 (7.2) | 113 (29.2) | 134 (34.6) | 69 (17.8) | 31 (8.0) | 12 (3.1) | 387 (26.1) | |
| No | 90 (8.2) | 341 (31.1) | 376 (34.3) | 184 (16.8) | 79 (7.2) | 25 (2.3) | 1095 (73.9) | |
| **A16** | | | | | | | | 4.377 |
| Yes | 14 (6.2) | 68 (30.2) | 78 (34.7) | 36 (16.0) | 20 (8.9) | 9 (4.0) | 225 (15.2) | |
| No | 104 (8.3) | 386 (30.7) | 432 (34.4) | 217 (17.3) | 90 (7.2) | 28 (2.2) | 1257 (84.8) | |

$* P < 0.05$; $** P < 0.001$; A10 – Financially stable in school; A11 – Currently studying preferred course; A12 – Academic performance; A13 – Academic workload; A14 – Perfectionist; A15 – Written resit examination(s); A16 – Repeated a class

Table 6shows that being female (B = 0.163, P = 0.006), having a family history of depression (B = 0.554, P < 0.001), smoking at least one stick of cigarette in the past month (B = 0.444, P = 0.001) and having increased academic workload (B = 0.332, P < 0.001) significantly predicted depression in these disciplines. On the contrary, being above 23 years old (B = -0.252, P = 0.001), in a higher year of study (B = -0.250, P < 0.001), studying one's preferred course (B = -0.311, P < 0.001) and having good/excellent academic performance (B = -0.443, P < 0.001) significantly predicted a decrease in depression among these students.

**Table 6:** Multiple linear regression analysis summary for the independent variables predicting depression for pharmacy and medical students, N = 1482

| Variables | Unstandardized Coefficient (B) | Unstandardized Coefficient (Standard Error) | Standardized Coefficient (Beta) | t | P-value |
|---|---|---|---|---|---|
| **Constant** | 2.516 | 0.179 | | 14.033 | < 0.001 |
| **Age** | -0.252 | 0.073 | -0.095 | -3.440 | 0.001* |
| **Gender** | 0.163 | 0.060 | 0.071 | 2.736 | 0.006* |
| **Department** | -0.032 | 0.060 | -.0.014 | -0.541 | 0.588 |
| **Year of study** | -0.250 | 0.059 | -0.109 | -4.210 | < 0.001** |
| **Marital status** | 0.101 | 0.147 | 0.018 | 0.690 | 0.490 |
| **Family history of depression** | 0.554 | 0.134 | 0.103 | 4.122 | < 0.001** |
| **Alcohol consumption** | -0.027 | 0.130 | -0.006 | -0.204 | 0.838 |
| **Smoking of at least one stick of cigarette in the past month** | 0.444 | 0.139 | 0.087 | 3.195 | 0.001* |
| **Place of upbringing** | -0.120 | 0.068 | --0.045 | -1.780 | 0.075 |
| **Financial stability in school** | -0.154 | 0.061 | -0.065 | -2.536 | 0.011 |
| **Preferred course** | -0.311 | 0.076 | -0.102 | -4.071 | < 0.001** |
| **Academic performance** | -0.443 | 0.076 | -0.153 | -5.818 | < 0.001** |
| **Academic workload** | 0.332 | 0.071 | 0.117 | 4.691 | < 0.001** |
| **Perfectionist** | 0.048 | 0.060 | 0.020 | 0.809 | 0.419 |
| **Written resit examinations** | 0.051 | 0.070 | 0.020 | 0.733 | 0.463 |
| **Repeated a class** | 0.006 | 0.085 | 0.002 | 0.070 | 0.944 |

Note: R = 0.360; $R^2$ = 0.130; Adjusted $R^2$ = 0.120; $F_{(16, 1465)}$ = 13.632, P < 0.001
*P < 0.05, **P < 0.001

## IV. Discussion

The findings reveal commonality in minimal and mild depression among the students. Female gender, family history of depression, cigarette smoking and high academic load were significant predictors for depression. On the contrary, being above 23 years old, in a higher year of study, studying their preferred course and having good academic performance were significant predictors for a decrease in depression.

Our study found minimal and mild depression among two-thirds of the students while few students had severe depression. Studies have revealed differing prevalence of depression among students in health-related disciplines. The overall prevalence of provisionally diagnosed depressive and major depressive disorder in

medical students in New Delhi was 21.5% and 7.6% respectively[15]. A study among medical students of the University of Michigan Medical School revealed a prevalence of moderate to severe depression of 14.3% [16]. The prevalence of self-reported depression for medical students was 15.2% at Hanoi Medical University, Vietnam[17].

The students provided differing opinions on Faculty responsibilities towards depressed students. Major suggestions were the need to reduce the academic workload and a close lecturer-student relationship. Burnouts have been associated with lack of support from lecturers[18,19,20]. In UNN, every student is assigned to an academic adviser who is a lecturer in the Faculty. These academic advisers are meant to provide guidance and counselling to their advisees from admission till graduation. However, some academic advisers do not discharge these responsibilities wholeheartedly as it could interfere with productive time for research and other administrative activities. On the other hand, some students fail to see their academic advisers for reasons such as fear, nonchalance or tight lecture schedules.

More females had severe depression compared to males. The relationship between medical students' gender and the development of depression is equivocal. Some studies have reported that female medical students experience more depression, anxiety, and stress compared to male students because females are more competitive, more concerned about topping the class, exaggerate their sadness, and probably participate in less exercise[1,21,22,23]. Others have reported no gender difference in the prevalence of depression[24]. In our study, being female was a significant predictor for depression. A Pakistani study also revealed a higher prevalence of depression among female pharmacy students (64%) than their male counterparts (59.49%)[25].

A larger proportion of students in their fifth year and sixth year had minimal depression compared to those in lower years. More advanced years of training have been linked with academic burnouts[26]. First- and second-year pharmacy students had lower stress levels than third- and fourth-year pharmacy students in a study conducted in Portugal[27]. Higher years of training in pharmacy, medical or veterinary schools usually involve increased academic requirements such as clerkship rotations at the hospitals. A study conducted in a public university in Brazil identified that students undertaking clinical training exhibited higher depression levels compared to preclinical students[28]. Conversely, another study revealed a higher prevalence of depression in first year students compared to those in higher years of study[15].

More students who had a family history of depression had moderately severe/severe depression compared to those with none. In a study conducted in Karachi, Pakistan, medical students who had a family history of depression were 2.35 times more likely to be depressed[29]. In our study, having a family history of depression was a significant predictor for depression among pharmacy, medical and veterinary students. However, some studies have reported no impact of family history of psychiatric disorders on the prevalence of depression[15].

Alcohol consumption on a daily and weekly basis as well as smoking at least one stick of cigarette in the past 30 days were associated with more severe depression. Burnout has been strongly associated with alcohol abuse/dependence and the stress of medical school could be responsible[30,31]. A study conducted among Egyptian medical students reported that stress was one of the most common causes of smoking cigarettes[32]. In a study conducted among Turkish Military Medical undergraduates, Medical students who smoked were 2.2 times more likely to have depressive symptoms than nonsmokers[33]. In our study, smoking at least a stick of cigarette in the past month significantly predicts depression.

Insufficient finances were associated with severe depression. The stress from debt or lack of finances combined with academics could be depressing. In UNN, as with many universities in Nigeria, students are expected to pay their fees every session. This could be burdensome for those that are not financially buoyant. Rising educational debt and financial burden have been associated with stress and depression[17,31].

Poor/fair academic performance was associated with more severe depression compared to those with excellent academic performance. Grading scales might be contributory to the well-being of students[34]. Unimpressive academic performances could affect self-esteem and reduce academic self-efficacy. In a study conducted in New Delhi, India, it was observed that students with either poor or excellent academic performance had higher rates of depression attributed to the stigma of poor performance in the former and the pressures associated with maintaining excellent results, in the latter[15]. Perfectionism and the anxiety to achieve within an academically homogenous group could lead to academic burnouts[35,36].

The characteristics of students could determine how they perceive and cope with their academic workload. It is believed that many medical students exhibit Type A personality with a knack for perfectionism leading to inappropriate self-expectations, stress and depression[37]. In our study, having increased academic workload significantly predicts depression.

Being above 23 years old, in a higher year of study, studying one's preferred course and having good academic performance significantly predicts a decrease in depression. A study suggests that junior medical students are more at risk for suicide[38]. In a higher year of study, students might be better adapted to the university. Sometimes, choosing any of these disciplines is based on societal prestige and family or peer pressure[39]. For instance, there is an erroneous belief that any science-inclined student who is highly intelligent

should study Medicine and Surgery[39]. The highly competitive environment of pharmacy, medical and veterinary programmes creates scenarios where students seem to achieve less than before[40]. This might cause low self-esteem, inability to undertake tasks within their abilities and withdrawal from the programme.Students might be self-motivated and more likely to accept the challenges that come with studying the course of their choice[41].

This study had limitations. It was conducted in one university. Though, the University of Nigeria Nsukka is one of the biggest in Nigeria. The National Universities Commission (NUC), Pharmacists Council of Nigeria (PCN), Medical and Dental Council of Nigeria (MDCN) and Veterinary Council of Nigeria (VCN) strive to ensure uniformity in learning experiences across universities. However, the findings may not be generalizable to all pharmacy, medical and veterinary schools in Nigeria since individual differences may not be completely ruled out. In addition, the utilization of self-administered questionnaires introduced recall bias. Some students might have answered untruthfully due to the stigmatization of persons with mental health disease. Due to blinding, students with depression could not be identified making it impossible to proffer individualized interventions.

Future studies should employ interventions targeted at abating depression and assess the impact of these interventions. There should also be a distinction between rising prevalence rates from a real increase in distress indicators and increases from reporting practices, support services or help-seeking behaviour.

We recommend enhanced orientation practices and regular seminars on good mental and physical health among students. There should be mental health counseling services on campus with toll free lifelines for confidentiality. Academic sessions should be organized to ensure time for extra-curricular activities and holidays. Course outlines should be appropriate for undergraduate students with the opportunity for more in-depth knowledge at postgraduate levels. Counsellors should counsel failing students on coping strategies especially after the release of results. Academic advisers should discharge their responsibilities with conscientiousness. Most importantly, good lecturer-student relationships should be established so there is a welcoming atmosphere where students feel safe to express their concerns.

## V. Conclusion

The findings reveal commonality in minimal and mild depression among pharmacy, medical and veterinary students. Female gender, family history of depression, cigarette smoking and high academic load were significant predictors for depression. On the contrary, being above 23 years old, in a higher year of study, studying their preferred course and having good academic performance were significant predictors for a decrease in depression. Faculties can provide coping strategies for depressed students.

## References

[1]. Killinger SL, Flanagan S, Castine E, et al. Stress and depression among veterinary medical students. J Vet Med Educ. 2017;44(1):3-8. https://doi.org/10.3138/jvme.0116-018R1.

[2]. Reisbig AMJ, Danielson JA, Wu T, et al. A study of depression and anxiety, general health, and academic performance in three cohorts of veterinary medical students across the first three semesters of veterinary school. J Vet Med Educ. 2012;39(4):341-358. https://doi.org/10.3138/jvme.0712-065R.

[3]. Rotenstein LS, Ramos MA, Torre M, et al. Prevalence of depression, depressive symptoms, and suicidal ideation among medical students: A systematic review and meta-analysis. JAMA 2016;316(21):2214-2236. https://doi.org/10.1001/jama.2016.17324.

[4]. Dyrbye L, Shanafelt T. A narrative review on burnout experienced by medical students and residents. Med Educ. 2016;50:132-149. https://doi.org/10.1111/medu.12927.

[5]. Gold JA, Xinran H, Huang G, et al. Medical student depression and its correlates across three international medical schools. World J Psychiatry. 2019;9(4):65-77. http://doi.org/10.5498/wjp.v9.i4.65.

[6]. Siqueira Drake AA, Hafen M, Rush BR, et al. Predictors of anxiety and depression in veterinary medicine students: a four-year cohort examination. J Vet Med Educ 2012;39(4):322-330. https://doi.org/10.3138/jvme.0112-006R.

[7]. Sreeramareddy CT, Shankar PR, Binu VS, et al. Psychological morbidity, sources of stress and coping strategies among undergraduate medical students of Nepal. BMC Med Educ 2007;7:26. https://doi.org/10.1186/1472-6920-7-26.

[8]. World Health Organization, WHO. Depression. 2020. [online]. (Updated 30 Jan 2020) Available from: https://www.who.int/news-room/fact-sheets/detail/depression [accessed 27April 2021].

[9]. Akinkuotu E, Aworinde T. Rising suicide crisis: How 250 psychiatrists battle Nigeria's 60 million mental cases. The Punch Newspaper [online]. 19 May 2019. Available from: https://punchng.com/rising-suicide-crisis-how-250-psychiatrists-battle-nigerias-60-million-mental-cases/ [accessed 27April 2021].

[10]. Dabana A, Gobir AA. Depression among students of a Nigerian university: prevalence and academic correlates. Archives of Medicine and Surgery. 2018;3(1):6-10. https://doi.org/10.4103/archms.archms_5_18.

[11]. Mac-Lewa F. Students top list as 42 Nigerians commit suicide in 6 months. Daily Trust Newspaper [online]. 23 June 2019. Available from: https://www.dailytrust.com.ng/students-top-list-as-42-nigerians-commit-suicide-in-6-months.html [accessed 27April2021]

[12]. Sidana S, Kishore J, Ghosh V, et al. Prevalence of depression in students of a medical college in New Delhi: A cross-sectional study. Australas Medical J. 2012;5(5):247-250. https://doi.org/10.4066/AMJ.2012.750.

[13]. Adebisi YA, Olaoye OC, Ekpenyong A, et al. Depression among pharmacy students in Nigeria: Is it a neglected issue? Stride Dev Med Educ. 2019;16(1):e97918. https://doi.org/10.5812/sdme.97918.

[14]. Kroenke K, Spitzer RL, Williams JB. The PHQ-9: validity of a brief depression severity measure. J Gen Intern Med. 2001;16(9):606-613. https://doi.org/10.1046/j.1525-1497.2001.016009606.x.

[15]. Ludwig AB, Burton W, Weingarten J, et al. Depression and stress amongst undergraduate medical students. BMC Med Educ. 2015;15:141. https://doi.org/10.1186/s12909-015-0425-z.

[16]. Schwenk TL, Davis L, Wimsatt LA. Depression, stigma, and suicidal ideation in medical students. JAMA. 2010;304:1181-1190. https://doi.org/10.1001/jama.2010.1300.
[17]. Pham T, Bui L, Nguyen A, et al. The prevalence of depression and associated risk factors among medical students: an untold story in Vietnam. PLoS ONE. 2019;14(8):e0221432. https://doi.org/10.1371/journal.pone.0221432.
[18]. Cook AF, Arora VM, Rasinski KA. The prevalence of medical student mistreatment and its association with burnout. Acad Med. 2014;89(5):749-754. https://doi.org/10.1097/ACM.0000000000000204.
[19]. Dyrbye LN, Thomas MR, Harper W, et al. The learning environment and medical student burnout: a multicenter study. Med Educ. 2009;43(3):274-282. https://doi.org/10.1111/j.1365-2923.2008.03282.x.
[20]. Muzafar Y, Khan HH, Ashraf H, et al. Burnout and its associated factors in medical students of Lahore, Pakistan. Cureus. 2015;7(11):e390. https://doi.org/10.7759/cureus.390.
[21]. Bayram N, Bigel N. The prevalence and socio-demographic correlations of depression, anxiety and stress among a group of university students. Soc Psychiatry Psychiatr Epidemiol. 2008;43(8):667-672.https://doi.org/10.1007/s00127-008-0345-x.
[22]. Inam SNB, Saqib A, Alam E. Prevalence of anxiety and depression among medical students of private university. J Pak Med Assoc. 2003;53(2):44-47.
[23]. Zaid ZA, Chan SC, Ho JJ (2007) Emotional disorders among medical students in a Malaysian private medical school. Singapore Med J 48:895-899.
[24]. Grant K, Marsh P, Syniar G, et al. Gender differences in rates of depression among undergraduates: measurement matters. J Adolesc. 2002;25(6):613-617. https://doi.org/10.1006/jado.2002.0508.
[25]. Abbas A, Ritvi SA, Hasan R, et al. The prevalence of depression and its perceptions among undergraduate pharmacy students. Pharm Educ. 2015;15(1):57-63.
[26]. Dyrbye LN, Thomas MR, Huntington JL, et al. Personal life events and medical student burnout: a multicenter study. Acad Med. 2006;81(4):374-384. https://doi.org/10.1097/00001888-200604000-00010.
[27]. Silva RG, Figueiredo-Braga M. Evaluation of the relationships among happiness, stress, anxiety, and depression in pharmacy students. Curr Pharm Teach Learn. 2018;10(7):903-910. https://doi.org/10.1016/j.cptl.2018.04.002.
[28]. Baldassin S, Alves TCdTF, de Andrade AG, et al. The characteristics of depressive symptoms in medical students during medical education and training: a cross-sectional study. BMC Med Educ. 2008;8:60.
[29]. Khan MS, Mahmood S, Badshah A, et al. Prevalence of depression, anxiety and their associated factors among medical students in Karachi, Pakistan. J Pak Med Assoc. 2006;56(12):583-586.
[30]. Jackson ER, Shanafelt TD, Hasan O, et al. Burnout and alcohol abuse/dependence among U.S. medical students. Acad Med. 2016; 91(9):1251-1256. https://doi.org/10.1097/ACM.0000000000001138.
[31]. Owens B. Growing concern over medical students' excessive drinking. Can Med Assoc J. 2018;190(40):E12165. https://doi.org/10.1503/cmaj.109-5662
[32]. Abu-elenin MMM, Atala AAEO, El-Salamy RM. Cigarette smoking among medical students and some associated risk factors. Tanta Med J. 2017;45(4):206-212. https://doi.org/10.4103/tmj.tmj_3_17.
[33]. Güleç M, Bakir B, Ozer M, et al. Association between cigarette smoking and depressive symptoms among military medical students in Turkey. Psychiatry Res. 2005;134(3):281-286. https://doi.org/10.1016/j.psychres.2003.02.001.
[34]. Reed DA, Shanafelt TD, Satele DW, et al. Relationship of pass/fail grading and curriculum structure with well-being among preclinical medical students: a multi-institutional study. Acad Med. 2011;86(11):1367-1373. https://doi.org/10.1097/ACM.0b013e3182305d81.
[35]. Yu JH, Chae SJ, Chang KH. The relationship among self-efficacy, perfectionism and academic burnout in medical school students. Korean J Med Educ. 2016;28(1):49-55. https://doi.org/10.3946/kjme.2016.9.
[36]. Zenner D, Burns GA, Ruby KL, et al. Veterinary students as elite performers: preliminary insights. J Vet Med Educ. 2005;32(2):242-248. https://doi.org/10.3138/jvme.32.2.242.
[37]. Watson WE, Minzenmayer T, Bowler M. Type A personality characteristics and the effect on individual and team academic performance. J Appl Psychol. 2006;36(5):1110-1128. https://doi.org/10.1111/j.0021-9029.2006.00033.x.
[38]. Puthran R, Zhang MWB, Tam WW, et al. Prevalence of depression amongst medical students: a meta-analysis. Med Educ 2016;50(4): 456-468. https://doi.org/10.1111/medu.12962.
[39]. Nedjat S, Majdzadeh R, Rashidan A. Graduate entry to medicine in Iran. BMC Med Educ. 2008;8:47.
[40]. Moir F, Yielder J, Sanson J, et al. Depression in medical students: current insights. Adv Med Educ Pract. 2018;9:323-333. https://doi.org/10.2147/AMEP.S137384.
[41]. Henning MA, Krägeloh CU, Hawken SJ, et al. Motivation to learn, quality of life and estimated academic achievement: medical students studying in New Zealand. Med Sci Educ. 2011;21:142-150.