

# PREVALENCE AND PREDICTORS OF DEPRESSION AMONG MEDICAL STUDENTS OF IMO STATE UNIVERSITY, OWERRI, SOUTH EASTERN NIGERIA.

## ABSTRACT

**Background:** Depression has been recognized as one of the significant public health problems of the 21<sup>st</sup> century. Previous studies have revealed higher prevalence of psychological morbidity among medical students in comparison to their age – matched non – medical counterparts.

**Objective:** This study evaluated the prevalence and predictors of depression among medical students of Imo State University, Owerri, South Eastern Nigeria.

**Methods:** An institution based cross – sectional survey was conducted among 180 medical students selected using a systematic sampling technique. Data collection was with the aid of a pretested semi – structured self –administered questionnaire. Prevalence of depression was assessed using a modified Depression, Anxiety and Stress Scale (DASS – 21). Data was analysed using Statistical Package for Social Sciences (SPSS), version 22. Descriptive statistics was presented using summary indices, frequency tables and percentages. Associations between variables were done using the Chi –square and logistic regression. A p – value of < 0.05 was considered statistically significant.

**Results:** The mean age of the respondents was  $26.9 \pm 4.1$  years. Only 10.6% of the students were very well informed about depression with social media (45.9%) as the main source of information. The prevalence of depression in this study was 41.2%. Sociodemographic variables significantly associated with depression were body mass index ( $p < 0.0001$ ) and psychoactive substance use ( $p < 0.0001$ ). Being overweight (OR = 8.41) or obese (OR = 4.25) were significant predictors of depression. Likewise, respondents who often (OR = 8.50) or always (OR = 7.40) use psychoactive substances were significantly more likely to be depressed in comparison to those who do not.

**Conclusion:** Depression is a burning public health problem among medical students. There is need for institutional reforms to help address depression among medical students.

**Key words:** *Depression, Prevalence, Predictors, Medical Students, Imo State.*

## 1. INTRODUCTION

Depression has been recognized as one of the significant public health problems of the 21<sup>st</sup> century. It is characterized by sadness, loss of interest in activities and by decreased energy.<sup>1</sup> Depression is the fourth most important contributor to the global burden of disease and 4.4% of the total disability adjusted life years (DALYs) is as a result of depression.<sup>2,3</sup>

Attending university is a particularly stressful time due to unique emergent stressors such as changes in environment, reduced social support networks, academic pressures, developing peer relationships and financial management.<sup>4</sup>

Researchers have reported that medical education is demanding and stressful.<sup>5</sup> An important factor in the academic achievement of medical students is the ability to be well – adjusted psychologically while training to become a medical doctor.<sup>6</sup>

Previously published studies revealed that medical students experienced various degrees of psychological distress such as stress, anxiety and depression from the onset of medical training.<sup>5,7-8</sup> Some of the identified causes of these psychological distress among medical students were rigorous academic programmes, frequent seminars and in-course assessments as well as sub-optimal social life.<sup>9,10</sup>

On account of these factors, the prevalence of psychological morbidity such as depression, anxiety and stress have been observed to be higher among medical students when compared to their age-matched non-medical counterparts.<sup>5-9</sup> The prevalence of psychological and psychiatric morbidity among medical students ranged from 14% to 67%.<sup>5,7-14</sup> It has also been documented that medical students' psychological distress could occur at various stages of their medical school training, especially during periods of clinical examination.<sup>5,7-9</sup> Poor academic performance, reduced self-esteem, lack of confidence, substance and alcohol abuse, low moods, attempted suicide and suicide were some of the documented consequences of the psychological distress experienced by medical students.<sup>5,7-9,11-14</sup> Researchers have also noted that if these psychological morbidities are not given early attention, they may impact negatively on the future career of these medical students and the society at large.<sup>5,7-9,14</sup>

Despite the well documented psychological morbidity of medical students, literature searches on studies on prevalence and determinants of depression among undergraduate medical students in Nigeria showed scanty results.<sup>6,15-16</sup> Therefore, this study aimed to assess the prevalence and factors associated with depression among medical students in the study area.

## **2. MATERIALS AND METHODS**

### **2.1 Study setting, study design and period**

The study was an institutional based cross – sectional survey conducted from March to May 2022 at Imo State University Teaching Hospital (IMSUTH), Orlu, Nigeria.

### **2.2 Study Population**

The study population is made up of clinical students (third to sixth year) of Imo State University, Owerri.

### **2.3 Sampling procedure**

The sample size was determined using the Cochran formula for single population proportion with 95% confidence interval, 5% margin of error and 27.7%<sup>17</sup> as prevalence of depression based on previous study. By considering a 10% non – response rate and applying sample correction formula for population less than 10,000; a total sample size of 180 undergraduate medical students were involved in the study.

A systematic random sampling technique was used to select the study participants. Sampling interval was determined by dividing the total number of students by the sample size which was 2. The first study

participants was selected using lottery method and the next were chosen at regular intervals until the sample size was attained.

#### 2.4 Data collection procedures and instrument

Data were collected using a pretested, semi – structured self-administered questionnaire. The questionnaire made up of five sections was used to elicit information about sociodemographic variables, awareness and knowledge of depression, prevalence of depression, determinants of depression and perceived possible complications of depression.

Prevalence of depression was assessed using a modified Depression Anxiety and Stress Scale, the DASS – 21.<sup>18</sup> The depression scale assesses seven items: dysphoria, hopelessness, devaluation of life, self – deprecation, lack of interest or involvement, anhedonia and inertia. Each of the item is scored from 0 (did not apply to me at all) to 3 (applied to me very much or most of the time). Normal scores ranged from 0 – 4, mild depression 5 – 6, moderate depression 7 – 10, severe depression 11 – 13, extremely severe depression > 14.

#### 2.5 Data quality control issues

Training was given to data collectors on the data collection tool and sampling techniques. Supervision was held regularly during the data collection period to check for completeness and consistency.

#### 2.6 Data processing and analysis

Data was analyzed using 20<sup>th</sup> version of Statistical Package for Social Sciences (SPSS). Percentages, means and standard deviation of nominal variables were determined. Categorical variables were compared using chi – square test.

Bivariate analysis was used to determine the presence of statistically significant associations between depression and the independent variables. Statistically significant variables were entered into the multivariate logistic regression model to quantify the effect of each independent variable. The strength of the association was presented by odds ratio and 95% confidence interval. P value of < 0.05 was considered statistically significant.

#### 2.7 Ethical consideration

Ethical approval for this study was obtained from the ethics committee of College of Medicine, Imo State University. Written consents were obtained from all study participants after they were informed about the aims and objectives of the study. Participation was entirely voluntary and respondents were assured of the confidentiality of their responses.

## 4. RESULTS

A total of 170 medical students participated in the study with a mean age of 26.9 years and standard deviation of 4.1 years (Mean age  $\pm$  SD = 26.9  $\pm$  4.1 years). 96 of the study participants (56.5%) were

females. A greater majority of the students were in their 4<sup>th</sup> (44.1%) and 5<sup>th</sup> (33.5%) year of study respectively. 65% of the respondents were single and more than half (51.8%) live off campus. Table 1.

Only a small proportion of the students (10.6%) were very well informed about depression with the main sources of information being the social media (45.9%) and print/electronic media (23.5%). Commonest symptoms of depression identified by the study participants were insomnia (21.1%), weight loss (21.1%), suicidal thoughts (18.3%) and anxiety (15.7%). Table 2.

Over 90% of the students had spent 7 years or more in medical school and 68.9% considered medical curriculum to be stressful or very stressful. A good proportion of the respondents (60.6%) considered their family background as wealthy (9.4%) or quite well-off (51.2%). Some of the traumatic events experienced by the students include resiting an examination (28.9%), being sexually abused (15.9%) and repeating a class (11.7%). Most of the students (91.1%) considered their academic performance to be good (44.1%), very good (29.4%) and excellent (17.6%). Proportion of overweight and obese students in this study were 21.8% and 10.6% respectively. As regards use of alcohol, tobacco and other stimulants, 41.2% of the students admit to have never used any of these while 28.2% use them sparingly. About one – third of the students often (19.4%) and always (11.2%) use these substances. Proportion of students who had often or always entertain thoughts of harming themselves or someone else were 7.6% and 3.5% respectively. The prevalence of depression among the students was 41.2%. Table 3.

Sociodemographic factors significantly associated with depression in this study were body mass index ( $\chi^2 = 30.74$ ,  $p < 0.0001$ ) and substance use ( $\chi^2 = 38.38$ ,  $p < 0.0001$ ). Table 4.

Respondents that are overweight (OR = 8.41; 3.52 – 20.10,  $P < 0.0001$ ) or obese (OR = 4.25; 1.50 – 12.09,  $p = 0.0067$ ) were significantly more likely to be depressed when compared to those with normal body mass index. Likewise, respondents that often (OR = 8.50; 3.35 – 21.56,  $p < 0.0001$ ) or always (OR = 7.40; 2.41 – 22.70,  $p = 0.0005$ ) use tobacco, alcohol and other stimulants were significantly more likely to be depressed in comparison to those who do not. Table 5.

**Table 1: Sociodemographic variables of study participants**

Variable	Frequency n=170	Percentage
<b>Age (years)</b>		
< 20	3	1.8
21 – 25	63	37.0
26 – 30	78	45.9
31 – 35	19	11.2
>35	7	4.1
Mean age $\pm$ SD = 26.9 $\pm$ 4.1 years		
<b>Sex</b>		
Male	74	43.5
Female	96	56.5

**Year of study**

3 <sup>rd</sup> year	17	10.0
4 <sup>th</sup> year	75	44.1
5 <sup>th</sup> year	57	33.5
6 <sup>th</sup> year	21	12.4

**Marital status**

Single	111	65.0
Married	41	24.0
Separated	11	6.5
Divorced	7	4.1

**Religion**

Christianity	143	84.1
Islam	6	3.5
African tradition	10	5.9
None	11	6.5

**Type of residence**

Family house	35	20.6
Off campus	88	51.8
School hostel	47	27.6

**Table 2: Awareness and knowledge of depression by study participants**

<b>Variable</b>	<b>Frequency(%)</b>
<b>How informed are you about depression</b>	
Very well	20 (10.6)
Averagely	76 (44.7)
Below average	47 (27.6)
Not informed	27 (15,9)
<b>Main source of information</b>	
Social media	78 (45.9)
Lectures in the class	34 (20.0)

Print/electronic media	40 (23.5)
Health workers	18 (10.6)

**Symptoms of depression known to respondents\* n=383**

Insomnia	81 (21.1)
Weight loss	81 (21.1)
Suicidal thoughts	70 (18.3)
Anxiety	60 (15.7)
Restlessness	55 (14.4)
Fatigue	36 (9.4)

**\*Multiple responses applicable**

**Table 3: Description of clinical, psychosocial and substance use characteristics among the study participants**

<b>Variable</b>	<b>Frequency (%)</b>
<b>Years already spent in medical school</b>	
6 years	15 (8.8)
7 years	39 (22.9)
8 years	33 (19.4)
9 years	26 (15.3)
10 years	36 (21.1)
11 years	18 (10.6)
>11 years	3 (1.8)
<b>School curriculum</b>	
Very stressful	57 (33.6)
Stressful	60 (35.3)
Normal	48 (28.2)
Easy	5 (2.9)
<b>Family background</b>	
Wealthy	16 (9.4)
Quite well-off	87 (51.2)

Not well-off 54 (31.8)

Poor 13 (7.6)

**Traumatic event experienced**

Resited an exam 49 (28.9)

Sexually abused 27 (15.9)

Repeated a class 20 (11.7)

Not allowed to sit for an exam 16 (9.4)

None 58 (34.1)

**Academic performance**

Excellent 30 (17.6)

Very good 50 (29.4)

Good 75 (44.1)

Bad 15 (8.8)

**Body Mass Index (BMI) Assessment**

Underweight 15 (8.8)

Normal weight 100 (58.8)

Overweight 37 (21.8)

Obese 18 (10.6)

**Substance use (alcohol, stimulants, tobacco)**

Never 70 (41.2)

Rarely 48 (28.2)

Often 33 (19.4)

Always 19 (11.2)

**Thoughts of harming someone or yourself**

Never 105 (61.8)

Rarely 46 (27.1)

Often 13 (7.6)

Always 6 (3.5)

**Depression**

Present 70 (41.2)

Absent

100 (58.8)

**Table 4: Factors associated with depression among the study participants**

Variable	Depression		$\chi^2$	p-value
	Present	Absent		
<b>Gender</b>				
Male	29	45	0.21	0.6439
Female	41	55		
<b>Age (years)</b>				
<20	1	2	6.51	0.1639
21 – 25	21	42		
26 – 30	32	46		
31 – 35	11	8		
>35	5	2		
<b>Years already spent in school</b>				
6 – 8 years	31	56	2.26	0.1326
9 – 11 years	39	44		
<b>Body Mass Index</b>				
Normal weight	27	73	30.74	<0.0001
Underweight	4	11		
Overweight	28	9		
Obese	11	7		
<b>Substance use</b>				
Never	11	38	38.38	<0.0001
Rarely	12	42		
Often	32	13		
Always	15	7		

**Table 5: Predictors of depression among the study participants**

Variable	OR (estimate)	95% C.I	p-value
<b>Body Mass Index</b>			

Normal weight	1.00	-	-
Underweight	0.9832	0.2884 – 3.3522	0.9784
Overweight	8.4115	3.5199 – 20.1012	<0.0001
Obese	4.2487	1.4936 – 12.0860	0.0067

### Substance Use

Never	1.00	-	-
Rarely	0.9870	0.3901 – 2.4976	0.9780
Often	8.5035	3.3533 – 21.5636	<0.0001
Always	7.4026	2.4144 – 22.6964	0.0005

## DISCUSSION

In this study, the prevalence of depression among medical students and their possible association with various socio – economic factors were assessed.

The prevalence of depression in this study was 41.2%. This is similar to the prevalence of depression (40.9%)<sup>19</sup> among undergraduate students of University of Gondor, Ethiopia. However, the current study prevalence is higher than the studies conducted in College of Medicine, Lagos State University (6.3%)<sup>6</sup>, Addis Ababa University, Ethiopia (27.7%)<sup>17</sup>; in Medinah, Saudi – Arabia (28.3%)<sup>20</sup>, in Sangareddy, India (14.0%)<sup>16</sup>, and in North East Brazil (33.7%)<sup>14</sup>. It is however lower than that of a study conducted in another medical college in Addis – Ababa, Ethiopia (51.3%)<sup>21</sup>, that conducted in Egyptian Public University (63.6%)<sup>22</sup> and another conducted in Tabriz, Iran (62.7%)<sup>23</sup>. Other similar studies carried out in Malaysia<sup>24</sup>, India<sup>10</sup> and Pakistan<sup>25</sup> gave prevalences of 64.4%, 58.0% and 70.0% respectively. The variations might be due to differences in sample size and data collection tools. Other possible reasons for the relatively high prevalence of depression in our study in comparison to that of College of Medicine, Lagos State University is the number of years already spent in medical school by our study participants. The average number of years already spent in medical school by our respondents is 8.6 years and a little over 42% of the students in the index study had spent 10 years or more for a 6 years course. The major reason for this prolonged stay in medical school by our respondents can be attributed to instability in the system occasioned by recurrent labour dispute between the government and the workers. Furthermore, approximately 70.0% of our study respondents consider the school curriculum to be stressful. Likewise, a good number of the students (56.5%) had experienced traumatic events in the course of their study such as resiting an examination, being sexually abused and repeating a class.

In agreement with some other studies<sup>26,27</sup>, the index research also revealed that female students (58.6%) were more likely to be depressed. The possible reason might be that a fair proportion of female students in our study are married and have to combine the stress of medical school and that of caring for a young family. However, a study among medical students in Lagos revealed that male medical students had higher scores in the subscales of depression and anxiety<sup>6</sup>. While some studies found some statistically significant relationship between gender and depression<sup>19,26</sup>, some others such as the index study did not find any significant statistical association<sup>6,28</sup>.

Predictors of depression among our study participants were being overweight or obese as well as psychoactive substance use. Some researchers had found that an elevated body mass index (BMI) is predictive of a chronic course of depressive and anxiety symptoms<sup>29,30</sup>. Others have found that the odds of developing major depressive disorder (MDD) and anxiety increase as a function of the numbers of co-existing metabolic impairments, such as those characteristics of metabolic syndrome<sup>31,32</sup>. Scientists have observed that obesity is coupled to various structural and functional changes in the brain that are remarkably similar to those seen in depressive disorders<sup>33</sup>.

As regards association between depression and psychoactive substance use, other researchers have corroborated our findings. A study carried out by Amorha et al on prevalence and predictors of depression among pharmacy, medical and veterinary students at University of Nigeria, Nsukka; found that alcohol consumption on a daily and weekly basis as well as smoking at least one stick of cigarette in the past month were associated with more severe depression<sup>26</sup>. In a similar study conducted among Turkish military medical undergraduates, medical students who smoked were 2.2 times more likely to have depressive symptoms than nonsmokers<sup>34</sup>.

## CONCLUSION

The findings from this work revealed that depression is quite a burning public health problem among medical students of Imo State University. It also revealed that only a small proportion of the students were well informed about depression. There is need to broaden the medical curriculum to address this deficiency. Also minimizing industrial disputes between the government and the university employees will go a long in ensuring a stable academic calendar thereby helping to reduce the incidence of depression among the students.

**Abbreviations:** BMI: Body mass index; CI: Confidence interval; DALYs: Disability adjusted life years; DASS: Depression, Anxiety and Stress Scale; IMSUTH: Imo State University Teaching Hospital; MDD: major depressive disorder; OR: Odds ratio; SPSS: Statistical Package for Social Sciences;

**Limitations:** The study was carried out in an institution setting among medical student, thus caution should be exercised in generalizing the findings to the general population.

## REFERENCES

1. Marianne C, Kastrup M, Armendo Baez Ramos M.D. Global Mental Health. Dan Med Bull 2007; 54: 42 – 3.
2. Sidi H. Depression and the associated factors among elderly hypertensives. Exp Clin Cardiovasc 2014; 20(5): 3065 – 72.
3. Michelle F.G.I. Integrating mental health into primary care: a global perspective. Geneva: WHO; 2008.
4. Aileen M, Pidgeon N.F.R, Peta S, Heidi B.M, Barbara C, Lo Y. Examining characteristics of resilience among university students: an international study. Open J Soc Sci. 2014; 2: 14 – 22.

5. Yussof M.S, Abdul Rahim A.F, Baba A.A, Ismail S.B, Mat Pa M.N, Esa A.R. Prevalence and associated factors of stress, anxiety and depression among prospective medical students. *Asian J Psychiatry* 2013; 6: 128 – 33.
6. Coker A.O, Coker O.O, Sanni D. Sociodemographic correlates and symptoms of depression, anxiety and stress among a sample of Nigerian medical students. *Niger J Basic Clin Sci* 2018; 15: 58 – 62.
7. Yaqoob R, Raza A. Shelizad M.A, Zesshan S.C. Anxiety and depression among medical students; a cross – sectional study. *J Pak Med Assoc* 2010; 60: 699 – 702.
8. Chatterjee C, Mandal P.J, Mallik S, Manna N, Sardar JC, Dasupta S. A study on medical distress among MBSS students in a medical college, Kolkatta India. *Ann Trop Med Public Health* 2012; 5: 453 – 7.
9. Yusoff M.S.B. Effects of a brief stress reduction intervention on medical students' depression, anxiety and stress levels during stressful period. *Asian J Psychiatry* 2011; 12: 71 – 84.
10. Mackenzie S, Wiegel J.R, Mundt, Brown D, Saewye E, Heileigenstein E et al. Depression and suicide ideation among students accessing campus health care. *Am J Orthopsychiatry* 2011; 81: 101 – 7.
11. RanuRawat S.K, Manju L. Prevalence of depression and its associated factors among medical students of a private medical college in south India. *Int J Commun Med Public Health* 2016; 3 (6): 1393 – 8.
12. Dana Sarokhani A.D, Yousef V. Prevalence of depression among university students: a systematic review and meta-analysis study. London: Hindawi Publishing Corporation; 2013. p.7.
13. Singh A, Shekhar L. Prevalence of depression among medical students of a private medical college in India. *Online J Health Allied Sci.* 2010; 9 (4): 8.
14. Edmea Fontes de Oliva Costa M.V.R, Ana Teresa Rodrigues de Abreu S, et al. Common mental disorders and associated factors among among final – year healthcare students. *Rev Assoc Med Brasil*, 2014; 60(6): 525 – 30.
15. Aniebue P.N, Onyema G.O. Prevalence of depressive symptoms among Nigerian medical undergraduates. *Trop Doct* 2008; 38: 157 – 8.
16. Ofili A.N, Oriaifo I, Okungbowa E, Eze E.U. Stress and psychological health of medical students in a Nigerian university. *Niger J Clin Pract* 2009; 12: 128 – 33.
17. Berhanu Y. Prevalence of depression and associated factors among addisababa university, Addis Ababa, Ethiopia. *J Multidisciplin Res Healthcare* 2015; 2 (1): 73 – 90.
18. Lovibond S.H, Lovibond P.F. Manual for the depression anxiety stress scales 2<sup>nd</sup> ed. Sydney: Psychology Foundation; 1995.
19. Berihun Assefa Dachew T.A.B, Resom B.G. Prevalence of mental distress and associated factors among undergraduate students of University of Gondar, Northwest Ethiopia: A cross – sectional institutional based study. *PLoS ONE* 2015; 10: 0119464.

20. Saud A, Sultan A.A.A, Shahad A.S. Prevalence of depression among medical students at Taibah University, Madinah, Saudi Arabia. *Int J Acad Sci Res.* 2016; 4(1): 93 – 102.
21. Kebede M.A, Anbessie B., Ayano G. Prevalence and predictors of depression and anxiety among medical students in Addis Ababa, Ethiopia. *Int J Ment Health Sys.* 2019; 13: 30
22. Gabr A.R. Depression, anxiety and stress among first year medical students in an Egyptian public university. *Int Res J Med Sci.* 2014; 2: 11 – 19.
23. Saeid Safiri N.K. Ahmad K, Mohammad Reza N, Nahid K. Prevalence of depression and its associated factors using Beck Depression Inventory among students of School of Health and Nutrition, Tabriz, Iran. *J Anal Res Clin Med* 2013; 1(2): 83 – 89.
24. Radeef A.S, Faisal G.G, Ali S.M, Ismail M.K. Source of stressors and emotional disturbances among undergraduate science students in Malaysia. *Int J Med Res Health Sci.* 2014; 3(2): 401 – 410.
25. Muhammad S., Khan S., Areef B., Syed U.A. Prevalence of depression, anxiety and their associated factors among medical students in Karachi, Pakistan. *J Pak Med Assoc.* 2006; 56:12.
26. Amorha K.C, Egbo K.I, Ibezim I.C. Prevalence and predictors of depression among pharmacy, medical and veterinary students in a Nigerian university. *IOSR Journal of Pharmacy and Biological Sciences* 2021; 16(3): 1 – 10.
27. Killinger S.L, Flanagan S, Castine E. et al. Stress and depression among veterinary medical students. *J Vet Med Educ.* 2017; 44(1): 3 – 8.
28. Radeef A.S, Faisal G.G, Ali S.M. Source of stressors and emotional disturbances among undergraduate science students in Malaysia. *Int J Med Res Health Sci* 2014; 3: 401 – 410.
29. Fulton S., Decarie – Spain L., Fioramonti X., Guiard B., Nakajima S. The menace of obesity to depression and anxiety prevalence. *Trends in Endocrinology and Metabolism.* 2022; 33(1): 18 – 35.
30. Milaneschi Y., Kyle Simmon W., Elisabeth F.C van Rossum., Penninx B. W. Depression and obesity: evidence of shared biological mechanisms. *Mol. Psychiatry.* 2019; 24: 18 – 33.
31. Tang F., Wang G., Lian Y. Association between anxiety and metabolic syndrome: A systematic review and meta – analysis of epidemiological studies. *Psychoneuroendocrinology* 2017; 77: 112 – 121.
32. Jokela M., Hamer M., Singh – Manoux A., Batty G.D., Kivimaki M. Association of metabolically healthy obesity with depressive symptoms: Pooled analysis of eight studies. *Mol. Psychiatry* 2014; 19: 910 – 914.
33. Opel N., Thalamuthu A., Milaneschi Y., Grotegerd D., Flint C., Leenings R. et al. Brain structural abnormalities in obesity: Relation to age, genetic risk and common psychiatric disorders: Evidence through univariate and multivariate mega – analysis including 6420 participants from the ENIGMA MDD working group. *Mol. Psychiatry* 2021; 26: 4839 – 4852.