



Prevalence and Comorbidity of Depression and Anxiety among Medical Students in Babcock University, Ogun State, Nigeria

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Authors' contributions

This work was carried out in collaboration between both authors. The concept of study, data collection and data entry in SPSS, data analysis, drafting and finalizing of the results were done by author NAD. The article was finally reviewed and approved by author DOA. Both authors read and approved the final manuscript.

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ABSTRACT

Background: Depression and anxiety are mental health disorders which both result in high negative affect and are two of the most common mental health disorders globally. Stress is one factor implicated in the cause and aggravation of such mental disorders. Medicine is among some of the most stressful courses that a student can undertake in the university.

Aim: The aim of the study was to determine the prevalence and comorbidity of depression and anxiety among medical students in Ogun state, Nigeria.

Study Design: Cross-sectional survey design

Methodology: 225 medical students (MBBS) aged 15-26 (mean: 19.09±2.14), majority of whom were female (69.8%), attending a private university in Ogun state participated in the study. The levels of depression and anxiety were assessed by administering an instrument comprising of the Beck Depression Inventory-II (BDI-II) and the Beck Anxiety Inventory (BAI).

Results: Findings indicated a prevalence of depression (moderate: 16.0%, severe: 9.8%) and anxiety (moderate: 11.1%, severe: 17.3%). The study revealed significant gender differences in the

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manifestation of depression (male: 19.1%, female: 28.7%) and anxiety (male: 13.3%, female: 35.0%) indicating that female students are more likely to be diagnosed with both disorders. The study identified a strong positive correlation between depression and anxiety in medical students ($r = 0.803$).

Conclusion: Depression and anxiety are significantly prominent disorders among medical students. Therefore, sensitization and periodic mental health screening for medical students should be carried out to ensure optimal health.

Keywords: Anxiety; comorbidity; depression; medical students; mental health; Nigeria.

1. INTRODUCTION

Depression refers to a disorder characterized by persistent low mood which can cause impairment while anxiety refers to feelings of worry and unease about an uncertain outcome. Both disorders are two of the most ubiquitous mental health diagnoses given worldwide and are more common in females than in males [1]. Entry into the university marks a highly transitional and often transformational time for many. For some, this is a period of significantly increased stress. This may be brought on by a slew of factors and can lead to the development or aggravation of more serious conditions such as depression and anxiety [2,3]. One of the main sources of strain to students is a heavy academic workload [4] which has been shown to account for increased stress levels in university students [5].

While there is no means by which to directly measure how difficult a course is, the consensus from numerous sources is that some courses are more challenging than others and medicine is a course that never fails to make top 10 when courses are being ranked in terms of difficulty and challenges posed. Medical students suffer high levels of stress [6] which may be caused by one or more of many factors including the fact that they are provided with tremendous amounts of information which they are to memorize [7], excessive workload, resultant sleep deprivation [8], board exams, social isolation, clinicals, etc. [9]. In addition to this, many medical schools present a rigid environment which tends to foster the spirit of competition in students rather than cooperation, the result being an aggravation of (the already present) stress and tension [10]. A study to determine the level of stress medical students face found that 33.56% of the medical students felt like they were constantly under some form of strain and 25.34% of the students had sleep disturbances due to worries. Majority of the students also had stress over competition for marks, frequent examinations, being away

from home (predominantly first year students) and difficulty in juggling social life with school work [11]. Students find it increasingly difficult to deal with these situations and as such, these disorders arise.

Depression and anxiety are some of the more common psychological disorders which medical students experience, sometimes even concurrently. This demographic typically manifests a higher prevalence of these disorders. Lloyd and Gartrell proved that medical students are more distressed when juxtaposed with the general population [12]. Meta-analyses revealed the global prevalence of depression in medical students to be 28.0% [6] and anxiety to be 33.8% [13].

15 studies and research works including cross-sectional, longitudinal, surveys and cohort studies were systematically reviewed; the entirety of the studies reviewed involved a total of 20,452 individuals. This involved studies carried out between 1987 and 2016 which took place in UK, US, Egypt, Canada, China and India. The review indicated that a higher prevalence of anxiety and depression could be found among these groups; medical students, residents, pharmaceutical students, etc. when comparisons were drawn with the general population. The study also discovered a higher prevalence of burnout and suicidal ideations [14]. In a 2019 study carried out in Addis Ababa in order to determine the prevalence of the disorders among medical students, 273 student participants were selected. It found the prevalence of depression to be 51.3% and the prevalence of anxiety to be 30.1%. There was also a comorbid depression and anxiety prevalence of 21.2% [15]. A 2018 study using a scale on both disorders to determine the level of stress, depression and anxiety in the College of Medicine of Lagos State University (LSU) students determined that of 240 respondents with 25 years as the mean age from the second to the sixth year, 6.3% and 9.5% of

them experienced depressive and anxiety symptoms respectively. The study additionally found that 61.6% of the students experienced symptoms of stress [16].

As a result of the high rate of stress, the prevalence and co-morbidity of depression and anxiety are, therefore, important conditions to look out for in medical students as they affect multiple facets of their lives. In addition, a better understanding of the prevalence and comorbidity of depression and anxiety among medical students is necessary as it will facilitate the planning of adequate intervention programs for said demographic.

2. MATERIALS AND METHODS

Study Design: A cross-sectional design was used. The study made use of quantitative data with the aid of questionnaires.

Study Setting: The study was carried out in Babcock University, Ilishan-Remo, Ogun state, south-western Nigeria.

Study Population: All 505 students of Benjamin S. Carson (Snr.) School of Medicine, Babcock University were invited to participate in the study. The 225 medical students from the first to the sixth year who gave permission and provided relevant information were enrolled. The participants' age ranged from 15-26.

Sampling Technique/Recruitment of Participants: Convenience sampling was the technique selected for this study. Using Cochran's 1977 correction formula [17] and adding an additional 10% to account for attrition, the sample size was determined to be 240. The first 240 respondents were to be selected for participation; however, only 225 viable respondents were gotten and enrolled. The instrument was administered to all members of the target population through the research assistants by way of an online survey. Included with the online survey was an informed consent document which comprised of the title, purpose, goal and procedure of the study as well as what was required of participants. Post research benefits and detailed contact information of the researchers were also included. Completed questionnaires were then sent back to the researchers to ensure privacy and confidentiality. The study spanned from January 2021 to April 2021.

2.1 Study Instrument

Socio-Demographic Data: This section contained questions on the socio-demographic profiles of the respondents. It comprised of the following items; age, gender and educational level (year of study).

Beck Depression Inventory (BDI-II): A self-administered screening instrument utilized in the measurement of symptoms, characteristic attitudes [18] and severity of depression. The instrument consists of 21 items answered using a multiple choice scale. Each item attracts a score of 0 - 3 with higher figures indicating more severe symptoms. The inventory divides the scores into low (minimal and mild), moderate and severe depression. Scores between 0-13 are classified as minimal depression, 14-19 as mild depression, 20-28 as moderate depression and 29-63 as severe depression. The BDI-II is able to measure symptoms of depression such as hopelessness, anhedonia, guilt, etc. It also accounts for physical symptoms such as weight loss. It however does not measure anxiety and so depression can be distinguished from anxiety. BDI-II is a revision of BDI and was created in 1996 by Beck, Steer and Brown [19]. The alpha coefficient of the BDI-II in the pilot study carried out was 0.94.

Beck Anxiety Inventory (BAI): A self-administered screening instrument utilized in the measurement of symptoms and severity of anxiety which respondents have experienced within the past month. The instrument consists of 21 items which are answered using a multiple choice scale. Each item attracts a score of 0 - 3 with higher figures indicating more severe symptoms. The inventory divides the scores into low (minimal and mild), moderate and severe anxiety. Scores between 0-7 are classified as minimal anxiety, 8-15 as mild anxiety, 16-25 as moderate anxiety and 26-63 as severe anxiety. BAI measures emotional, cognitive and physiological symptoms of anxiety but does not measure depression and so anxiety can be distinguished from depression. BAI was developed in 1988 by Beck, Epstein, Brown and Steer [20]. The alpha coefficient of the BAI in the pilot study carried out was 0.89.

Data Collection: The study instrument (questionnaire) was administered by online survey with the help of 6 research assistants purposively selected from each level/year of medicine in Babcock University. The research

assistants were trained to assist in the distribution of the questionnaires and answering of basic questions which may be posed by the participants. Links were sent to the research assistants who made them available to the class group chats along with an informed consent document and brief introductory message from the researcher. This method of data collection was chosen to ensure the study was compliant with the WHO's social distancing protocol due to the COVID-19 pandemic. Data was collected over a period of 4 weeks.

Data Analysis: The data gathered from complete sets of questionnaires were collated, inputted and analysed using the 23rd version of the Statistical Package for Social Science (SPSS version 23). The socio-demographic details of respondents were reported using descriptive statistics (frequencies and percentages). Cross tabulation was used to determine the prevalence of depression and anxiety, Independent samples t-test was used to determine gender differences in the manifestation of depression and anxiety, Pearson's coefficient was used to test for comorbidity of depression and anxiety and Analysis of Variance (ANOVA) and Tukey HSD were used to test for significant differences in the manifestation of depression and anxiety across the 6 educational levels (years of study). Confidence interval was set at 95% and all tests were two-tailed. Statistical significance was considered at a *p*-value less than 0.05.

3. RESULTS

Of the 505 medical students enrolled in the Benjamin S. Carson (Snr.) School of Medicine, Babcock University, 225 (44.6%) participated in the study. 164 (72.9%) of them were aged

between 15 – 20 years while 61 (27.1%) were aged 21-26 years old. The mean age of the medical students was 19.09±2.14 years old. Most of the respondents were female (157 i.e. 69.8%) with only 30.2% (68) being male. The educational levels (year of study) of the respondents were distributed as; 14.2% in year 1 (32), 26.2% in year 2 (59), 11.6% in year 3 (26), 19.1% in year 4 (43), 16.9% in year 5 (38) and 12.0% in year 6 (27).

The results showed a 74.2% prevalence of no/low depression and a 25.8% prevalence of moderate (16.0%) to severe (9.8%) depression while a 71.6% prevalence of no/low anxiety and 28.4% of moderate (11.1%) to severe (17.3%) anxiety was also observed (Table 2). Table 1 shows the prevalence of depression and anxiety among respondents.

Findings revealed that over a quarter of the respondents had moderate to severe depression and moderate to severe anxiety with anxiety observed to be slightly more prevalent in the medical students than depression.

The findings also revealed a strong positive correlation ($r = 0.803$) between the manifestations of depression and anxiety among the respondents. From that, it is evident that the likelihood of an individual with depression having or developing anxiety is high and vice versa.

Findings indicated significant gender differences in the manifestation of depression ($t = 2.60, p = 0.01$) and anxiety ($t = 4.01, p = 0.00$). Among the male medical students, there was 14.7% moderate depression and 4.4% severe depression. Thus, the manifestation of depression/depressive traits which fit the criteria

Table 1. Distribution of no/low, moderate and severe depression and anxiety

Variable	Depression		Anxiety	
	Frequency (N)	Percentage (%)	Frequency (N)	Percentage (%)
No/Low	167	74.2	161	71.6
Moderate	36	16.0	25	11.1
Severe	22	9.8	39	17.3
Total	225	100	225	100

Table 2. Prevalence of depression and anxiety among respondents

Variable	Frequency (N)	Percentage (%)
Depression	58	25.8
Anxiety	64	28.4

N = number of respondents who reported respective symptoms of depression and anxiety which were moderate or severe

for diagnosis of depression in the male students was determined to be 19.1%. Among the female medical students, there was 16.6% moderate depression and 12.1% severe depression. Thus,

the manifestation of depression/depressive traits which fit the criteria for diagnosis of depression in the female students was determined to be 28.7%.

Gender and Level of Depression

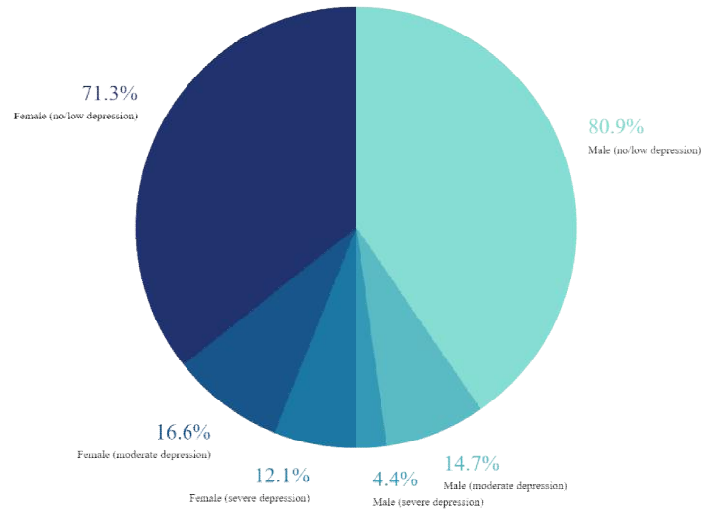


Fig. 1. Pie chart depicting the levels of depression across gender

Gender and Level of Anxiety

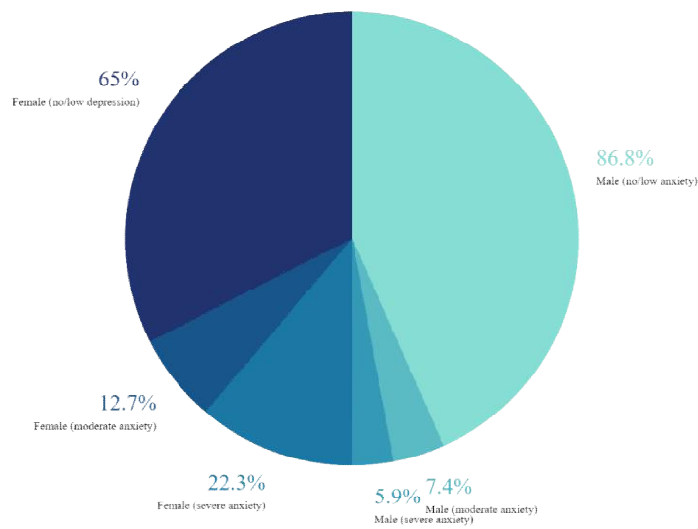


Fig. 2. Pie chart depicting the levels of anxiety across gender

In the same vein, among the male medical students, there was 7.4% moderate anxiety and 5.9% severe anxiety. Therefore, the manifestation of anxiety/anxious traits which fit the criteria for diagnosis of anxiety disorders in the male students was determined to be 13.3%. Among the female medical students, there was 12.7% moderate anxiety and 22.3% severe anxiety. Therefore, the manifestation of anxiety/anxious traits which fit the criteria for diagnosis of anxiety disorders in the female students was determined to be 35%.

Furthermore, significant differences were observed in the manifestation of depression and anxiety across the years of study.

A one-way ANOVA showed statistically significant difference in the depression scores ($F(5, 225) = 6.04, p = .00$) and anxiety scores ($F(5,$

$225) = 6.05, p = .00$) of the six years of study. To determine exactly which pair of means the difference is significant, a post hoc test (Tukey HSD) was carried out. For depression, findings revealed that the year 2, year 4 and year 5 students had statistically significantly higher depression scores than the year 6 students ($p = 0.12, .00$ and 0.01 respectively) while the year 3 students had statistically significantly higher depression scores than the year 1 students ($p = 0.01$) and the year 6 students ($p = .00$).

For anxiety, findings indicated the year 2 and year 4 students had statistically significantly higher anxiety scores than the year 6 students ($p = .00$ and 0.02 respectively) while the year 3 students had statistically significantly higher anxiety scores than the year 1 students ($p = .00$) and the year 6 students ($p = .00$).

Table 3. Distribution of depression and anxiety across the 6 years of study

Variable	Depression		Anxiety	
	Frequency (N)	Percentage (%)	Frequency (N)	Percentage (%)
Year 1	6	18.8	6	18.8
Year 2	14	23.7	20	33.9
Year 3	11	42.3	15	57.7
Year 4	16	37.2	11	25.6
Year 5	10	26.4	10	26.4
Year 6	1	3.7	2	7.4

N = number of respondents who reported respective symptoms of depression and anxiety which were moderate or severe

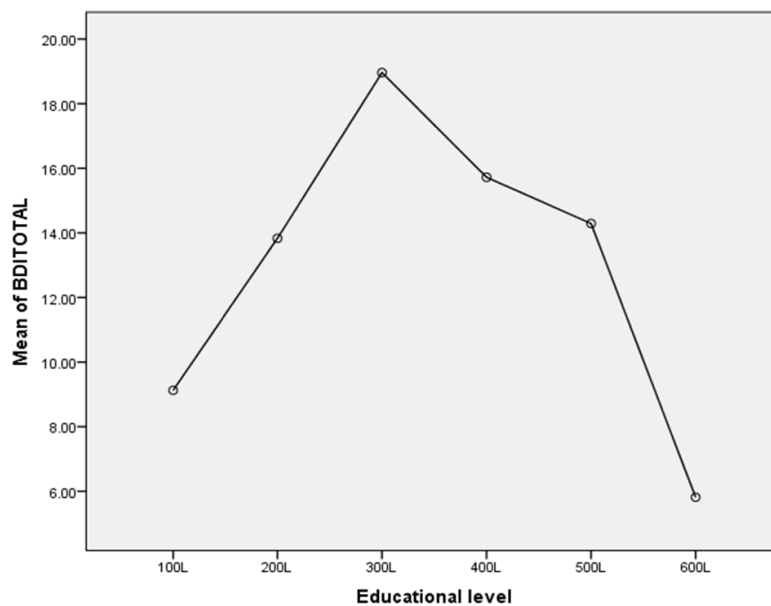


Fig. 3. Mean Plot depicting mean distribution of depression scores (BDITOTAL) across educational levels of medicine/medical school in Babcock University

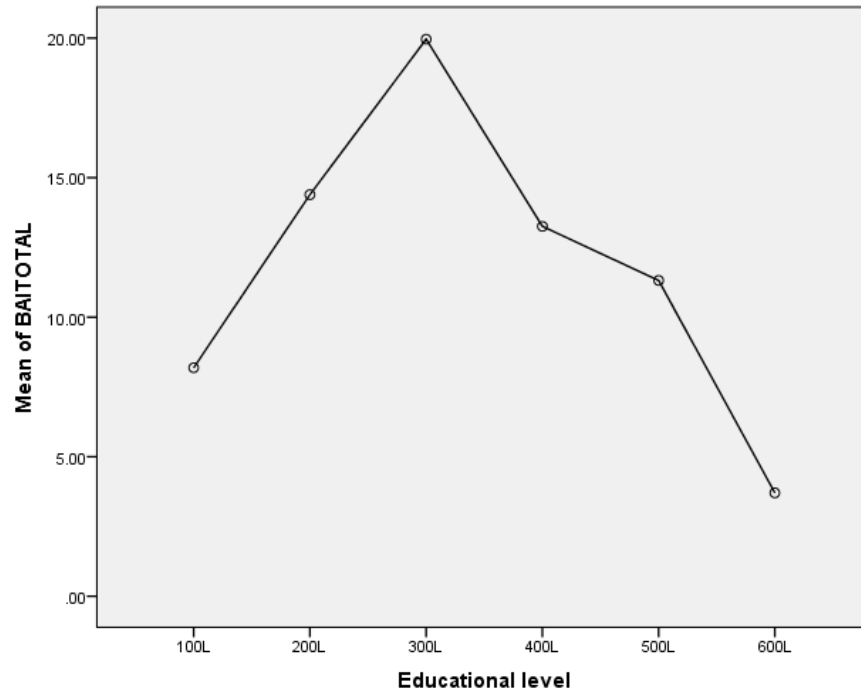


Fig. 4. Mean Plot depicting mean distribution of anxiety scores (BAITOTAL) across educational levels of medicine/medical school in Babcock University

4. DISCUSSION

The present study indicates a high prevalence of depression and anxiety among medical students, especially the female students. While there are many factors to consider when assessing mental health issues in this demographic, one of the most prominent factors to consider is stress [12,21].

The results of the study are in line with other studies done both within and outside Nigeria. A previous study on medical students in Addis Ababa identified a 51.3% and 30.1% prevalence in depression and anxiety respectively [15]. Another study conducted in Brazil determined the prevalence of depression among medical students to be 28.8% [22]. Lastly, a study carried out in Lagos state determined that 6.3% and 9.5% of the students who participated experienced depressive and anxiety symptoms respectively [16].

The study determined that there is a statistically significant difference in the depression and anxiety scores of the six years of study. Further analysis indicated that the year of study with the highest manifestation of depression and anxiety

was year 3 and the year of study with the lowest manifestation of depression and anxiety was year 6.

The mean plot indicated a steady rise in the rate of depression and anxiety from year 1 to year 3 followed by a consistent drop from year 4 to the lowest point in year 6. It is interesting to note that at the time of this study, the year 3 students were about to commence their first medical board exams and the year 6 students had just concluded their final batch of exams.

Medical students experience a higher degree of stress and strain from the beginning to the end of the attainment of a medical degree and even well into the practice of medicine. This can often lead to the development of mental health disorders and in turn, the development of these disorders may lead to impairment in the functionality of these individuals.

The study of medicine is such a challenging undertaking and may lead to further complications. Identification of the problem in a timely manner combined with adequate techniques to reduce or alleviate the strain on these individuals may lead to the subsequent

reduction in these high numbers of adverse effects i.e. mental health disorders reported. Sensitization programs should be organized to increase the awareness about depression and anxiety. Most students are aware of the disorders but may be completely oblivious to the fact that they or someone they know are clinically depressed or suffering from anxiety. Mental health awareness seminars should be deemed compulsory to all students and held frequently. It would be beneficial for university authorities to mandate all students, not just medical students, to attend one on one counseling at least once every academic session. These sessions will be helpful as students will be evaluated by trained professionals to determine their mental states. The study showed 3 students reporting that they would like to kill themselves and another 3 reporting that they would go ahead with a suicide attempt if they had the chance (BDI-II item on suicidal thoughts or wishes). With counseling programs in place, such ideations could be arrested before they reach a point of no return. Additionally, it might be advantageous to make help-lines readily available to students who need it in order to give those who might feel uncomfortable with out-rightly seeking help an opportunity to do so anonymously. That way, students may feel more inclined to seek help without a fear of consequences. The fact remains that there is still a lot of stigma around mental health in Nigeria [23] and so many students may be prepared to suffer in silence rather than come forward to ask for help. Jacob et al (2020) analysed the efficiency of services like these and discovered psychiatric assessment and therapy led to a significant reduction in the levels of depression, anxiety and distress in medical students. The study also found that there was a significant improvement in the functioning of participants [24]. The findings of this research will be made available to the school authorities and the Student Support Centre of Babcock University to ensure the proper steps are taken to safeguard and improve the mental health of the students.

5. CONCLUSION

The study reports high prevalence of depression and anxiety among medical students in Babcock University, Ogun state when compared to the general population and suggests that sensitization programs and university-organized psychological evaluations should be put in place as a strategy to promote positive mental health among medical students.

6. LIMITATIONS

Due to the COVID-19 pandemic, the responses had to be collected online, which made data collection difficult as respondents are typically passive and sometimes unresponsive when asked to provide data online. Additionally, the study focused only on one institution.

7. RECOMMENDATIONS

The limitations should be addressed in further studies. Also, we strongly suggest that mental health awareness seminars and one-on-one counseling programs should be put in place and regularly conducted. It may also be beneficial to inform parents and educators on the mental health challenges students face and enlighten them on what they can do to improve the situation.

CONSENT

Informed consent was obtained from all participants.

ETHICAL APPROVAL

Ethical approval was obtained from the Babcock University Health Research and Ethics Committee (BUHREC) [Ref. no.: BUHREC208/21].

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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