

# A Systematic Review and Meta-Analysis of Depression Prevalence Among Nigerian Students Pursuing Higher Education

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## Research Article

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## ABSTRACT

Depression is one of the most prevalent mental health disorders currently going undiagnosed in many developing countries, including Nigeria. Stigmatization, inadequate financial resources, poor healthcare infrastructure for accurate diagnosis, and low research attention are contributing factors to the prevalence of depression among youths in West Africa. This study therefore estimated the prevalence of depression among higher education students in Nigeria. Data was extracted and examined from 1225 publications by three independent reviewers. Pooling of logit-transformed data was done using generalized linear mixed-effects model, while restricted maximum likelihood was used to estimate between-study variance ( $\tau^2$ ). Knapp-Hartung adjustments were included for calculating the confidence intervals around pooled effects; and R was used to calculate pooled estimates of depression prevalence. The effects of predictors of depression were examined by subgroup analyses and random-effect meta-regression models.

Mean age of students across the 18 studies ranged from 19.09 to 26.3 years, with sample sizes ranging from 81 to 1482 participants. The pooled depression prevalence across studies was 26% (95% CI 0.18, 0.36) with high heterogeneity ( $I^2=97%$ ,  $\tau^2=0.9512$ ). The subgroup analyses showed that higher education students in the Northwestern region of Nigeria have the highest depression prevalence (45.9%), followed by the South-South region (33%), Southeastern (22.1%), and Southwestern region (18.1%). Our findings show that depression among higher

education students in Nigeria is highly prevalent. The factors contributing to the high depression prevalence, particularly among higher education students in the Northwestern region of Nigeria, should be investigated.

## INTRODUCTION

Depression is characterized as alterations in thinking, mood, or behaviours associated with distress and/or impaired function. It remains one of the most prevalent health disorders of the 21st century, placing a considerable economic and social burden on both individuals bearing the disease and society at large. While depression prevalence is inversely correlated with indicators of national health such as GDP/GDP per capita, it remains one of the most undiagnosed disorders in many developing countries, largely due to lack of data and poor healthcare infrastructure to diagnose reliably. To reduce global mental health inequity and improve the demographic and economic transition of developing countries, it is important to estimate the prevalence of depression and determine the factors related to undiagnosed depression. West Africa is particularly at greater risk, as studies have reported up to 30%-80% of mentally ill individuals in this region lack the resource or access to mental health services. To this end, Nigeria in particular is important to examine, as it remains the most populous West African nation, and the fastest growing economy in Africa [1]. Studies have found that depression prevalence information is limited in this region, due to cited factors of poor mental health education, unregulated healthcare infrastructure, tendency for patients to describe somatic symptoms, and stigma towards individuals with mental disorders by both patients and physicians. The few studies available that have examined depression have been so in groups of psychiatric clinics, student athletes, geriatric attending clinics, postpartum women, and outpatient clinics [2-4]. To date, there has yet been a comprehensive assessment of depression prevalence of higher education Nigerian students.

Higher education, defined as education after post-secondary, is a critical development phase for youth, and a period where mental health is particular vulnerable [5]. Higher education students are often aged between 18-24, a period where individuals undergo role transitions and identity formation, increasing the potential for depression. There is evidence to suggest that transition in this period may be particularly difficult for Nigerian youth, due to factors related to a feeling of career hopelessness, distrust in academic institutions, unavailable learning materials, poverty, and consequentially disrupted peer relationships [6]. Thus, this study aims to estimate the prevalence of depression in Nigeria amongst higher educational students.

## MATERIALS AND METHODS

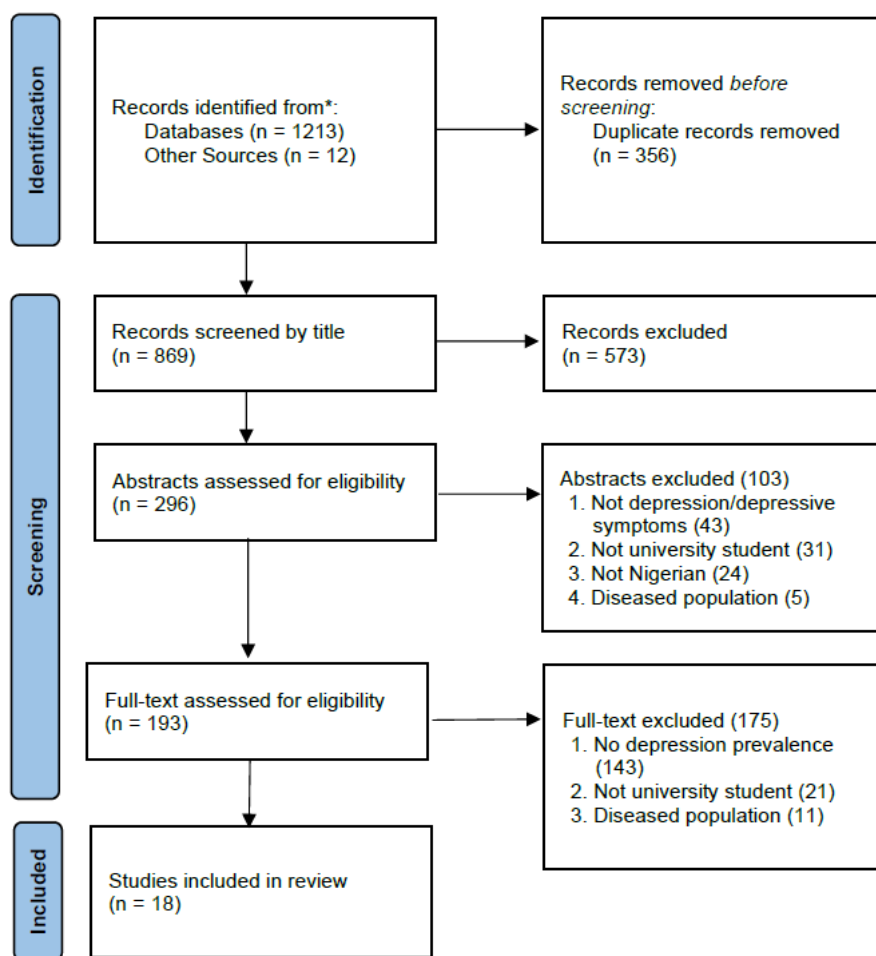
To this end, Nigeria in particular is important to examine, as it remains the most populous West African nation, and the fastest growing economy in Africa [7]. Studies have found that depression prevalence information is limited in this region, due to cited factors of poor mental health education, unregulated healthcare infrastructure, tendency for patients to describe somatic symptoms, and stigma towards individuals with mental disorders by both patients and physicians [8,9]. The few studies available that have examined depression have been so in groups of psychiatric clinics, student athletes, geriatric attending clinics, postpartum women, and outpatient clinics [10-14]. To date, there has yet been a comprehensive assessment of depression prevalence of higher education Nigerian students. Higher education, defined as education after post-secondary, is a critical development phase for youth, and a period where mental health is particular vulnerable [15]. Higher education students are often aged between 18-24, a period where individuals undergo role transitions and identity formation, increasing the potential for depression. There is evidence to suggest that transition in this period may be particularly difficult for Nigerian youth, due to factors related to a feeling of career hopelessness, distrust in academic institutions, unavailable learning materials,

poverty, and consequentially disrupted peer relationships [16]. Thus, this study aims to estimate the prevalence of depression in Nigeria amongst higher educational students.

### RESULTS

A total of 18 papers were included in this review. Figure 1 shows the PRISMA flow diagram.

Figure 1. Flow diagram detailing process and outcome of study selection.



### Demographic data

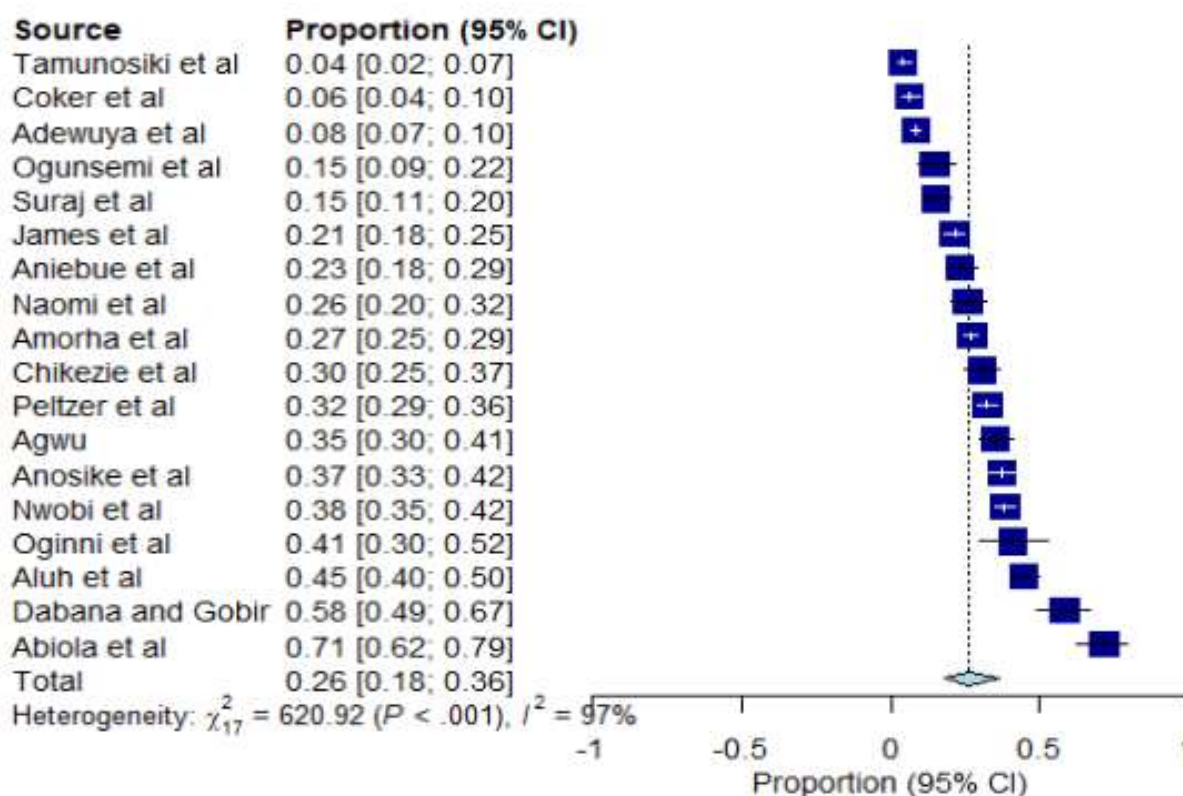
Mean age of students across the 18 studies were from 19.09 and 26.3 years. All studies recruited participants from post-secondary educational programs at a Nigerian university. 5 of the studies were directed towards general university students, while the remaining studies evaluated either medical, pharmacy, dental, or veterinary students. All of the studies recruited participants from a Nigerian accredited university. The regional locations of the study populations are as follow: 3 studies from northwest Nigeria, 5 studies from Southeast, 2 studies from south-south, 5 studies from southwest, and 2 that collected participants from more than one region [17-20].

Multiple instruments were used to assess depression. 2 studies used Beck Depression Inventory (BDI), 3 studies used the Depression Anxiety Stress Scale (DASS), 3 studies used the Hospital Anxiety and Depression Scale (HADS), 2 studies used the Mini-International Neuropsychiatric Interview (MINI), 3 studies used the Patient Health Questionnaire (PHQ-9), and 2 studies used Zung's Self-Rating Depression Scale (SDS).

**Prevalence of depression**

The pooled prevalence of depression amongst post-secondary Nigerian studies was 26% (95% CI 0.18, 0.36) based on a random-effects model. This result reflected high heterogeneity ( $I^2=97%$ ,  $\tau^2=0.9512$ ). The prevalence of depression ranged from 4.0% to 71.3% in individual studies and are presented in a forest plot in Figure 2. Due to the significant heterogeneity observed in the included studies, meta-regressions against publication year, percentage of students married, percentage of male students, and mean age were conducted (Table 1). Subgroup analyses conducted based on Nigerian geographic region showed differences, with the prevalence of depression in the Northwestern region being the highest at 45.9% followed by the South-South region (33%), Southeastern (22.1%), and Southwestern region (18.1%). However, these differences were not statistically significant. The prevalence of depression between general undergraduate students compared to students in health-professional programs were 31.6% and 24.0% respectively. Results of subgroup analyses are shown in Table 2.

**Figure 2.** Forest plot summarizing 18 studies assessing depression prevalence amongst higher-educational Nigerian students (n=8125). 95% CI=95% Confidence Interval.



**Table 1.** Meta-regression analysis against quantitative factors.

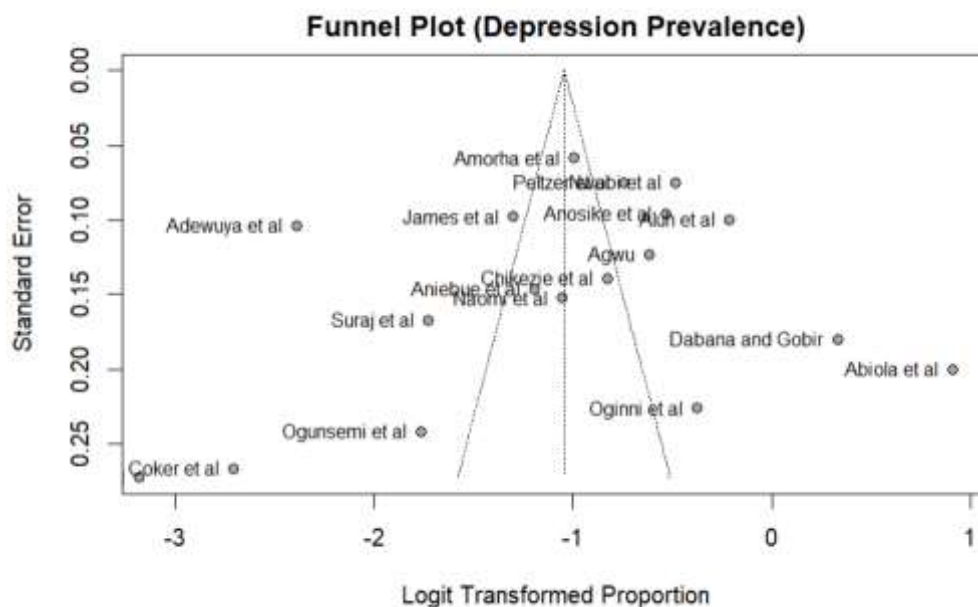
Covariate	Coefficient	S.E	95% CI	t-value	P
% male	0.0053	0.0259	(-0.0498, 0.0605)	0.2964	0.8393
Mean age	-0.2209	0.1447	(-0.5361, 0.0943)	-1.5217	0.1527
Year of publication	-0.0134	0.1082	(-0.2545, 0.2276)	-0.1242	0.9036
% of students married	0.0361	0.0474	(-0.0644, 0.1365)	0.7613	0.4576

**Table 2.** Results of subgroup analyses for depression prevalence based on categorical factors

Factors	Studies (n)	95% CI	P value
Region	-	-	0.1317
Northwest	3	0.4587 (0.0473; 0.9354)	-
Southwestern	6	0.1809 (0.0829; 0.3506)	-
Southeastern	5	0.2209 (0.0786; 0.4851)	-
South-south	2	0.3296 (0.1324; 0.6129)	-
Multi-region	2	0.3182 (0.0035; 0.9842)	-
Type of student	-	-	0.4349
General	5	0.3163 (0.1308; 0.5872)	-
Health	13	0.2398 (0.1468; 0.3663)	-

Bias 9 of the 18 studies had a score of 1, indicating a high risk of bias. 13 of the studies had a sample size less than 500. 9 of the studies used non-random sampling, and all studies sampled participants from university campuses. Of the 6 Nigerian regions, only the northwest, south-south, southeast, and southwest were represented. Sample sizes ranged from 81 to 1482 participants, with percentage of male participants ranging from 30.2% to 66.1%. Assessment and visualization of the funnel plot and Egger’s test did not find any significant bias with respect to small-study effects ( $P=0.51$ ) are shown in [Figure 3](#).

**Figure 3.** Symmetrical funnel plot.



## DISCUSSION

This is the first study to examine the prevalence of depression amongst post-secondary students in Nigeria. While there was variation in the estimate for the prevalence of depression due to differing measures used, our finding is that the prevalence of depression amongst post-secondary Nigerian students is high. Depression did not seem to vary significantly between the different regions, or whether an individual was married. Depression prevalence was lower in older participants, though differences were not significant.

Previous meta-analyses examining depression prevalence amongst post-secondary students have reported between 30.6% and 35.7%, while for health-related specialties such as medical or pharmacy report rates between 27.2% and 40.9%, with Africa having the highest rate of depressive symptoms. Our results are comparable to other pooled estimates of depression found in West Africa [21-25]. A previous 2015 study conducted in Ghana reported a depression prevalence of 39.2% amongst university students [26]. While a 2018 global meta-analysis found a pooled depression prevalence of 24% in low-income countries [27-29].

## CONCLUSION

Our results are consistent with previous studies that show post-secondary and professional students are at a higher risk of depression compared to that of the general population. This may be attributed to the fact that students in university may undergo frequent examinations that lead to higher stress and anxiety. We found no difference between depression prevalence amongst majors within post-secondary, despite previous studies suggesting medical students experience greater depressive symptoms compared to students of other subjects. This discrepancy in findings could be explained by the fact that often times, students in liberal arts have uncertain career directions and must study a broader range of subjects, leading to lower well-being and greater anxiety over employment. Furthermore, certain studies have reported higher depression prevalence amongst female students. In our meta-regressions, gender did not have a significant effect on depression prevalence, which is corroborated with previous reviews of post-secondary students. This may be due to increased opportunity and reduced barriers for females entering higher education.

Limitations should be considered when interpreting the findings of this study. First, a substantial amount of the heterogeneity among the studies remained unexplained by the variables examined. Factors not taken into account include institutional culture, funding, timing, and university environment, which could have contributed to risk of depressive symptoms. Secondly, a wide range of diagnostic tools were used, which could contribute to the heterogeneity. For instance, across the 18 studies examined, 7 different assessment tools were used to determine depression prevalence. Thirdly, our analysis was done on papers that chose to publish aggregated data. This led to only obtaining data from certain regions in Nigeria where academic resources are presently concentrated. Thus, for future studies a multicentre prospective design with a single measure of depression would provide a better estimate of depression prevalence. Finally, due to the cross-sectional nature of findings, cause-and-effect relationships cannot be readily established. With recent government initiatives in 2018 that aim to rapidly expand undergraduate enrolment in Nigerian universities by 2023, this review serves to summarize mental health and depression research over the past 20 years within the nation. Our findings underline the importance of implementing strategies that help post-secondary students reduce anxiety and depressive symptoms as they transition to adulthood during their time in university.

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