

# Prevalence and Factors Associated with Psychological Distress Among Adolescents in Sierra Leone in 2017

Tchedie Etdechie Elvyre Klikpo<sup>1</sup>, Alphonse Kpozehouen<sup>2</sup>, Yolaine Glele Ahanhanzo<sup>2</sup>,  
Lucrece Anagonou<sup>3</sup>, Emilie Fiossi Kpadonou<sup>3</sup>, Dismand Houinato<sup>4</sup>, Josiane Ezin Houngebe<sup>1</sup>,  
Roger Salamon<sup>5</sup>

<sup>1</sup>Adult Psychiatry Unit, Faculty of Health Sciences, University of Abomey Calavi, Cotonou, Benin

<sup>2</sup>Department of Epidemiology, Regional Institute of Public Health, University of Abomey Calavi, Ouidah, Benin

<sup>3</sup>Child Psychiatry Unit, Faculty of Health Sciences, University of Abomey Calavi, Cotonou, Benin

<sup>4</sup>Epidemiological Laboratory of Chronic and Neurological Diseases, Faculty of Health Sciences (FSS), University of Abomey Calavi, Cotonou, Benin

<sup>5</sup>Institute of Public Health, Epidemiology and Development, University of Bordeaux, Bordeaux, France

## Email address:

eklikpo@gmail.com (T. E. E. Klikpo)

## To cite this article:

Tchedie Etdechie Elvyre Klikpo, Alphonse Kpozehouen, Yolaine Glele Ahanhanzo, Lucrece Anagonou, Emilie Fiossi Kpadonou, Dismand Houinato, Josiane Ezin Houngebe, Roger Salamon. Prevalence and Factors Associated with Psychological Distress Among Adolescents in Sierra Leone in 2017. *American Journal of Psychiatry and Neuroscience*. Vol. 10, No. 1, 2022, pp. 4-12. doi: 10.11648/j.ajpn.20221001.12

**Received:** December 4, 2021; **Accepted:** January 18, 2022; **Published:** January 24, 2022

---

**Abstract:** Adolescent mental health problems are a public health challenge around the world and particularly in a country like Sierra Leone that has experienced war and the Ebola virus epidemic. Adolescents may suffer from psychological distress with school and family determinants. The goal of this study was to determine the prevalence and factors associated with psychological distress among school-going adolescent in Sierra Leone. This involved the secondary analysis of the data from the Sierra Leone, 2017 Global School-based Student Health Survey (GSHS). The dependent variable was “psychological distress,” which was assessed using two questions: 1) “In the past 12 months, how often have you worried about something to the point of not being able to sleep at night?” and 2) “In the past 12 months, how often have you felt lonely?” A weighted analysis of the data was performed using the software STATA version 12.0 (Stata Corporation, College Station, Texas, United States). One in two adolescents surveyed was male (51.53%). The average age of these school-going adolescents was 15.32±1.73 years. The average age of the boys was 15.37±1.74 years and that of girls was 15.15±1.66 years. The prevalence of psychological distress in this population was 26.81% CI95%=[24.91 - 28.70]. The boys seemed to suffer more of psychological distress than the girls (28.95% CI95%=[26.12 - 31.78] vs 24.54% CI95%=[22.05 - 27.01]). The factors associated with psychological distress among school-going adolescents were bullying, lack of respect for their privacy, alcohol and/or cannabis use, multiple sexual partnerships and sedentary lifestyle. The psychological distress among adolescents in Sierra Leone is real. Knowing the risk factors for psychological distress in adolescents will improve its prevention and promote the mental health of these future adults.

**Keywords:** Psychological Distress, Adolescents, School, GSHS, Sierra Leone

---

## 1. Introduction

Adolescence, transitional stage of development between childhood and adulthood, is the period during which a person undergoes biological and emotional changes [1]. During this period, adolescents may suffer from different types of psychological dysfunction problems and conflicts, which could

affect their normal psychological development. Researchers attempted to define this psychological dysfunction as a state of emotional and behavioral disturbance synonymous of internalization and externalization [2]. The most common disorders include depression and anxiety (internalizing disorders), delinquency, aggressiveness, educational difficulties and absenteeism (externalizing disorders) [2].

According to Greenbaum, adolescence is affected primarily by the family and school environment. Schools play a critical role in the development of adolescents. Indeed, they spend a lot of time at school, participate in extracurricular activities and complete schoolwork at home. School is an institution that contributes to the overall processes of education and socialization, which are essential to the development of an adolescent's personality [3].

Half of all lifetime mental disorders start before the age of 14 and 75% of them start by the age of 24 [4, 5]. Studies in Canada and the United States have shown that adolescent mental health is a public health issue [6, 7]. In developing countries such as Zambia, Nepal, or other South Asian countries, mental health problems are more acute than in developed countries. The health care system in these countries often does not take these problems into account.

The lack of attention paid to the mental well-being of children and adolescents, during a key phase of socialization, can have lifelong mental health consequences and can reduce the capacity and socio-economic productivity of societies [5, 8]. According to Bista et al. the appropriate psychological development of the adolescent translates into good academic performance, good physical health and adequate social, emotional and psychological health [1]. This eventually helps reduce the risk of psychological and behavioral problems, violence, crime, teenage pregnancy, drug and alcohol abuse [9]. Detecting a psychological distress problem in early adolescence could be beneficial for the quality of life.

Psychological distress was assessed using different scales such as the Psychological Distress Scale (K6) or (K10) [10, 11] or the General Health Questionnaire (GHQ-12) [12] as well as several different psychological distress indicators such as anxiety, loneliness, sadness, and suicidal plan [13], lack of close friends, suicide thoughts and attempts [14].

Children growing up in a post-conflict environment, such as Sierra Leone, may be exposed to a variety of adversities, notably domestic violence and family disintegration, and may develop various psychopathological symptoms [15-17]. "In Sierra Leone, the effects of trauma from living through conflict, epidemics, and natural disasters are long-lasting and may be transmitted intergenerationally" [18]. The qualitative study conducted in Sierra Leone by Yoder et al. [19] concluded that "in the aftermath of a decade of conflict and a devastating Ebola crisis, children and adolescents in Sierra Leone are at critical risk of developing mental health problems".

In Sierra Leone, there are very few studies on psychological distress; these studies only give a description of the phenomenon but do not cover the risk factors for psychological distress in adolescents [20].

The goal of this study was to determine the prevalence and

factors associated with psychological distress among school-going adolescent at the national level in Sierra Leone.

## 2. Methods

### 2.1. Description of the Survey and Study Population

This involved the secondary analysis of the data from the Sierra Leone, 2017 Global School-based student Health Survey (GSHS). The purpose of the GSHS was to collect data primarily from students aged 13 to 19. A two-stage cluster sample design was used to produce data representative of all students in grades 8 to 12 (JSS2, JSS3, SSS1, SSS2, SSS3). At the first stage, schools were selected with a probability proportional to the reported student population. At the second stage, classes in the selected schools were randomly drawn and all eligible students in those classes (those who had given their consent) participated in the survey. The GSHS is self-administered. Students record their answers to each question on an answer sheet that can be analyzed by computer. The core modules of the GSHS questionnaire address the leading causes of morbidity and mortality among children and adults, namely: use of tobacco, alcohol and other drugs; dietary behaviors; hygiene; mental health; physical activity; sexual behaviors that contribute to unintended pregnancy, HIV infection, and other sexually-transmitted infections; violence and unintentional injury; and the demographic factors of respondents [21].

### 2.2. The Variables

#### 2.2.1. Dependent Variable

The dependent variable was "psychological distress", which was assessed using two questions: 1) "In the past 12 months, how often have you worried about something to the point of not being able to sleep at night?" and 2) "In the past 12 months, how often have you felt lonely?" Response options included and were coded as: "Never=0; Rarely=1; Sometimes=1; Most of the time=2; Always=3". Scores of the two items were summed and scores 3 or more were defined as psychological distress, following the scoring of other 2-item mental health screeners: the "Patient Health Questionnaire-2 (PHQ-2)" [22, 23], and the "Generalized Anxiety Disorder-2 (GAD-2)" [23-25].

#### 2.2.2. Independent Variables

We drew on the study by Pengpid *et al.* [23] to choose the independent variables. These were, among others: age, gender, bullying, school fights, alcohol use, physical activity, friendship, parental support and supervision. All the independent variables used in this study are listed in Table 1.

Table 1. List of variables.

Variables	Question	Response options (coding scheme)
Anxiety	"During the past 12 months, how often have you been so worried about something that you could not sleep at night?"	"1=never to 5=always"
Loneliness	"During the past 12 months, how often have you felt lonely?"	"1=never to 5=always"

Variables	Question	Response options (coding scheme)
Gender	"What is your sex?"	"Male, Female"
Age (Years)	"How old are you?"	"11 years old or younger to 18 years old or older" 1 Jr Sec(JSS) 2 2 Jr Sec(JSS) 3 3 Sr Sec(SSS) 1 4 Sr Sec(SSS) 2 5 Sr Sec(SSS) 3
Grade	"In what grade are you?"	"1=0 to 4=3 or more (coded 1+=0, 0=1)"
No close friends	"How many close friends do you have?"	"1=0 days to 7=All 30 days"
Bullied in past months	"During the past 30 days, on how many days were you bullied?"	"1=never to 5=always (coded 1-2=1, 3-5=0)"
Peer Support	"During the past 30 days, how often were most of the students in your school kind and helpful?"	"1=never to 5=always (coded 1=1 and 2-5=0)"
Parents check your homework	"During the past 30 days, how often did your parents or guardians check to see if your homework was done?"	"1=never to 5=always (coded 1=1 and 2-5=0)"
Parental emotional neglected	"During the past 30 days, how often did your parents or guardians understand your problems and worries?"	"1=never to 5=always (coded 1-3=0 and 4-5=1)"
Parents respect privacy	"During the past 30 days, how often did your parents or guardians go through your things without your approval?"	"1=0 times to 5=20 or more times (coded 1=0 and 2-5=1)"
School attendance (miss class)	"During the past 30 days, on how many days did you miss classes or school without permission?"	"1=0 time to 4=10 or more times (coded 1=0 and 2-4=1)"
Current Cannabis use	"During the past 30 days, how many times have you used marijuana?"	"1=0 times to 5=20 or more times (coded 1=0 and 2-5=1)"
Trouble from alcohol use	"During your life, how many times have you got into trouble with your family or friends, missed school, or got into fights, as a result of drinking alcohol?"	"I have never had sexual intercourse, 1 person to 6 or more people" (coded 2-6 people=1 and never and 1=0)"
Amphetamine use	"During your life, how many times have you used amphetamines or methamphetamines?"	"1=Less than 1 hour per day... 3=3 to 4 hours per day ...6=8 or more hours a day"
Multiple sexual partners	"During your life, with how many people have you had sexual intercourse?"	
Leisure-time sedentary	"How much time do you spend during a typical or usual day sitting and watching television, playing computer games, talking with friends, or doing other sitting activities, such as using the computer or cell phone?"	

### 2.3. Data Analysis

A weighted analysis of the data was performed using the software STATA version 12.0 (Stata Corporation, College Station, Texas, United States). The results for all the adolescents were presented. Next, we presented the results by gender because psychological distress is experienced differently depending on whether the adolescent is a boy or a girl. Proportions and frequencies were estimated for qualitative variables. For quantitative variables, we calculated the mean followed by  $\pm$  the standard deviation (SD). The means were compared using Student's *t* test. The associations between qualitative variables were detected using Pearson's  $\chi^2$  test. The strength of the associations between the dependent variable (psychological distress) and the independent variables was assessed using Odds Ratios (OR) followed by their 95% confidence interval (CI 95%).

Logistic regression was used to assess the influence of explanatory variables on psychological distress (dependent variable). All the variables in the univariate analysis that were statistically significant at the  $p$ -value  $\leq 0.20$  level were included in the multivariate models. In the final model, variables that had a  $p$ -value  $< 0.05$  were retained. A stepwise regression was adopted to select the variables used to build the final model. All the analyses were weighted to take into account the sampling method used [26]. The goodness of fit of the logistic regression model was verified using the

Hosmer-Leshow test.

### 2.4. Ethical Consideration

The present study involved a secondary analysis of the data from the Sierra Leone, 2017 GSHS. This data is freely available online with no identifying information attached. As a result, permission and ethical approval for this analysis were automatically deemed unnecessary. Moreover, written consent had been obtained from all eligible participants before they completed the GSHS survey questionnaire.

## 3. Results

We analyzed data from 2672 school-going adolescents, with a 98.52% response rate of the surveyed population on questions about psychological distress. One in two adolescents surveyed was male (51.53%). The average age of these school-going adolescents was  $15.32 \pm 1.73$  years. The average age of the boys was  $15.37 \pm 1.74$  years and that of the girls was  $15.15 \pm 1.66$  years, with a statistically significant difference ( $p=0.0091$ ). 4 out of 9 surveyed adolescents were at least 16 years old (44.7%). 5 out of 9 adolescents reported having been bullied (56.12%). 7 out of 8 adolescents reported having at least one close friend (91.24%). See Table 2 for the other adolescent characteristics.

### 3.1. Prevalence and Other Factors Associated with Psychological Distress in the Univariate Analysis

#### 3.1.1. Both Sexes

The prevalence of psychological distress in this population was 26.81% (CI95%=[24.91; 28.70]). The boys seemed to suffer more of psychological distress than the girls: 28.95% (CI95%=[26.12 - 31.78]) vs 24.54% (CI95%=[22.05 - 27.01]). This difference was statistically significant ( $p=0.0210$ ). The older school-going adolescents (16 years and older) suffered less from psychological distress (26.1%).

Adolescents who reported having been bullied once were at greater risk of suffering from psychological distress (OR=1.72, CI95%=[1.39 - 2.13]) than those who had not experienced any bullying. The less the adolescents' privacy was respected, i.e., their parents searched their belongings without their consent, the more likely they were of experiencing psychological distress (OR=1.68, CI95%=[1.39 - 2.13]). The adolescents who missed classes (absenteeism), those who smoked cannabis (marijuana), those who drank alcohol, were more likely to be susceptible to psychological distress. The risks were respectively 1.28; 1.86 and 1.81. Adolescents who had multiple sexual partners were at greater risk of suffering from psychological distress (OR=1.72, CI95%=[1.39 - 2.14]). Adolescents who

spent 3 to 4 hours in sedentary activities were at greater risk of suffering from psychological distress (OR=1.70, CI95%=[1.32 - 2.20]) compared to those who spent less than 3 hours in sedentary activities (24.6). The higher the grade, the lower the risk of suffering from psychological distress. The adolescents who were in Senior Secondary School (SSS1, SS2 and SS3) were less likely to experience psychological distress than those who were in Junior Secondary School 2 (JSS2). The odds ratios were respectively OR=0.78 (CI95%=[0.32 - 0.62]) and OR=0.71 (CI95%=[0.52 - 0.96]).

#### 3.1.2. Girls

The prevalence of psychological distress was higher among girls who were less than 16 years old. The difference between the various age groups was not significant ( $p=0.1221$ ). (See Table 2). This prevalence was very high among girls who reported being bullied (28.3%). These girls were 1.62 times more likely to suffer from psychological distress (OR=1.62, CI95%=[1.21 - 2.17]). Adolescent girls who smoked cannabis (marijuana) had the highest prevalence (43.6%) and were 2.51 times more likely to experience psychological distress than non-smoking girls (OR=2.51, CI95%=[1.23 - 5.12]). See Tables 2 and 3 for other adolescent girl characteristics.

Table 2. Psychological distress and characteristics among Adolescents in Sierra Leone, GSHS, 2017.

Variable	Sample		Psychological Distress					
	N	%	Both Sex		Female		Male	
			%	p-value	%	p-value	%	p-value
Psychological distress								
No	1948	73.19						
Yes	724	26.81	26.81		24.54		28.95	
Gender				0.0210				
Male	1241	51.53	29.0					
Female	1471	48.47	24.5					
Age (Years)				0.7874		0.1221		0.4830
13 or less	467	17.35	27.9		30.1		25.7	
14 – 15	971	37.95	27.1		23.7		30.8	
16 or more	1274	44.7	26.1		23.0		28.7	
Grade				0.0876		0.0078		0.0710
Jr Sec(JSS) 2	1244	35.88	29.9		26.6		33.0	
Jr Sec(JSS) 3	485	34.71	25.8		25.7		25.9	
Sr Sec(SSS) ½	666	15.48	25.0		26.4		23.7	
Sr Sec(SSS) 3	317	13.93	23.4		13.6		31.5	
No close friends				0.9009		0.4891		0.7339
Yes	2414	91.24	26.7		24.0		29.2	
No	234	8.758	27.1		27.0		27.3	
Bullied in past months				0.0000		0.0012		0.0002
No	1058	43.88	21.1		19.5		22.7	
Yes	1370	56.12	31.5		28.3		34.5	
Peer Support				0.0707		0.2125		0.0024
No	787	27.94	29.6		26.6		35.5	
Yes	1889	72.06	25.7		25.7		26.1	
Parents check your homework				0.1865		0.0094		0.7395
Yes	1870	70.43	25.7		21.2		29.9	
No	804	29.57	28.3		27.7		28.9	
Parental emotional neglected				0.8646		0.9619		0.9758
No	1495	54.73	27.1		24.6		29.1	
Yes	1182	45.27	26.7		24.7		29.0	

Variable	Sample		Psychological Distress					
	N	%	Both Sex		Female		Male	
			%	p-value	%	p-value	%	p-value
Parents respect privacy						0.0003		0.0004
Yes	1870	70.43	23.7	0.0000	21.5		25.7	
No	804	29.57	34.4		31.6		37.1	
School attendance (miss class)				0.0124		0.0194		0.1816
No	1724	65.27	25.0		22.3		27.5	
Yes	960	34.73	30.0		28.5		31.6	
Current Cannabis use				0.0026		0.0084		0.1019
No	2478	95.8	26.0		23.5		28.4	
Yes	130	4.205	39.6		43.6		37.8	
Trouble from alcohol use				0.0007		0.0098		0.0300
No	2332	93.64	26.2		23.9		28.4	
Yes	191	6.356	39.1		38.5		39.5	

Table 2. Continued.

Variable	Sample		Psychological Distress					
	N	%	Both Sex		Female		Male	
			%	p-value	%	p-value	%	p-value
Amphetamine use				0.0533		0.1152		0.2500
No	1850	92.18	25.0		22.5		27.2	
Yes	181	7.823	32.2		30.9		33.2	
Multiple sexual partners				0.0000		0.0573		0.0000
No	1801	72.37	23.4		23.0		23.8	
Yes	712	27.63	34.5		28.9		37.9	
Leisure-time sedentary				0.0003		0.4890		0.0001
< 3 h	1965	75.25	24.6		23.6		25.5	
3 – 4 h	412	14.3	35.8		25.8		43.9	
5 – 6 h	101	3.722	30.7		31.9		29.2	
7 h and more	190	6.732	30.4		27.2		34.9	

Table 3. Univariate Analysis; Associated Factors with psychological distress in Sierra Leone, GSHS, 2017.

Variables	Both Sex			Female			Male		
	OR	IC95%		OR	IC95%		OR	IC95%	
Gender									
Male	1								
Female	0.79	0.65	0.96						
Age (Years)									
13 or less	1			1			1		
14 - 15	0.96	0.72	1.26	0.72	0.49	1.05	1.28	0.85	1.93
16 or more	0.91	0.70	1.19	0.69	0.48	0.99	1.16	0.79	1.70
Grade									
Jr Sec(JSS) 2	1			1			1		
Jr Sec(JSS) 3	0.81	0.64	1.04	0.95	0.68	1.33	0.70	0.49	1.01
Sr Sec(SSS) 1/2	0.78	0.62	0.97	0.98	0.73	1.33	0.62	0.45	0.87
Sr Sec(SSS) 3	0.71	0.52	0.96	0.43	0.26	0.70	0.93	0.62	1.39
No close friends									
Yes	1			1			1		
No	1.02	0.72	1.43	1.16	0.75	1.82	0.91	0.54	1.54
Bullied in past months									
No	1			1			1		
Yes	1.72	1.39	2.13	1.62	1.21	2.17	1.79	1.31	2.44
Peer Support									
No	1			1			1		
Yes	0.82	0.66	1.01	1.22	0.89	1.68	0.64	0.48	0.85
Parents check your homework									
Yes	1			1			1		
No	1.68	1.37	2.06	1.42	1.09	1.86	0.95	0.72	1.25
Parental emotional Neglected (connectedress)									
No	1			1			1		
Yes	0.98	0.80	1.19	1.01	0.76	1.31	0.99	0.75	1.31
Parents respect privacy									
Yes	1			1			1		
No	1.68	1.37	2.06	1.69	1.27	2.24	1.70	1.26	2.29

Variables	Both Sex		Female		Male	
	OR	IC95%	OR	IC95%	OR	IC95%
School attendance (miss class)						
No					1	
Yes	1.28	1.05	1.57	1.38	1.05	1.82
Current Cannabis use						
No	1		1		1	
Yes	1.86	1.23	2.82	2.51	1.23	5.12
Trouble from alcohol use						
No	1		1		1	
Yes	1.81	1.28	2.57	1.99	1.17	3.38
					1.64	1.05
						2.60

Table 3. Continued.

Variables	Both Sex		Female		Male	
	OR	IC95%	OR	IC95%	OR	IC95%
Amphetamine use						
No	1		1		1	
Yes	1.42	0.99	2.05	1.53	0.89	2.64
Multiple sexual partners						
No	1		1		1	
Yes	1.72	1.39	2.14	1.36	0.98	1.88
Leisure-time sedentary						
< 3 h	1		1		1	
3 – 4 h	1.70	1.32	2.20	1.12	0.76	1.64
5 – 6 h	1.36	0.82	2.24	1.51	0.82	2.77
7 h and more	1.34	0.93	1.92	1.20	0.74	1.94
					1.56	0.91
						2.69

### 3.1.3. Boys

Adolescent boys who had been bullied were at greater risk of experiencing psychological distress than those who had not been bullied (OR=1.79, CI95%=[1.31 - 2.44]). When an adolescent boy felt good around his fellow students, he was less likely to experience psychological distress (OR=0.64, CI95%=[0.48 - 0.85]). Boys whose privacy was not respected by their parents were more at risk of psychological distress than those whose privacy was respected by their parents (OR=1.70, CI95%=[1.26 - 2.29]). Boys who had multiple sexual partners were at greater risk of psychological distress than those who had at most one sexual partner (OR=1.94, CI95%=[1.44 - 2.61]).

### 3.2. Factors Associated with Psychological Distress in the Multivariate Analysis

Knowing the other variables, the higher the students' level, the lower their risk of suffering from psychological distress. Indeed, students in Senior Secondary School (SSS1, SSS2 and SSS3) were at lower risk of suffering from psychological

distress compared to students in Junior Secondary School 2 (JSS2). The risks were respectively 0.67 (CI95%=[0.51 - 0.88]) and 0.63 (CI95%=[0.44 - 0.90]). This observation was mostly made in boys. Students who have been bullied in the past months were at greater risk for psychological distress than those who had not experienced any bullying. The risk for the boys was 1.67 (CI95%=[1.24 - 2.25]) and the risk for the girls was 1.51 (CI95%=[1.06 - 2.13]). The more parents did not respect their children's privacy, the more likely the latter were to experience psychological distress. The risk for all students was 1.62 (CI95%=[1.28 - 2.05]) and the risk for girls was 1.79 (CI95%=[1.33 - 2.42]). Girls who had peer support were less likely to experience psychological distress than those who did not (OR=0.63, CI95%=[0.44 - 0.90]). Students who had more than one sexual partner were twice as likely to experience psychological distress (OR=1.77, CI95%=[1.39 - 2.25]), especially boys (OR=1.80, CI95%=[1.29 - 2.52]). Students, especially boys, who spent 3 to 4 hours in sedentary activities (television) were at greater risk of suffering from psychological distress compared to students who spent less than 3 hours in sedentary activities. (See Table 4).

Table 4. Multivariate Analysis: Associated Factors with psychological distress in Sierra Leone, GSHS, 2017.

Variables	Both Sex		Female		Male	
	OR	IC95%	OR	IC95%	OR	IC95%
Grade						
Jr Sec(JSS) 2	1				1	
Jr Sec(JSS) 3	0.99	0.75	1.32		0.83	0.54
Sr Sec(SSS) ½	0.67	0.51	0.88		0.45	0.30
Sr Sec(SSS) 3	0.63	0.44	0.90		0.77	0.47
Bullied in past months						
No			1		1	
Yes			1.67	1.24	2.25	1.51
Peer Support						
No					1	
						1.06
						2.13

Variables	Both Sex		Female		Male	
	OR	IC95%	OR	IC95%	OR	IC95%
Yes					0.63	0.44
Parents respect privacy						0.90
Yes	1		1			
No	1.62	1.28	1.79	1.33	2.42	
Multiple sexual partners						
No	1				1	
Yes	1.77	1.39	2.25		1.80	1.29
Leisure-time sedentary						2.52
< 3 h	1				1	
3 – 4 h	1.69	1.26	2.26		2.32	1.54
5 – 6 h	1.27	0.69	2.32		0.76	0.23
7 h and more	1.10	0.72	1.69		1.02	0.50
						2.11

## 4. Discussion

In our study, 26.81% of the adolescents were likely to suffer from psychological distress (CI95%=[24.91 - 28.70]). Boys seemed to suffer more from psychological distress than girls: 28.95% (CI95%=[26.12 - 31.78]) vs. 24.54% (CI95%=[22.05 - 27.01]). Through the analysis of the Sierra Leone GSHS, the main factors that would influence psychological distress among the students were: the class attended, bullying, peer support, parental respect for their privacy, the number of sexual partners and a sedentary lifestyle.

The 26.81% prevalence obtained in this study was almost identical to those found in Lebanon (28%) [27], in Afghanistan (27.7%) [28] and in the United Arab Emirates (28%) [29]. This value was higher than the ones found in Egypt (16.8%) [30], in Morocco (23.3%) [23], in Tanzania (23%) [31] and in Nigeria (24.2%) [32]. It was lower than the one found in Iran (67.7%) [33]. The prevalence of psychological distress was higher among girls under 14 years of age (30.1%) compared to boys of the same age (25.7%). This difference could be explained by the pubertal timing, which is earlier in girls and could be associated with an increase in mental health problems [34].

In our study, adolescents who were bullied were more likely to experience psychological distress. Authors such as Pengpid *et al.* and Swearer *et al.* found the same result [23, 35]. Bullying is a major stress factor in the life of adolescents [35]. It can have negative consequences on their mental health (low self-esteem, major depression) and can extend into adulthood [36]. In addition, Klomek *et al.* demonstrated that childhood bullying can affect three of the most burdensome areas in adulthood: psychopathology, suicidality and criminality [37].

Adolescents who did not have peer support were at greater risk of suffering from psychological distress. According to the available literature, peer victimization is also considered an important predictor of the development of anxiety disorders in adolescents [38]. This is because limited peer support increases adolescent loneliness, which contributes to the development of an anxiety disorder [39]. Moreover, previous studies have shown that peer victimization increases the risk of generic and gender-specific risk factors such as low life satisfaction and loneliness. Peer victimization also makes adolescents highly

vulnerable to psychiatric disorders [40, 41].

In this study, adolescents who had multiple sexual partners were more likely to experience psychological distress. This could be explained by the fact that young people in psychological distress may turn to sexual activity to alleviate or escape feelings of distress such as loneliness, despair, depression, anxiety and suicidal thoughts [42]. Young people in Burkina Faso gave several reasons for their multiple sexual partnerships: searching for a safe reliable partner; in exchange for money or gifts; for emotional reason; because of the economic situation of the head of the household [43].

Non-respect of adolescents' privacy by their parents was a risk factor for psychological distress. Other authors have made the same observation [13, 14], which leads us to advocate for programs to improve parents' support for their children and improve parent-teen relationships.

We noted that the sedentary behavior of an adolescent could lead to psychological distress. This result is consistent with those of other authors [14, 44-46]. Lack of physical activity alters mood and increases stress, leading to psychological distress. Being bullied can lead to isolation and avoidance of sports activities with peers, thus reducing interactions with peers and opportunities for physical activity.

The main limitation of this study is its cross-sectional design, which does not allow a causal link to be determined between the suspected exposure factors and psychological distress. However, this study has several strengths. First, we analyzed a large nationally representative sample with appropriate statistical methods taking into account the complex design of the survey and the sample weights. Second, GSHS uses the same standardized methods from one survey to another with regard to the sample (school-based), data collection and the formulation of questions, which allows for international comparisons of results.

Despite the listed limitations, this study can contribute to the development and/or modification of prevention strategies. Parents, teachers or other school personnel could play an important role in early identification of adolescents with these emotional and behavioral problems. This could be implemented in Sierra Leone because, despite the lack of human resources to provide mental health services in Sierra Leone [47], "mental health services are now available in all districts, with nurses stationed in almost all district hospitals trained to do basic counseling for those with common mental

health disorders and where needed, provide referrals for more complex cases” [23, 48].

## 5. Conclusion

Psychological distress among adolescents in Sierra Leone is a real public health problem. Given the importance of the phenomenon, more indicators need to be taken into account to refine the definition of psychological distress. Prevalence studies should be conducted to determine the extent of psychological distress and its links in order to generate other hypotheses on psychological distress. These hypotheses would then be tested using cohort studies or randomized field trials, in order to gather more evidence in favor of causality. Knowing the risk factors for psychological distress in adolescents will improve its prevention and promote the mental health of these future adults.

## Conflict of Interest

The authors declare that they have no competing interests.

## References

- [1] Bista B, Thapa P, Sapkota D, Singh SB, Pokharel PK: Psychosocial Problems among Adolescent Students: An Exploratory Study in the Central Region of Nepal. *Frontiers in public health* 2016, 4: 158.
- [2] Ahamd A, Khalique N, Khan Z, Amir A: Prevalence of psychosocial problems among school going male adolescents. *Indian J Community Med* 2007.
- [3] Greenbaum W: America in search of a new ideal: an essay on the rise of pluralism. *Harvard Educ Rev* 1974, 44: 25–28.
- [4] Kessler RC, Berglund P, Demler O, Jin R, Merikangas KR, Walters EE: Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of general psychiatry* 2005, 62 (6): 593–602.
- [5] World Health Organization: The World Health Report 2001. Mental Health: New Understanding, New Hope. In. Geneva: WHO 2001.
- [6] Jellinek MS, Murphy JM, Little M, Pagano ME, Comer DM, Kelleher KJ: Use of the Pediatric Symptom Checklist to screen for psychosocial problems in pediatric primary care: a national feasibility study. *Arch Pediatr Adolesc Med* 1999, 153 (3): 254–260.
- [7] Polaha J, Dalton WT, 3rd, Allen S: The prevalence of emotional and behavior problems in pediatric primary care serving rural children. *J Pediatr Psychol* 2011, 36 (6): 652–660.
- [8] Wittchen HU, Nelson CB, Lachner G: Prevalence of mental disorders and psychosocial impairments in adolescents and young adults. *Psychological medicine* 1998, 28 (1): 109–126.
- [9] Keyes CL: Promoting and protecting mental health as flourishing: a complementary strategy for improving national mental health. *The American psychologist* 2007, 62 (2): 95–108.
- [10] Kessler RC, Barker PR, Colpe LJ, Epstein JF, Gfroerer JC, Hiripi E, Howes MJ, Normand SL, Manderscheid RW, Walters EE *et al*: Screening for serious mental illness in the general population. *Archives of general psychiatry* 2003, 60 (2): 184–189.
- [11] Furukawa TA, Kessler RC, Slade T, Andrews G: The performance of the K6 and K10 screening scales for psychological distress in the Australian National Survey of Mental Health and Well-Being. *Psychological medicine* 2003, 33 (2): 357–362.
- [12] Goldberg DP, Blackwell B: Psychiatric illness in general practice. A detailed study using a new method of case identification. *British medical journal* 1970, 1 (5707): 439–443.
- [13] Siziya S, Mazaba ML: Prevalence and Correlates for Psychosocial Distress Among In-School Adolescents in Zambia. *Frontiers in public health* 2015, 3: 180.
- [14] Pengpid S, Peltzer K: Psychological Distress and Its Associated Factors Among School-Going Adolescents in Tanzania. *Psychological studies* 2020, 65 (2): 174–181.
- [15] Betancourt TS, McBain R, Newnham EA, Brennan RT: Trajectories of internalizing problems in war-affected Sierra Leonean youth: examining conflict and postconflict factors. *Child development* 2013, 84 (2): 455–470.
- [16] Delomez H: The worst forms of violence against children and youth in Sierra Leone. In.; 2015.
- [17] World Health Organization (WHO): Child maltreatment. In.; 2018.
- [18] Betancourt TS, Keegan K, Farrar J, Brennan RT: The intergenerational impact of war on mental health and psychosocial wellbeing: lessons from the longitudinal study of war-affected youth in Sierra Leone. *Conflict and health* 2020, 14: 62.
- [19] Yoder HN, Tol WA, Reis R, de Jong JT: Child mental health in Sierra Leone: a survey and exploratory qualitative study. *International journal of mental health systems* 2016, 10: 48.
- [20] World Health Organization (WHO): Global school-based student health survey (GSHS). In.; 2019.
- [21] The Global School and Health Survey Background [<http://www.cdc.gov/gshs/background/index>].
- [22] Kroenke K, Spitzer RL, Williams JB: The Patient Health Questionnaire-2: validity of a two-item depression screener. *Medical care* 2003, 41 (11): 1284–1292.
- [23] Pengpid S, Peltzer K: Prevalence and associated factors of psychological distress among a national sample of in-school adolescents in Morocco. *BMC psychiatry* 2020, 20 (1): 475.
- [24] Kroenke K, Spitzer RL, Williams JB, Monahan PO, Löwe B: Anxiety disorders in primary care: prevalence, impairment, comorbidity, and detection. *Annals of internal medicine* 2007, 146 (5): 317–325.
- [25] Plummer F, Manea L, Trepel D, McMillan D: Screening for anxiety disorders with the GAD-7 and GAD-2: a systematic review and diagnostic metaanalysis. *General hospital psychiatry* 2016, 39: 24–31.



- [26] Bennett S, Woods T, Liyanage WM, Smith DL: A simplified general method for cluster-sample surveys of health in developing countries. *World Health Stat Q* 1991, 44 (3): 98-106.
- [27] Maalouf FT, Ghandour LA, Halabi F, Zeinoun P, Shehab AA, Tavitian L: Psychiatric disorders among adolescents from Lebanon: prevalence, correlates, and treatment gap. *Social psychiatry and psychiatric epidemiology* 2016, 51 (8): 1105-1116.
- [28] Pengpid S, Peltzer K: High psychological distress among school-going adolescents in Afghanistan: prevalence and correlates from a national survey. *Vulnerable children and youth studies* 2020, 15 (1): 40-47.
- [29] Al-Yateem N, Bani Issa W, Rossiter RC, Al-Shujairi A, Radwan H, Awad M, Fakhry R, Mahmoud I: Anxiety related disorders in adolescents in the United Arab Emirates: a population based cross-sectional study. *BMC pediatrics* 2020, 20 (1): 245.
- [30] Ismail A: The prevalence and risk factors of anxiety disorders in an Egyptian sample of school and students at the age of 12–18 years. *European psychiatry* 2017, 41 (S1): S410-S411.
- [31] Mwakanyamale AA, Yizhen Y: Psychological maltreatment and its relationship with self-esteem and psychological stress among adolescents in Tanzania: a community based, cross-sectional study. *BMC psychiatry* 2019, 19 (1): 176.
- [32] Okwaraji FE, Obiechina KI, Onyebueke GC, Udegbumam ON, Nnadum GS: Loneliness, life satisfaction and psychological distress among out-of-school adolescents in a Nigerian urban city. *Psychology, health & medicine* 2018, 23 (9): 1106-1112.
- [33] Qorbani M, Kelishadi R, Taheri E, Motlagh ME, Arzaghi SM, Ardalan G, Chinian M, Mahmoudarabi M, Rezapoor A, Asayesh H *et al.*: Association between psychosocial distress with cardio metabolic risk factors and liver enzymes in a nationally-representative sample of Iranian children and adolescents: the CASPIAN-III study. *J Diabetes Metab Disord* 2014, 13 (1): 44.
- [34] Kaltiala-Heino R, Marttunen M, Rantanen P, Rimpela M: Early puberty is associated with mental health problems in middle adolescence. *Soc Sci Med* 2003, 57 (6): 1055-1064.
- [35] Swearer SM, Hymel S: Understanding the psychology of bullying: Moving toward a social-ecological diathesis-stress model. *The American psychologist* 2015, 70 (4): 344-353.
- [36] Juvonen J, Graham S: Bullying in schools: the power of bullies and the plight of victims. *Annual review of psychology* 2014, 65: 159-185.
- [37] Klomek AB, Sourander A, Elonheimo H: Bullying by peers in childhood and effects on psychopathology, suicidality, and criminality in adulthood. *The lancet Psychiatry* 2015, 2 (10): 930-941.
- [38] Stapinski LA, Bowes L, Wolke D, Pearson RM, Mahedy L, Button KS, Lewis G, Araya R: Peer victimization during adolescence and risk for anxiety disorders in adulthood: a prospective cohort study. *Depression and anxiety* 2014, 31 (7): 574-582.
- [39] Pickard H, Happé F, Mandy W: Navigating the social world: The role of social competence, peer victimisation and friendship quality in the development of social anxiety in childhood. *Journal of anxiety disorders* 2018, 60: 1-10.
- [40] McLaughlin KA, Hatzenbuehler ML, Hilt LM: Emotion dysregulation as a mechanism linking peer victimization to internalizing symptoms in adolescents. *Journal of consulting and clinical psychology* 2009, 77 (5): 894-904.
- [41] Pickering L, Hadwin JA, Kovshoff H: The Role of Peers in the Development of Social Anxiety in Adolescent Girls: A Systematic Review. *Adolescent research review* 2019.
- [42] Page RM, Hall CP: Psychosocial Distress and Alcohol Use as Factors in Adolescent Sexual Behavior Among Sub-Saharan African Adolescents. *The Journal of school health* 2009, 79 (8): 369-379.
- [43] Adohinzin CC, Meda N, Belem AM, Ouédraogo GA, Sombie I, Berthe A, Fond-Harmant L: [Risk assessment in young people living in Bobo Dioulasso: analysis of factors associated with sexual precocity and multiple partners]. *The Pan African medical journal* 2016, 25: 132.
- [44] Kwon M, Park E, Dickerson SS: Adolescent substance use and its association to sleep disturbances: A systematic review. *Sleep health* 2019, 5 (4): 382-394.
- [45] Pengpid S, Peltzer K: Leisure-Time Sedentary Behavior Is Associated with Psychological Distress and Substance Use among School-Going Adolescents in Five Southeast Asian Countries: A Cross-Sectional Study. *International journal of environmental research and public health* 2019, 16 (12): 2091.
- [46] Songco A, Hudson JL, Fox E: A Cognitive Model of Pathological Worry in Children and Adolescents: A Systematic Review. *Clinical child and family psychology review* 2020, 23 (2): 229-249.
- [47] Alonso P, Price B, Conteh AR, Valle C, Turay PE, Paton L, Turay JA: Where there is no psychiatrist: A mental health programme in Sierra Leone. *The South African journal of psychiatry* 2014, 20 (3): 6-e6.
- [48] Talking about depression in Sierra Leone, 2017 [<https://www.afro.who.int/news/talking-about-depression-sierra-leone>].