Examining the Relationship between Depression and Regular Physical Activity among Undergraduates of University of Nigeria, Nsukka

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Abstract

Increased prevalence of depression symptoms, which is a strong predictor of suicidal behaviour and thoughts, may be connected to an increase in the rate of suicide cases among undergraduates of University of Nigeria, Nsukka (UNN). Literature suggests regular physical activity (PA) reduce depression-related symptoms and the associated negative health consequences. This study aimed to identify proportion of students experiencing depression, their levels of depression and PA levels. Also, to determine if there are differences in their depression based on fathers and mothers' levels of education, as well as determine relationship between depression and PA. A cross-sectional survey was conducted using 383 participants recruited for the study. Participants completed self-report questionnaire on Patient Health Questionnaire-9 (PHQ-9) for measuring depression severity and International Physical Activity Questionnaire-Short Form (IPAQ-SF). The result indicated 77% prevalence of depression, above one fifth of the participants experienced minimal or none depression while a good percent had mild, moderate, moderately severe and severe depression. The chi-square test of independence showed no significant difference on depression based on fathers and mothers level of education. Result on PA showed that large proportion of the participants were inactive, above half were moderately active while only a few achieved high (health enhancing) PA level. The chi-square test of independence indicated differences on PA level of participants based on fathers and mothers' levels of education. However, Kruskal-Wallis tests revealed no significant difference in participants' depression and physical activity based on fathers and mothers' education. Spearman's correlation showed strong negative relationship between PHQ-9 scores and IPAQ-SF scores. The result shows that high PA level is associated with lower depression symptoms. It was recommended that University administration should promote regular PA in all the students to mitigate depression in undergraduates.

Keywords: *Depression, Physical activity, Undergraduates, University of Nigeria Nsukka,
Students mental health*

Introduction

Depression is a global modifiable mental health problem licked to high burden of diseases that adds directly or indirectly to health care cost. Depression is a widespread health issue and one of the leading causes of disability, ranking third after heart and respiratory disorders (Ibrahim et al, 2013). Studies have reported increased prevalence of depression among university undergraduate students especially in Nigeria (Adewuya et al., 2006; Dabana & Gobir, 2018). Undergraduate students are students given admission to study various professional courses in the university after passing the Joint Matriculation Examination (JAMB). Adewuya et al. (2006) in their study on students of Obafemi Awolowo University, Ile-Ife in South-western Nigeria observed 5.6% minor depressive disorder and 2.7% major

depressive disorder. Still in Western Nigeria, Pelter et al. (2013) reported prevalence of 7.0% severe depression and 25.2% moderate to severe depression. Dabana and Gobir (2018) observed 58.2% prevalence of depression, with 37.0%, 15.7%, 3.9%, and 1.6% having mild, moderate, moderately-severe, and severe depression, respectively among Ahmadu Bello University Undergraduates, Zaria. Aluh et al. (2020) identified 44.6% prevalence of depression among undergraduate students. Anosike et al. (2022) reported 71.8% prevalence of depression.

Depression is a mood disorder which affects how individual feels, think and behave resulting in lingering feeling of sadness and loss of interest that may lead to series of emotional and physical blems (Mayoclinic, n.d.). Depression present symptoms such as bad mood, loss of interest and pleasure, feeling of guilt, low self-esteem and worth, decreased energy, poor concentration, poor appetite and disturbed or lack of sleep (Marcus et al. 2012), feeling of sadness, hopelessness or disappointment (Lotfi et al., 2015; Ibrahim et al., 2013). Several risk factors are associated with depression such as financial difficulties, being isolated from family members or other social groups, inability to cope with academic load. In addition to the above enumerated risk factors of depression, is the recent COVID-19 pandemic waves which led to closure of universities for almost one academic year, coupled with the eight months industrial strike action of Academic Staff Union (ASU) of universities in Nigeria, which seem to have elevated depression level of students. These two instances resulted in delay of academic programme of students, lead to subsequent extension of their graduation year which probably may affect students' future career plans, imposed more financial burden and subject them to crash programme.

Depression result in many negative consequences for students such as poor academic grades as it may lead to missing of classes, assignments, examination and possibly dropping a number of courses (Peltzer et al., 2013). In addition to school failure, depression may also lead to conduct disorder, and delinquency, eating disorders such as anorexia and bulimia, school phobia, panic attacks, substance abuse, suicidal ideation or actual suicide (Yalemwork, 2017). However, routine PA has been suggested to reduce negative health consequences of depression. Physical activity is any movement produced by the muscles of the body which uses energy more than the basal energy or amount of energy required at rest (WHO, 2020). PA is categorized into low, moderate and high intensity based on summation of metabolic equivalent task (METs).

Studies have shown association between physical activity and depression. Adeniyi et al. (2011) in a study on adolescents discovered that more severe depressive symptoms were linked with lower PA levels. De Mello et al. (2013) also reported that Individuals who do not engage regularly in PA are twice as likely to experience depressive symptoms compared to those who routinely participate in PA. Regular engagement in PA has been found to lower the risk of depression (Kleppang et al., 2018; Okeafor, okeafor, 2020; Pearce et al., 2022). Undergraduates PA involvement may be positively or negatively influenced by their parents' educational levels. Parents are great force and their roles cannot be over emphasized in their children's PA involvement (Smith et al., 2010). Parents play vital roles in terms of motivation, mounting pressure, providing opportunities, material, emotional and social support such as Praise, funding cost of participation, sports and exercise equipment, transportation to attend activities, trainings or competitions (Galiano et al., 2020; Weiss & Kipp, 2018). On the other hand Parents may exert negative influence by discouraging and critiquing involvement in PA (Amado et al., 2015; Lawler et al., 2022). This could be as a result time that should be spent on studies or domestics that would be diverted to PA. From the for-going, educated parents who are aware of the health benefits of PA may serve as role

model to their children by their own level of participation which can influence their children's participation. Children with high and moderate educated parents engage more in PA per week (Galiano et al., 2020).

A few studies have been conducted to determine relationship between PA and depression among university undergraduates in Nigeria but none of these was carried out in South-east Nigeria. In University of Nigeria, Nsukka cases have been reported of students who attempted taking their lives. Some of the victims locked up themselves and refused to see anybody while a few others drank chemicals such as sniper to end their lives. Given these instances, it is pertinent to conduct a study to ascertain students' depression status which would inform decision to provide needed intervention to deal with such health issues. Moreover, only one study by Mbada et el() used PHQ-9 depression scale. Okeafor and Okeafor (2020) used Becks Depression Index (BDI), hence the need to employ PHQ-9 in the present study. Furthermore, none of these studies determined the association between PA and depression or their link with undergraduates' parents' level of education.

Purpose of the Study

The purpose of the study was to investigate examine the relationship between depression and regular physical activity among undergraduates of University of Nigeria, Nsukka. Specifically, the study determined:

1. proportion of undergraduate students experiencing different levels of depression;
2. proportion of undergraduate students experiencing depression based on father and mothers' level of education;
3. level of physical activity among undergraduate students;
4. level of physical activity among undergraduate students based on fathers and mothers' level of education; and
5. relationship between depression and physical activity levels of undergraduate students.

Research Questions

1. What is the proportion of undergraduate students experiencing different levels of depression?
2. What is the proportion of students experiencing depression based on father and mothers' level of education?
3. What is the level of physical activity among undergraduate students?
4. What is the level of physical activity among undergraduate students based on fathers and mothers level of education?
5. What is the relationship between physical activity and depression?

Hypotheses

1. There is no significant difference in PA levels of undergraduates based on fathers and mothers' level of education.
2. There is no significant difference in depression level of undergraduates based on fathers and mothers' level of education

Methods

The study employed the cross-sectional survey research design and was approved by the Faculty of Education, University of Nigeria Ethics Committee. Population for the study was 36,000 undergraduate students enrolled during 2020/2021 academic session in University of Nigeria, Nsukka (Sulhazan, 2020).

Sample and sampling size technique

The sample consist three hundred and eighty three participants determined using a formula $Z^2_{\alpha/2}*P*(1-P)*D/E^2$ for sample size estimation for proportion in survey type of study (Suresh & Chandrashekara, 2015). A ten percent of the sample was added to guide against missing responses and poor return rate (Bartlett, 2001). Multi stage sampling technique was used to select the participants. First, five faculties were randomly selected out of the ten faculties in Nsukka campus and then two Departments from each of the faculties. Finally, convenience sampling was used to select forty students from eight Departments and forty nine students from the two departments in faculty of education which is the largest faculty.

Instruments for data collection

The instrument consisted of three sections (A, B & C). Section 'A' contained items that elicited information on personal data of the participants. Section 'B' was Patient Health Questionnaire-9 (PHQ-9) adopted from Kroenke (1999). The PHQ-9 scale was on 4 point likert scale of 'not at all (0), several days (1), more than half the days (2) and nearly every day (3). Scores of 0-4 is minimal or no depression, 5-9 is mild depression, 10-14 is moderate depression, 15-19 is moderately severe depression and 20-27 severe depression. Section 'C' contained the adapted International Physical Activity Questionnaire Short-Form (IPAQ-SF) assessed from www.ipaq.ki.se. Cronbach's Alpha method was used to determine reliability coefficient of the adopted PHQ-9 and IPAQ-SF which gave 0.76. and .72 respectively.

The IPAQ short form is a self-reported questionnaire that measures duration of PA on four categories including vigorous, moderate, walking (low) and sitting. Each category of PA is assigned Metabolic Equivalent Task (MET) such as 3.3 METs for walking or low PA, 4 METs for moderate PA and 8 METs for Vigorous PA. Estimation of energy expenditure for each category was calculated by multiplying the MET value for the category x duration /minutes x number of times such activity was performed in a week. The study adapted only the sections on walking, moderate and vigorous intensity activities. Participants were classified into three categories of physical activity levels based on summation of their MET values as follows: Inactive < 600 MET-min/week; minimally or sufficiently active >600 - 2999 MET-min/week and HEPA active > 3000 MET-min/week.

Data analysis
Data collected with the instrument were analyzed using the statistical Package for Social Sciences (SPSS), version 21) for descriptive statistic and testing of the hypotheses. Frequencies, percentages and chi-square were used on categorical data. Spearman correlation was used to test relationship between depression and PA while Kruskal-Wallis test was used for continuous data (hypotheses) to determine differences since the data does not yield to ANOVA because is not normally distributed.

Results

Table 1. Physical Activity levels and Depression levels of undergraduates (n = 383)

Variable	Frequency	Percentage
Physical activity levels		
Low PA	120	31.3
Moderate PA	242	63.2
High PA	21	5.5
Depression Levels		
Overall depression	295	77.0
Minimal or none depression	88	23.0
Mild depression	111	29.0
Moderate depression	74	19.3
Moderately severe depression	63	16.4
Severe depression	46	12.0

Table 1 indicates that 31.3% had low PA, 63.2% had moderate PA and only 5.5% had high PA which is the health enhancing PA. In the table prevalence of depression was 77%, 23.2% had minimal or no depression, 29.0 had mild depression, 19.3% had moderate depression, 16.4% had moderately severe depression while 12% had severe depression.

Table 2: Physical Activity levels and Depression levels of undergraduates based on father and mothers' level of education (n = 383)

Variable	N	Minimal	Mild	Moderate	Moderate Severe		Severe	
		f(%)	f(%)	f (%)	f	%	f	%
Father education								
Non-formal	28	11(12.4)	5(4.5)	3(4.1)	7(11.1)		2(4.3)	
Primary	44	16(18.0)	10(9.0)	5(6.8)	9(14.3)		4(8.7)	
Secondary	97	20(22.5)	30(27.0)	23(31.1)	16(25.4)		8(17.4)	
Tertiary	214	42(47.)	66(59.5)	43(58.1)	31(49.2)		32(69.6)	
Mother Education								
Non-formal	19	7(7.9)	6(5.4)	2(2.7)	4(6.3)		0(0)	
Primary	26	6(6.7)	5(4.5)	4(5.4)	9(14.3)		2(4.3)	
Secondary	108	29(32.6)	32(28.8)	22(29.7)	18(28.6)		7(15.2)	
Tertiary	230	47(52.8)	68(61.3)	46(62.2)	32(50.8)		37(80.4)	

Table 3: Chi-square test determining the differences in depression levels of undergraduates based on fathers and mothers' levels of education (n = 383)

Variable	N	X^2	Df	p-value	Phi/cramer v
Father education	383	19.300[a]	12	.08	.13
Mother Education	383	19.904[a]	12	.07	.13

Key: N = number of participants in each group; X^2 = chi-square test of independence, df = degree of freedom; p-val = p-value, phi/cv = effect size; cv = cramer's V

In Table 3. Chi-square test showed no significant association between depression levels and fathers and mothers' education, X^2 (6, n = 383) = 19.300, p = .08 and X^2 (6, 383) = 19.904, p = .07.

Table 4: Chi-square test determining the differences in physical activity levels of undergraduates based on fathers and mothers levels of education (n = 383)

Variable	N	X^2	Df	p-value	Phi/cramer v
Father education	**383**	**13.261**	**6**	**.04**	**.13**
Mother Education	**383**	**13.642ᵃ**	**6**	**.03**	**.13**

Key: N = number of participants in each group; X^2 = chi-square test of independence, df = degree of freedom; p-val = p-value, phi/cv = effect size; cv = cramer's V

In Table 4 Chi-square test indicated significant association between PA levels and fathers and mothers education, X^2 (6, n = 383) = 13.261, p = .04 and X^2 (6, 383) = 13.642, p = .03.

Table 5: Kruskal-Wallis test determining association between depression total scores and undergraduates Fathers and Mothers levels of education (n = 383)

Variable	N	Mean Rank	Median	H(x²)	Df	*p-value*
Father education						
Non-formal	28	**172.02**	**7.50**			
Primary	44	**177.33**	**7.50**	**2.354**	**3**	**.50**
Secondary	97	**190.94**	**9.00**			
Tertiary	214	**198.11**	**9.00**			
Mother education						
Non-formal	19	**149.76**	**6.00**			
Primary	26	**204.63**	**11.00**	**5.947**	**3**	**.11**
Secondary	108	**178.78**	**8.00**			
Tertiary	230	**200.27**	**9.50**			

Key: N = number of participants in each group; H(X^2)=Kruskal-Wallis H test (chi-square); df= Kruskal-Wallis degree of freedom; p-al = p-value

In Table 5 Kruskal-Wallis test showed no significant difference between total depression scores across four different educational levels of and father and mother. For father (group1, n = 28: non-formal, group 2, n = 44: primary, group 3, n = 97: secondary, group 4, n = 214: tertiary) X^2 (2, n = 383) = 2.354, p = .50. For mother ((group 1, n = 19: non-formal, group 2, n = 26: primary, group3, n = 108: secondary, group 4, n = 230: tertiary) X^2 (2, n = 383) = 5.947, p = .11.).

Table 6: Kruskal-Wallis test determining association between total physical activity total scores and undergraduates Fathers and mothers level of education (n = 383)

Total PA score (MET-min/week)						
Variable	**N**	**Mean rank**	**Median**	**H(x²)**	**Df**	***p-value***
Father education						
Non-formal	28	207.32	1248.00			
Primary	44	196.85	1215.00	**.745**	**3**	**.86**
Secondary	97	188.76	1095.00			
Tertiary	214	190.47	1125.00			
Mother education						
Non-formal	19	219.63	1187.00			
Primary	26	181.37	1009.00	1.731	3	.63
Secondary	108	196.02	1156.50			
Tertiary	230	189.03	1125.00			

Key: **H(Z²)=Kruskal-Wallis H test; df= Kruskal-Wallis degree of freedom; P-al = P-Value**

In Table 6 Kruskal-Wallis test showed no significant difference between total PA scores across four different educational levels of and father and mother. For father (group 1, n = 28: non-formal, group 2, n = 44: primary, group 3, n = 97: secondary, group 4, n = 214: tertiary) X^2 (2, n = 383) = .745, p = .86. For mother ((group 1, n = 19: non-formal, group 2, n = 26: primary, group3, n = 108: secondary, group 4, n = 230: tertiary) X^2 (2, n = 383) = 1.731, p = .63.).

Table 7: Spearman correlation Analysis of PA levels scores and PHQ-9 Scores

Variable	Mean	SD	1	2	3	4	5
TPHQ-9(overall)	10.29	6.42	-				
IPAQ-SF TPA MET min/wk	1221.08	777.03	-.83**	-			
IPAQ-SF LPA[a]	528.99	347.97	-.53**	.56**	-		
IPAQ-SF MPA[b]	277.43	325.51	-.51**	.70**	.15**	-	
IPAQ-SF HPA[c]	408.76	43375.	-.63**	.75**	.12*	.39**	-

Table 7 showed significant negative relationship between depression (TPHQ-9) and different levels of physical activity, with IPAQ TPA (rho = -.83), IPAQ LP (rho = -.53), IPAQ MPA (rho = -.51) and IPAQ HPA (rho = -.63).

Discussion

In Table 1 the overall proportion of undergraduate students experiencing depression was 77%. The table also shows that students experienced different levels of depression ranging from 29.0% mild, 19.3% moderate, 16.4% moderately severe and 1.0% severe depression respectively. This is a clear indication of increase in prevalence of depression among university students since 2006 till date. In 2006, Adewuya et al. in their study among Obafemi Awolowo university students observed 5.6% minor depressive disorder and 2.7% major depressive disorder. In 2013, Pelter et al. in their study in western Nigeria reported prevalence of 7.0% severe depression and 25.2% moderate to severe depression. Dabana and

Gobir (2018) in their research among Ahmadu Bello University students observed increased prevalence of 58.2% depression, with 37.0%, 15.7%, 3.9%, and 1.6% of mild, moderate, moderately-severe, and severe depression, respectively. Aluh et al. (2020) in a study among Nigeria adolescents identified 44.6% prevalence of depression. Anosike et al. (2022) reported 71.8% prevalence of depression among medical and nursing students in a Nigeria University. These different years' reports have portrayed a growing prevalence of depression among undergraduates. In fact in the present study, I expected majority of the undergraduates would have severe depression given the odd times they passed through during different waves of COVID-19 pandemic and the eight months industrial strike action of Academic Staff Union (ASU) of universities in Nigeria which multiplied their depression risk factors.

Table 1 also revealed that only 5.5% of the undergraduate students achieved high PA level which is the health enhancing PA level. This very low proportion of students who attained the health enhancing PA level has varied health implication for the undergraduate students. This could be a possible explanation of why undergraduate students were victims of various levels of depression in Table 1 which highlighted 29.0%, 19.3%, 16.4% and 12% of mild, moderate, moderately severe and severe depression. This claim is further supported by the significant negative relationship that exists between depression and PA in Table 7, which suggests that depression increases when PA level is low. This finding is in line with previous studies that a relationship exists between physical activity and depression. The result also supports Adeniyi et al. (2011) that more severe depressive symptoms were linked with lower PA levels. The result is equally in accordance with De Mello et al, (2013) that Individuals who do not engage regularly in PA are twice as likely to experience depressive symptoms compared to those who routinely participate in PA. This result lends credence to the views of Kleppang et al. (2018); Okeafor & okeafor, (2020) ; Pearce et al, (2022) that regular engagement in PA helps to lower the risk of depression. Although, literature evidences show that accumulation of low volume of the recommended PA volume can reduce depression (Pearce et al., 2022; Slomski, 2022). It is vital for the students to achieved the recommended PA guideline of moderate to vigorous PA done at least for 30 minutes five days weekly (health enhancing volume of PA which is above 3000 METs).

In Table 3 no significant association was observed between students' depression and their parents' academic status, implying that irrespective of parents' education, student may experience depression if subjected to depressive situations. In Table 4 a strong association was observed between undergraduates PA level and their parents' level of education. This supports the claim of previous studies that undergraduates PA involvement may be positively or negatively influenced by their parents' educational levels. This is in agreement with Smith et al. (2010) that parents are great force, and their roles cannot be over emphasized in their children's PA involvement. Parents especially very enlightened ones, play vital roles in terms of motivating, providing opportunities, material, emotional and social support such as Praise, funding cost of participation, sport and exercise equipment, transportation to attend activities, trainings or competitions (Galiano et al., 2020; Weiss & Kipp, 2018). On the other hand some of the undergraduates who failed to achieve health enhancing level of PA may have the types of parents who exert negative influence by discouraging and critiquing involvement in PA

(Amado et al., 2015; Lawler et al., 2022). This could be as a result of feeling that their children are wasting time that should be spent on studies or domestics. Suffix to say that educated parents who are aware of the health benefits of PA serve as role model to their children by their own level of participation which influences their children's participation in PA. Children with high and moderate educated parents are expected to engage more in PA (Galiano et al., 2020).

Conclusion

Only a few undergraduate students achieved the health enhancing PA level, majority were moderately active while over one-third were inactive. Different levels of depression were observed from the study participants. It was therefore recommended that the university administration should develop policies that will compel students to engage in regular PA as well as go for routine screening services at the primary health care centers. Also, further research studies on family income need to be conducted because it could predispose students to depression.

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