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Depressive symptoms among in-school adolescents in north- western Nigeria

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Abstract
Objectives: To assess depressive symptoms among in-school adolescents in Sokoto metropolis, the factors associated with depression, and the independent predictors of depressive symptoms in the affected subjects.
Materials and Methods: A cross sectional survey of secondary school students in Sokoto metropolis via multistage random sampling, using the Patient Health Questionnaire (PHQ-9) modified for Adolescents (PHQ-A). Data was analyzed using Statistical package for social sciences (SPSS) version 23.
Results: Respondents consisted of 312(53.8%) males and 268(46.2%) females, with male to female ratio 1.2: 1. Their ages ranged between 10 and 19 years with mean (±SD) of 15± 2.6 years. Most (62.1%) of the subjects attended public schools, their parents were mainly Hausa by tribe (79.7%), traders, (33.1%), graduates (37.6%), married (96%), and majority (44.7%) belonged to the middle socioeconomic class. One hundred and twenty eight (22.1%) of the 580 subjects had various degrees of depressive symptoms with majority 83(64.8%) of them having mild depression. Logistic regression analysis showed that age category 15-17 years (p=0.006), school type (p=0.03), family history of mood disorder (p<0.001), somatic symptoms (p<0.001), parent factor (p<0.001), self –rated poor academic performance (p<0.001), bullying (p=0.02), and emotional stress (p<0.001), were independent predictors of depressive symptoms among the subjects.
Conclusion: Depressive symptoms were high among the respondents and multiple factors were independently associated with the symptoms.

Keywords: depressive symptoms, adolescents, in-school, Sokoto, Nigeria

Introduction

Adolescence is a developmental period in the life of normal human beings through which a child passes into adulthood [1]. It is said to be a period of rapid biological, intellectual and psychosocial development which is largely determined by genetic, hormonal and environmental factors, it is heralded by puberty and ends at maturity [1]. Psychosocially, they deal continuously with issues of achievement and competence, with other concerns relating to their identity, autonomy, sexuality and social status among others [2]. Adolescents have also been observed to lack the services that respond to their distinctive needs, as interventions for children very often focus on the younger ages while other programs focus on adults [3]. Compromising their health needs could result into outcomes such as depression, low self -concept, and suicidal ideation if not identified and managed on time [1]. Adolescents have the tendency of being unable to discuss their problems with others probably because they are yet to identify their confidants, or perhaps they do not understand the nature of the problems they encounter and keep seeking for answers, a situation that further subject them to emotional stress. This tendency could have grave consequences as problems are likely not to be identified or could be misunderstood by family, friends and other persons in the society, resulting in deterioration in their health status including the risk of occurrence of depression.

Depression is defined as a state of low mood and aversion to activity [4]. Depression was previously unrecognized and symptoms suggestive of depression were thought to be normal occurrence during the period of adolescence [5]. However, depression has recently been documented as the most common form of emotional problem experienced during adolescence which may be accompanied by inappropriate guilt or regret, worthlessness, hopelessness, and confused thinking [6, 7]. Major depressive disorder is said to be increasingly common among adolescents in well-resourced countries with an estimated prevalence of 5.6% and higher among females [8]. The life time prevalence of up to 20% have been reported with about 8% of youth with adolescent onset depression estimated to have completed suicide by young adulthood, and a five-fold risk of attempting suicide compared to non-depressed adolescents [9-11]. In resource constraint countries including Eastern and Western parts of Nigeria, studies have reported the prevalence of depressive symptoms among adolescents to range from 2.3% to 36.6%, depending on the severity of symptoms [12-16]. Female gender has been reported as a factor increasing the risk of depression among adolescents. Reasons ranging from biological, hormonal to genetic factors have been suggested as the possible causes of these occurrences [14, 16, 17].

There appears to be limited studies in depression among adolescents in the northern region of Nigeria, with no known documented study in Sokoto, North –Western Nigeria to the best of the researchers' knowledge. Cultural, traditional and religious factors may be attributable to the dearth of information concerning depression, as sensitive issues with socio cultural implications may be discovered and reported. Adolescents constitute about 27% of the population in the study location, which has been categorized as one of the states in Nigeria with high religiosity and

apparent peace and harmony among the inhabitants [18]. The receptive nature of the State might be viewed as an advantage to the adolescents as it provides an enabling environment for their survival and development. However, they may suffer from depression in silence because they are expected to exhibit attitudes such as resigning to fate, patience in times of hardship, as well as tolerance in adversity, which at times could be detrimental to their very own health and existence. Focusing on in-school adolescents in this study was deliberate because schools serve as primary institutions outside the family within which health problems of adolescents such as depression can be investigated and tackled. This study was conducted with the objective of assessing depression among in-school adolescents in Sokoto metropolis, the factors associated with depression by affected students if any, and the independent predictors of depressive symptoms among the subjects. The findings from the study is hoped to bring to fore, the occurrence or otherwise of depression among adolescents in the study location, and the need to map out strategies for early detection and intervention by stakeholders if found to be in existence.

Materials and methods

Study area

The study was conducted in Sokoto metropolis, the Capital of Sokoto State, created in 1976 out of the former Northwestern State. The metropolitan city of Sokoto lies between latitudes 10^{O} and 14^{O}N, and longitude $3^{O}3^{1}$ and $7^{O}7^{1}$ east of the equator, and covers an area of 60.33 square kilometers. The town has within it, three Local Government Areas (LGAs) which include Sokoto-North, Sokoto-South and Wamakko LGAs. There were 47 (28 public and 19 private) secondary schools in the metropolis and 27 of them were co-educational. Sokoto-North LGA had 15(7 public and 8 private) secondary schools, Sokoto- South LGA had 19(14 public and 5 private) secondary schools and Wamakko LGA had 13(7 public and 6 private) secondary schools. Islam is the predominant religion of the people. The major indigenous tribes in the State are Hausa and Fulani, with few non- indigenous tribes also represented. Major occupation of the inhabitants include trading, farming and civil service. Hausa language is generally spoken, with English as the official language of the State. The total population of people in Sokoto metropolis was 506,241.99 based on 2006 census figures with a projected population of 721,780.03 in 2018 at an annual growth rate of 3.0% [18]. The total population of adolescents aged 10-19 years in the metropolis was 136,900 [18] with a projected population of 195,186.67 in 2018.

Study design and subjects

The study was a cross sectional survey that was conducted between January and April 2018 in secondary schools in Sokoto metropolis, Sokoto State, Nigeria. Multi-stage random sampling technique was employed in selecting the participating schools. The schools were stratified based on LGA's into co-educational (27) schools and non-coeducational (20) schools. Further stratification per LGA was done by line listing the schools into public and private schools. Simple random sampling method (balloting technique) was used to select 6 secondary schools from the coeducational schools (one public and one private school from each of the three LGA's) following 20% proportional allocation. The desired sample size was allocated proportionally to the randomly selected schools based on the pupil population. Six class levels were identified per selected school, and an arm from each class level was randomly selected by balloting. Students from each arm were selected by systematic random sampling technique, with investigators ensuring proportional allocation of gender. The study comprised of assenting randomly selected apparently healthy secondary school adolescents aged between 10 years and 19 years whose parents or guardians consented to the study, and who satisfactorily completed the questionnaire. Critically ill adolescents during the study period, those with previous history of psychiatric illness, and current or previous history of ingestion of antidepressant medications ascertained from information sought on past medical history, were excluded from the study.

Sample size determination

The minimum sample size for the study was calculated using the formula for qualitative cross-sectional study [19]. A proportion of 50% was used because of the absence of a reasonable estimate of depression in the target population in the study area. The degree of accuracy was also set at 0.05. A minimum sample size of 384 was arrived at, which was increased to 429 in anticipation of 90% response rate. However, because of the non-invasive nature of the study, the researchers enhanced the calculated sample size by 50%, of the minimum sample size to a total of 621.

Data collection

The selected schools were visited before the commencement of the study. This provided the investigators an opportunity to establish rapport with the Principals and other relevant staff, to discuss the significance, nature and requirements for the study, as well as identifying a vacant room for the conduct of the study. On the day of the commencement of the study in each school, the investigators were introduced by the principal or a representative, to the students and teachers during the assembly period. Free periods for data collection were identified per school, which were mostly morning break time, and detailed information about the study was given to the students from the selected classes.

Subjects that satisfied the inclusion criteria were recruited into the study. Designed pretested semi-structured questionnaires were distributed to the parents and guardians of the randomly selected students, through the school teachers. Information sought included; age, gender, address, ethnicity and socio-economic status of parents and guardians using Oyedeji classification [20]. Other information sought included parent/guardian's marital status, family setting (monogamy/polygamy), family history of depression, previous history suggestive of psychiatric illness in the subject, and subject's drug history. A separate questionnaire containing questions adapted from health behaviour in school children study, (a school based anonymous survey of adolescents in Europe) was administered to the subjects [21]. Information sought included; self -image, diet, exercise, injuries, self-rated academic performance and pressures, attitude about school, fighting and bullying, and substance use.

For the purpose of this study, data on depressive symptoms occurring or otherwise among respondents for two or more consecutive weeks in the last 12 months was obtained using

the Patient Health Questionnaire (PHQ-9) modified for Adolescents (PHQ-A), which is a nine item questionnaire that screens for depression [22]. For each item, the responses range from not at all (score of 0) to nearly every day (score of 3). The total scores range from 0-27, and the cut off score suggestive of depressive symptoms is five. The grading of depressive symptoms range from mild to severe with higher scores indicating greater severity of depression. The PHQ-A Questionnaire has been validated for use as a screening tool for depressive symptoms in Nigerian students [23]. It is also said to be useful in monitoring treatment in diagnosed patients in the primary healthcare setting [22]. Students identified to have mild depressive symptoms were referred by the investigators for counselling by the school guidance and counsellors. Those with moderate, and moderately severe symptoms were referred to the Psychiatry department of UDUTH Sokoto for further evaluation, management and follow –up.

Ethical considerations

Ethical approval for the study was obtained from the Ethics Committee of Usmanu Danfodiyo University Teaching Hospital (UDUTH) Sokoto. Approval to conduct the study was also obtained from the Sokoto State ministries of Education/ Science and Technical Education, the school authorities concerned. An Informed written consent and assent was sought and obtained from the parents/ guardians, and the study participants respectively. The interviews were scheduled to take place during morning break sessions to avoid undue disruption of students' academic activities. Privacy was ensured by attending to study participants one at a time, in a class designated for the purpose of the study. The data obtained were treated with utmost confidentiality. Results were communicated to the study participants on an individual basis. The parents/guardians were informed of the results contained in a letter, sealed in an envelope and directly delivered to them by the class teachers.

Data analysis

Statistical package for social sciences (SPSS) version 23.0 was used to analyze the data. Data entered was carefully checked to eliminate multiple or wrong entries and outliers. The prevalence of depressive symptoms was presented as percentage while the age distribution of the subjects was analyzed and expressed as mean and standard deviation. Frequency distribution tables were used to illustrate results. Chi square test was used to determine the association between socio-demographic variables and depressive symptoms, and Fisher's exact test was used as applicable. Logistic regression was used to determine the variables that were independently associated with depression. The level of statistical significance was set at 5%, which is p-value < 0.05.

Results

Six hundred and twenty one subjects were recruited from six secondary schools (3 public and 3 private) into the study. However, 41 subjects were excluded either as a result of acute ill-health during the study period (12), withdrawal of parental consent to participate in the study (9), or incomplete data (20). Therefore, 580 subjects (360 public school students and 220 private school students) were interviewed, giving an overall participation rate of 93.4%.

Demographic characteristics of the study population

Of the 580 subjects that participated in the study, 312 (53.8%) were males and 268 (46.2%) were females. The male to female ratio was 1.2: 1. Their ages ranged between 10 and 19 years with mean (±SD) of 15± 2.6 years. Majority (41.4%) of the subjects were within the age group of 10-14 years however, this was not statistically significant (p= 0.43). Most (62.1%) of the subjects attended public schools, and were in senior secondary class (53.4%). Their parents were mainly Hausa by tribe (79.7%), traders, (33.1%), graduates (37.6%), married (96%), and majority (44.7%) of them belonged to the middle socioeconomic class. (Table I).

Prevalence of Depressive symptoms

One hundred and twenty eight (22.1%) of the 580 subjects had various degrees of depressive symptoms with majority 83(64.8%) of them having mild depression. The other categories of depressive symptoms among respondents were moderate 39 (30.5%) and moderately severe 6(4.7%) symptoms. None of the students had severe depression. Those in the age category 15-17 years had higher 59(30.3%) prevalence of depression. Male subjects had higher prevalence 71 (22.8%) of depression. The prevalence of depression was higher in public schools 90(25.0%) and among senior secondary school students 73(23.5%). Eighteen (3.1%) of the studied subjects had positive family history of mood disorder among first degree family relations.

Perceived causes of depressive symptoms

The causes of depression as perceived by subjects manifesting with depressive symptoms were mainly emotional stress 25(19.5%), perceived ill health 20(15.6%), parental demise 13(10.2%), parental pressure 5(3.9%), self-rated poor academic performance 9(7.0%), poor self - concept 7(5.5%), and a combination of the aforementioned factors 27(21.2%). Others were bullying 4(3.1%) parental separation, neglect, and disharmony 3 (2.3%), 3(2.3%) and 1(0.8%) respectively, and unidentified factors in 11(8.6%) subjects.

Association of Socio-Demographic variables with depressive symptoms

Age category 15-17 years was significantly associated with depression (p=0.003). There was no association between gender and depression (p=0.689). There was significant association between school type (p=0.03), family history of mood disorder (p<0.001), somatic symptoms (p<0.001), parent factor (p<0.001), poor self –concept (p<0.001), self-rated poor academic performance (p<0.001) bullying (p=0.002), emotional stress (p<0.001), and depression. No association between class being junior or senior secondary (p=0.36), parental education (p=0.74), parental occupation (p=0.37), social status (p=0.18), substance use (p=0.93), exercise (p=0.06) and depression.

Factors independently associated with depressive symptoms

The socio-demographic variables that were significantly associated with depression on chi-square analysis were further subjected to logistic regression analysis (backward conditional) with depression as the dependent variable. The independent variables were age group category, school type, family history of depression, somatic symptoms, parent

factor, poor self -concept, and self- rated poor academic performance, bullying, and stress. Logistic regression analysis showed that age category 15-17 years (p=0.006), school type (p=0.03), family history of mood disorder (p<0.001), somatic symptoms (p<0.001), parent factor (p<0.001), self –rated poor academic performance (p<0.001), bullying (p=0.02), and emotional stress (p<0.001), remained independent predictors of depressive symptoms among the studied subjects.

Discussion

The results of this study has shown that depressive symptoms does exist among adolescents in the study location, despite the apparently peaceful co-existence, as well as the practice of cultural and religious values. The prevalence rate of depressive symptoms of 22.1% in this study is comparable to those of 21.2% reported by Fatiregun *et al* in a study of depressive symptoms among school adolescents in a rural community in South-Western Nigeria, the prevalence rate of 22.45% reported by Trivedi *et al* in a study of depression among adolescent students in South India and the rate of 20.3% reported among students in Brazil [14, 24, 25]. The similarity in the prevalence rates of our study to those of the studies conducted in India and Brazil is despite the fact that different tools were used to assess depressive symptoms in all studies. Unlike in this study, Trivedi *et al* applied the Beck Depression Inventory, while Saint-Clair used the Children's Depression Inventory [28, 29].

The prevalence rate of depressive symptoms in this study is however, in contrast with reports from other studies where lower rates of 16.3%, 13.0%, and 6.4% were reported by Oderinde *et al*, Njoku, and Chinawa *et al* in Southern and Eastern Nigeria, respectively, and a higher prevalence rate of 26.4% was reported by Khasakhala *et al* in Nairobi [13, 15, 16, 26]. Although Oderinde *et al* used PHQ-A as well as Kiddies- Schedule for affective disorders and Schizophrenia (Kiddies-SADS), which is designed to assess current and past episodes of psychopathology in children and adolescents according to Diagnostic and Statistical Manual of Mental Disorders third and fourth edition criteria [29], their study considered only the current episode in the last one month, rather than current and past episodes of depressive symptoms. The inconsistencies in the prevalence rates of depressive symptoms reported by studies have been linked to differences in the methodology in terms of screening tools with diverse cut-off points, sampling methods, age category of subjects, and sampling frames [30]. It is worthy of note however, that this study raises question about assertions regarding difference in prevalence rates occurring as a result of variation in study instruments.

The increasing prevalence of depression with age among adolescents and especially middle adolescents as demonstrated in this study is comparable to reports from other studies [12, 13, 21, 25, 26, 30]. The reasons for this finding could be that they are often faced with increasing challenges of trying to develop capacity for critical analysis of life situations, experimenting their personality, trying to delineate between their opinion from those of other individuals around them, in addition to academic and interpersonal pressures from parents which could be quite overwhelming and distressing [1, 30]. Societal expectations from older adolescents compared to the younger ones as well as hormonal factors have also been suggested as stressors that could produce behavioural and neural signs of depression by sensitizing the brain to the harmful effects of stress [14, 31].

This study reports no significant difference in the prevalence of depression among males and females. The finding is consistent with those of other reports [26, 30] but contrast with many other studies in which depression had been reported to be significantly more common among female adolescents [12-17, 32, 33]. The absence of significant difference in gender specific prevalence in this study suggests that the adolescents in this study irrespective of their gender, are exposed to similar risk factors for depression by virtue of their changing biological, emotional, and hormonal conditions in addition to the social and environmental factors. The threshold for adapting to these conditions might however differ, but not so apparent as to determine who amongst them eventually develops depressive symptoms. Other yet unidentified factors may be responsible for the findings of the aforementioned contrasting studies.

Socio-economic class, parental education or occupation were not significantly associated with depressive symptoms in this study and this finding is in consonance with reports from other studies [12, 13, 33]. Other studies have reported an association between low socio-economic status, parental low level of education and depression [26, 34, 35]. The finding in this study suggests that parental socio-economic status is less likely to be an important factor to consider in evaluating the risk factors for depression among adolescents in the study location. There was strong association between family history suggestive of mood disorder and depressive symptoms among adolescents in this study. Although validating the information on positive family history of mood disorder in this study could not be done, early depression has been said to be associated with family history of mood disorders in addition to other psychiatric illnesses [33, 36, 37].

Somatic symptoms been independently associated with depressive symptoms in this study is comparable to studies from USA and Iran [21, 33]. Perhaps, this finding could mean that manifesting with frequent somatic symptoms to address difficulties rather than adopting a problem solving approach could with time, result to depressive symptoms if left unchecked. Frequent internalization of symptoms have been identified as a stressor and a risk factor for depression [21]. Attempts to meet up with societal demands and expectations in the face of growing physical, psychological and socio-economic challenges are other factors to consider. Like in previous studies [16, 23, 26, 30, 33] factors such as parental demise, disharmony, separation, neglect, and pressure were found to be significantly associated with depressive symptoms in this study. Reasons for this observation have been linked to such set-ups as depriving adolescents of secure and loving relationships with their parents, and these are protective factors that reduce the rate of emotional disorders among adolescents [13]. Unfavorable parent-child relationship could result in lack of confidence in parents thereby discouraging adolescents from sharing sensitive issues concerning them with their parents. Additionally, provision of basic needs could be quite challenging in the absence of either or both parents or parental discord, thereby resulting to neglect of these adolescents with subsequent development of psycho-social stress and depression.

Poor self-rated academic performance as an independent predictor of depression in this study is similar to reports

from other studies [12, 34]. Academic achievement in today's world is a determinant of future occupational opportunity and independent source of income and livelihood. The perceived possibility of not being able to achieve these milestones in life due to early poor academic performance could be important enough to predispose adolescents to depressive symptoms. Bullying being associated with depression in this study is in consonance with the study by Saluja *et al* in USA where higher frequency of bullying either as victims or perpetrators was associated with higher proportion of depression [21]. The feeling of social isolation among those who are bullied has been thought to increase the risk of depression in them [12]. In this study, the association of emotional stress and depression is not surprising considering the aforementioned related factors ranging from somatic symptoms through parental factors to poor academic performance amongst others.

The cross-sectional nature of our study is a limitation because exposure and outcome were assessed the same time, thereby making it not possible to determine causal relationships. Variables such as family history of mood disorder and somatic symptoms could not be validated as our study relied on recall which could be associated with bias. The assessment of academic performance among respondents was based on self-reports and not reports obtained from the school records. Depressive symptoms in this study does not imply clinical diagnosis of depression because conditions needed to meet the criteria for depression were not assessed and other conditions apart from depression could have been the reason for the symptoms experienced by the respondents.

Table 1: Demographic characteristics of the subjects (N=580)

Variables	Frequency (n)	Percentage (%)
Age group (Years)		
10-14	240	41.4
15-17	195	33.6
18-19	145	25.0
Gender		
Male	312	53.8
Female	268	46.2
School type		
Public	360	62.1
Private	220	37.9
Class groups		
JSS Class	270	46.6
SSS Class	310	53.4
Ethnicity		
Hausa	462	79.7
Yoruba	33	05.7
Igbo	20	3.4
Others	65	11.2
Parent's marital status		
Single	00	0.00
Married	557	96.0
Divorced	06	1.10
Widowed	17	2.90
Caregivers educational status		
Tertiary	218	37.6
Secondary	222	38.3
Primary	063	10.9
None / Arabic school	077	13.3
Caregivers occupation		
Professionals, Senior civil servants, Large scale businesses, contractors	266	45.9
Intermediate level civil servants	143	24.6
Artisans, Drivers	041	07.1
Petty traders, messengers, laborers	082	14.1
Subsistence farmers, Students	032	05.5
Unemployed, retired	016	02.8
Socio-economic status		
Lower	165	28.4
Middle	259	44.7
Upper	156	26.9

Table 2: Prevalence of depressive symptoms among respondents (N=580)

Variables	Depression (n)	No depression (n)	Total (N)	Prevalence (%)
Age group (Years)				
10-14	44	196	240	18.3
15-17	59	136	195	30.3
18-19	25	120	145	17.2

Total	128	452	580	22.1
Gender				
Male	71	241	312	22.8
Female	57	211	268	21.3
School type				
Public	90	270	360	25.0
Private	38	182	220	20.9
Class group				
JSS Class	55	215	270	20.4
SSS Class	73	237	310	23.5

Table 3: Association of Socio-Demographic variables with depression

Variables	Depressed (%)	Not depressed (%)	Chi square (X^2)	DF	p-value
Age-group (Years)					
10-14	44 (18.3)	196 (81.7)			
15-17	59 (30.3)	136 (69.7)	11.513	2	0.003
18-19	25 917.2)	120 (82.8)			
Total					
Gender					
Male	71 (22.8)	241 (77.2)	0.186	1	0.689*
Female	57 (21.3)	211 (78.7)			
School type					
Public	90 (25.0)	270 (75.0)	4.741	1	0.029
Private	38 (17.3)	182 (82.7)			
Class group					
JSS Class	55 (20.4)	215 (79.6)	0.847	1	0.368*
SSS Class	73 (23.5)	237 (76.5)			
Ethnicity					
Hausa	103 (22.3)	359 (77.7)			
Yoruba	04 (12-1)	029 (87.9)	2.257	3	0.521
Igbo	005 (25.0)	015 (75.0)			
Others	016 (24.6)	049 (75.4)			
Parent's marital status					
Married	113 (20.3)	444 (79.7)			
Divorced	004 (66.7)	002 (33.3)	25.936	2	<0.001
Widowed	011 (64.7)	006 (35.3)			
Caregiver's educational status					
Tertiary	047 (21.6)	171 (78.4)			
Secondary	052 (23.4)	170 (76.6)	1.970	4	0.741
Primary	012 (19.0)	051 (81.0)			
None / Arabic school	017 (22.1)	060 (77.9)			
Social class					
Lower	042 (25.5)	123 (74.5)			
Middle	048 (18.5)	211 (81.5)	3.458	2	0.177
Upper	038 (24.4)	118 (75.6)			
Family history of mood disorder					
Yes	016 (88.9)	002 (11.1)	48.226	1	<0.001*
No	112 (19.9)	450 (80.1)			
Somatic symptoms#					
Yes	041 (62.1)	025 (37.9)	69.466	1	<0.001*
No	087 (16.9)	427 (83.1)			
Poor academic performance					
Yes	028 (54.9)	23 (45.1)	35.049	1	<0.001*
No	100 (18.9)	429 (81.1)			
Parent-factor**					
Yes	034 (79.1)	009 (20.9)	87.739	1	<0.001*
No	094 (17.5)	443 (82.5)			
Poor Self -concept					
Yes	022 (100.0)	000 (00.0)	80.750	1	<0.001*
No	106 (19.0)	452 (81.0)			
Bullying					
Yes	004 (80.0)	001 (20.0)	9.842	1	0.002*
No	124 (21.6)	451 (78.4)			
Emotional Stress					
Yes	042 (70.0)	018 (30.0)	89.396	1	<0.001*
No	086 (16.5)	434 (83.5)			
Substance use					

Yes	003 (23.1)	010 (76.9)	0.008	1	0.574*
No	125 (22.0)	442 (78.0)			
Exercise					
Yes	95 (30.3)	314 (69.7)	5.60	2	0.060
No	33 (19.3)	138 (80.7)			

Key: DF= Degree of freedom
*Fisher's Exact Test
#regular non-specific symptoms of headache, backache, abdominal discomfort, feeling of unwell.
** Parental demise, disharmony, separation, neglect, pressure.

Table 4: Factors independently associated with depression

Variable	B	S.E	OR (95%CI)	p-value
Age group	-0.733	0.270	0.480(0.283 0.814)	0.006
School type	-0.468	0.216	0.626(0.410-0.956)	0.030
Family history of mood disorder	-3.470	0.757	0.031(0.007-0.137)	<0.001
Somatic symptoms#	-2.086	0.280	0.124(0.072-0.215)	<0.001
Parent factor*	-2.879	0.392	0.56(0.260-0.121)	<0.001
Poor self -concept	-22.653	8569.170	0.000(0.000)	0.998
Poor academic performance	-1.653	0.303	0.191(0.106-0.346)	<0.001
Bullying	-2.677	1.123	0.069(0.008-0.621)	0.020
Emotional stress	-2.466	0.305	0.857(0.047-0.155)	<0.001

Key: B=Unstandardized beta; S.E= Standard error; OR= Odds ratio; CI= Confidence interval
#Regular non-specific symptoms of headache, backache, abdominal discomfort, feeling of unwell.
* Parental demise, disharmony, separation, neglect, pressure.

Conclusion
It is obvious that multiple stressor factors exist among adolescents in this study and depressive symptoms need to be given priority in terms of early identification of risk factors and symptoms by periodic screening of the adolescents, as well as adequate intervention to forestall the immediate and future consequences associated with depression. Addressing factors such as ensuring an appropriate child-parent relationship, identifying academically weak adolescents and putting in-place strategies to assist in improving their performance by parents and teachers, encouraging good interpersonal relationships between student-student and student teacher pairs and tackling bullying as an unacceptable behaviour in addition to sensitizing all stakeholders on the fact that depressive symptoms exist among adolescents in the study location and possibly beyond, will go a long way in improving the current reality of high prevalence of depression among the adolescents.

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Author Contribution
Fatima Bello Jiya: Conceptualization, study design, data analysis, writing original draft
Paul Kehinde Ibitoye, Nma Muhammed Jiya, Bilkisu Ilah Garba: writing, reviewing, editing
Jibrin Baba, Adamu Asma'u, Isezuo Khadijat O: Data collection, analysis and interpretation.
All authors approved the submission of the final draft.

Conflicts of interest
The authors declare that they have no competing interests.

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