Scientific Research Publishing

Open Journal of Epidemiology, 2025, 15(2), 345-364
https://www.scirp.org/journal/ojepi
ISSN Online: 2165-7467
ISSN Print: 2165-7459

Prevalence of Anxiety, Depression, and Substance Use among Secondary School Students Aged 10 - 24 Years in the Southwest Region of Cameroon

Lifafa Kinge Kange*, Tanyi Regobell Mua, Ashley Wotany Luma, Ghangha Jamin Ghangha, Amin Ruth Tabi, Vamtowe Hezal Tracy, Kum Mineva Ziagha, Akeh Gismarvel, Fuh Inda Kwolo, Demassosso Didier, Kwandze Juliette Vernyuy, Nupa Kawo Christelle

Lifafa Research Foundation, Buea, Cameroon
Email: *kingejet@yahoo.com, *kinge@lifafarf.org

How to cite this paper: Kange, L.K., Mua, T.R., Luma, A.W., Ghangha, G.J., Tabi, A.R., Tracy, V.H., Ziagha, K.M., Gismarvel, A., Kwolo, F.I., Didier, D., Vernyuy, K.J. and Christelle, N.K. (2025) Prevalence of Anxiety, Depression, and Substance Use among Secondary School Students Aged 10 - 24 Years in the Southwest Region of Cameroon. *Open Journal of Epidemiology*, **15**, 345-364.
https://doi.org/10.4236/ojepi.2025.152022

Received: March 13, 2025
Accepted: May 11, 2025
Published: May 14, 2025

Abstract

Background: Mental health disorders represent a significant public health concern, particularly among adolescents. This study aimed to assess the prevalence of mental health disorders and associated factors, as well as knowledge of mental health, among secondary school students in the Southwest Region of Cameroon. **Methods:** A cross-sectional study was conducted involving 958 secondary school students. Data were collected on demographics, knowledge of mental health disorders, and the presence of anxiety, depression, substance use disorders, and suicidal thoughts. Descriptive statistics and univariate and multivariate logistic regression were used. **Results:** The overall prevalence of mental health disorders (anxiety, depression, and substance use) was 73.6%, with high rates of anxiety (54.7%), depression (57.3%), and substance use disorders (42.2%). Knowledge of mental health disorders was adequate for 55.3% of the students. Males demonstrated lower odds of adequate knowledge than females (OR = 0.730, 95% CI: 0.559 - 0.954), and residents of Tiko had lower odds than residents of Limbe (OR = 0.368, 95% CI: 0.213 - 0.639). Younger age groups and the presence of suicidal thoughts were significantly associated with mental health disorders according to multivariate analysis. **Conclusion:** This study revealed a high prevalence of anxiety, depression, and substance use among students. 55.3% of students demonstrated adequate knowledge of mental health. Disparities exist in terms of gender and location. These findings highlight the urgent need for mental health awareness programs, especially for vulnerable populations.

Keywords

Mental Health Disorders, Anxiety, Depression, Substance Use, Students

1. Introduction

1.1. Background

Students aged 10 - 24 years are at very high risk of developing mental health disorders [1]. This may be because adolescents and young adults have fewer past experiences, making them vulnerable to their immediate environment [2]. Academic success is highly dependent on the good mental health of students, making their mental health a call for concern [3]. Globally, one in five adolescents is estimated to experience a mental health disorder, with anxiety, depression, and substance use representing significant barriers to educational potential [4]. The relationship between mental health conditions is often complex and intertwined; those with anxiety are at a significantly increased risk of depression, and those with both anxiety and depression are more vulnerable to substance use disorders [5].

Anxiety is the ninth leading cause of illness and disability for adolescents aged 15 - 19 years and the sixth leading cause for those aged 10 - 14 years [6]. Anxiety is a subjective feeling of tension, apprehension, nervousness, and worry associated with arousal of the nervous system [7]. In 2019, there were 932 million new cases of anxiety disorders in children and adolescents alone, resulting in an immense loss of 380.62 million disability-adjusted life years (DALYs) [8]. Approximately 50% of adult sufferers of anxiety disorders identify that their symptoms began in childhood [9]. In sub-Saharan Africa (SSA), depression and anxiety have been identified as the most common mental disorders [6]. Among school-going adolescents, anxiety is a prevalent and significant issue that can affect their daily school activities. A study conducted in Ghana revealed a high prevalence of anxiety among final-year junior high students, with a prevalence of 71.4% [10].

Depression, on the other hand, often results in feelings of profound sadness, a loss of interest in previously enjoyed activities, and a crippling sense of hopelessness. Nearly three in ten adults (29%) have been diagnosed with depression at some point in their lives, and approximately 18% are currently experiencing depression [11]. Between 2009 and 2019, the prevalence of major depressive episodes among adolescents aged 12 - 17 years in the United States increased from 8.1 to 15.8%. One study investigated 4100 Chinese students aged 11 - 16 years and reported a high prevalence of depression of 34.0% [12]. Depression among adolescents seems to be evident at earlier ages and may occur with comorbid psychiatric disorders, increased risk for suicide, substance abuse, and behavioural problems [13]. Depression is a serious mental disorder that can often have an impact on social functioning, relationships with family and peers, and academic performance in adolescents. A study performed in the southwestern and northwestern

regions of Cameroon revealed a high prevalence of depression among nursing students [14].

Furthermore, substance use disorders, involving the abuse of or dependence on substances, such as alcohol, cocaine, cannabis, or nicotine, further complicate the mental health of young people. [15]. In 2019, 22% of 15 - 19-year-olds worldwide used alcohol, and 5.5% used cannabis, highlighting the intertwined nature of mental health and substance abuse in this age group [16]. Sub-Saharan Africa reported a total prevalence of 11.3% for current alcohol use, 2% for marijuana, and 2.6% for lifetime amphetamine use among school-going students in a 2023 study. Interestingly, in that same study, the highest prevalence was reported in Seychelles (46.5%), and the lowest was reported in Tanzania (2.7%), highlighting the contextual variations in these issues [17].

This interplay creates a cycle of vulnerability, making it essential to address these conditions concurrently. Moreover, the context of students' lives plays a crucial role. For example, those in conflict-affected regions may experience higher levels of mental distress because of trauma, displacement, and disruption of education [18]. The South West Region of Cameroon, which has faced ongoing sociopolitical turmoil for more than seven years, has experienced disrupted educational systems, displacement, and property destruction [19]. Daily exposure to this trauma places students in this region at increased risk for these mental health conditions.

This study specifically focuses on students aged 10 - 24 years, a critical developmental phase marked by significant physical, emotional, and social changes. By analysing existing literature, this study identifies gaps in current research, such as the need for more studies focusing on this specific age group. Exploring the prevalence of anxiety, depression, and substance use disorders among students in the southwest region of Cameroon, this study aims not only to identify high-risk populations but also to inform appropriate strategies for interventions by contributing to the body of knowledge needed to support students in conflict zones. This research provides much-needed evidence to support mental health policies and practices tailored to the unique needs of students in conflict settings while noting the importance of education for young people.

1.2. Research Questions

1) What is the level of knowledge of mental health disorders among secondary school students aged 10-24 years in some selected schools in the South West region of Cameroon?

2) What is the prevalence of mental health disorders among secondary school students aged 10 - 24 years in secondary school students in the southwest Region of Cameroon?

3) What are the factors associated with depression, anxiety, and substance use disorders among secondary school students aged 10 - 24 years in the Southwest Region of Cameroon?

1.3. Specific Objectives

1) To assess the level of knowledge of mental health disorders among secondary school students aged 10 - 24 years in the Southwest Region.

2) To determine the prevalence of depression, anxiety, and substance use disorders among secondary school students aged 10 - 24 years in the Southwest Region.

3) To identify factors associated with depression, anxiety, and substance use disorders in secondary school students aged 10 - 24 years.

2. Methods

2.1. Study Design and Setting

An 8-month (June 2024-January 2025) cross-sectional study in which structured questionnaires were administered to students by guidance counselors in the 5 secondary schools of intervention in the Southwest Region was conducted**.** The chosen schools in the Fako division were the most populated in terms of the student population and had more internally displaced students due to subsidized school fees.

2.2. Study Population

This study essentially targeted students aged 10 - 24 years of both genders in the five participating schools found in the Fako division, Southwest region of Cameroon.

2.3. Selection Criteria

2.3.1. Inclusion Criteria

All students aged 10 - 24 years in the five selected secondary schools who gave their consent.

2.3.2. Exclusion Criteria

- Those who did not complete most of the questions in the questionnaire were excluded.
- Those who were critically ill during data collection.

2.4. Sampling Method

Consecutive sampling was used to select the students aged 10 - 24 years in the five participatory secondary schools as identified by the assigned guidance counselors in these schools.

2.5. Data Collection Procedure

Coded questionnaires made up of standardized scales to assess knowledge of mental health disorders and screen for anxiety, depression, and substance use were shared with students in their classrooms during free periods by guidance counsellors with lived experiences, assisted by a research assistant. Clinical psychologists

and research staff trained the guidance counsellors in applying the scales to their various school settings. The questionnaires were cross-checked, validated, and signed by guidance counselors. These questionnaires were collected every week, checked again for completeness, and validated.

2.6. Sample Size Calculation

The sample size was determined via Cochran's formula [$Z^2 p\,(1-p)/d^2$], and the estimated proportion of mental disorders among students was 50%, 95% confidence level, and 5% margin of error. This gave a minimum sample size of $n = (1.96)^2 \times 0.5\,(1-0.5)/(0.05)^2 = 384$. A 10% contingency addition was performed on the sample size for nonresponses; the final sample size was 423 participants [20]. 423 was the minimum sample size calculated but a total of 958 participants were recruited to improve data quality and to enhance precision and reliability.

2.7. Assessment Tools and Measures

The questionnaire was divided into 3 main sections: section A had 6 questions designed to assess the sociodemographic characteristics of the study participants, section B comprised 18 questions aimed at evaluating students' knowledge of mental health disorders, and section C had 34 questions that focused on assessing the diagnosis and prevalence of mental health disorders [anxiety (7), substance abuse (4) and depression (9)]. The knowledge section was adapted from the Mental Health Knowledge Schedule (MAKS), which evaluated participants' understanding of mental health concepts.

For the prevalence assessment, the following standardized screening tools were employed: the Generalized Anxiety Disorder 7-item scale (GAD-7) to evaluate anxiety symptoms, the CAGE (Cut, Annoyed, Guilty, Eye) Substance Abuse Screening Tool to assess substance use, and the Patient Health Questionnaire 9-item scale (PHQ-9) to measure depressive symptoms. These tools were selected for their validity, reliability, and sensitivity in evaluating mental health disorders among adolescents and young adults.

For anxiety, a score ≥5 indicated anxiety, whereas for substance use, a score ≥1 suggested a problem, and for depression, a score ≥5 indicated depression. Anxiety was measured with seven statements scored from 0 to 21, and respondents with scores ≥5 were considered to have anxiety. Suicide risk was assessed with four questions scored from 0 to 4, and respondents with scores ≥1 were considered to be suffering from suicidal thoughts. Depression was determined with nine statements scored from 0 to 27, and respondents with scores ≥5 were considered to have depression. The overall prevalence was determined by the presence of any of these four disorders. For substance use, ≥2 indicated an alcohol problem.

2.8. Data Management

The coded questionnaires were thoroughly checked for completeness, and the data were entered into the Kobo Toolbox via the Open Data Kit application in-

stalled on Android phones. The data were then downloaded as an Excel file from the secure Kobo Toolbox database, cleaned, coded, and exported to SPSS version 25 for analysis. The data were saved in a password-protected file to prevent unauthorized access.

2.9. Data Analysis

Regarding knowledge of mental health disorders, each correct answer was awarded a score of 1. The total score for each participant was calculated by summing all the knowledge questions. Participants who scored ≤ 9 points were considered to have poor knowledge, whereas those who scored above 9 points were deemed to have good knowledge of mental disorders. The disparity in knowledge between schools and communities was determined by comparing knowledge scores between participants in schools and communities. Regarding. The prevalence of anxiety, suicidal thoughts, depression, and substance use was used to determine the prevalence of mental health disorders in the study. For specific mental health disorders, anxiety was assessed via 7 statements with a four-point Likert scale, where 0 = not at all and 3 = nearly every day. The scores were calculated for each respondent, with the total scores ranging from 0 to 21 points. The respondents had anxiety if they scored ≥5 and no anxiety if they scored <5. For the substance use questions, a response of "yes" was assigned a score of 1, whereas "no" was assigned a score of 0. The total scores ranged from 0 to 4 points. Respondents with 1 point had no problem, whereas all the respondents with ≥1 point had a problem with substance use. For depression screening, 9 statements were used on a four-point Likert scale, where 0 = not at all and 3 = nearly every day. The scores were calculated for each respondent, with the total scores ranging from 0 to 27 points. The respondents had depression if they scored ≥10 and no depression if they scored <10. For substance abuse, 4 statements were used on a four-point Likert scale. The scores were calculated for each respondent, with the total scores ranging from 0 to 4 points. The respondents had substance abuse disorders if they scored ≥2 and no substance abuse disorder if they scored <2.

2.10. Ethics Approval

Ethical clearance with number: 2023/2066-3/UB/SG/IRB/FHS was sought and obtained from the Institutional Review Board of the Faculty of Health Sciences, University of Buea. We collaborated with the Ministry of Youth and Civic Education and the School administration to reach out to these students in the various schools. The school administration and guidance counsellors stood in as legal guidance for students. Confidentiality was maintained for participant responses through proper storage of the data in an encrypted system. Data was then extracted from the records with confidentiality and securely managed using the Open Data kit database with a password for protection. Parental consent was obtained through a written consent form, which was distributed to parents or guardians through the school. The consent form was sent home with students and re-

turned to the school. Participatory students aged 10 - 17 years provided assent through a separate age—age-appropriate assent form, which was administered by the guardian counsellors in the school

3. Results

3.1. Demographic Characteristics

A total of 958 study participants were recruited successfully; the mean age of the respondents was 15.41 years, with a range of 10 - 24 years. Most of the study participants (614, 64.1%) were aged 15 - 19 years. Additionally, 585 participants (61.1%) were female, and the majority of the participants (370, 38.6%) were from the locality of Limbe, with 581 being from the host population (Table 1).

Table 1. Demographic characteristics of the study population.

Variable	Frequency (n = 958)	Percentage (%)
Age group (15.41 ± 2.38)		
10 - 14	308	32.2
15 - 19	614	64.1
20 - 24	36	3.8
Total	**958**	**100.0**
Gender		
Male	373	38.9
Female	585	61.1
Total	**958**	**100.0**
Locality		
Buea	346	36.1
Limbe	370	38.6
Tiko	87	9.1
Mutengene	155	16.2
Total	**958**	**100.0**
Displacement status		
Internally displaced person	298	31.1
Host population	581	60.6
Refugee	40	4.2
Returnee	39	4.1
Total	**958**	**100.0**

3.2. Knowledge of the Respondents Regarding Mental Health Disorders

Almost all (574, 59.9%) of the study participants knew that mental health disorders are a type of medical disorder, and the majority (774, 80.8%) recognized mental health disorders as treatable. Additionally, 776 (81.0%) of the study participants reported that mental health disorders are not contagious, and 804 (83.9%) indicated that living alone is not a treatment for mental illness. Additionally, many (655, 68.8%) of the respondents indicated that the development of mental health problems is identical for males and females. Talking or laughing alone and excessive or unusual happiness were reported as the major symptoms of mental illness by 648 (67.6%) and 601 (62.7%) of the study participants, respectively (Table 2).

Table 2. Knowledge of mental health disorders.

No.	Items	Correct answers	Percentage (%)
1	Mental health disorders are a kind of medical disorder **[yes]**	574	59.9
2	Mental health disorders are contagious diseases **[no]**	776	81.0
3	Recovered psychiatric patients are employed productively **[yes]**	466	48.6
4	Mental health disorders are treatable **[yes]**	774	80.8
5	People with severe mental health problems can fully recover **[yes]**	627	65.4
6	Living alone is the treatment for mental illness **[no]**	804	83.9
	Symptoms of mental illness:		
	i) Irritability **[yes]**	504	52.6
	ii) Talking/laughing alone **[yes]**	648	67.6
	iii) Wandering **[yes]**	582	60.8
	iv) Excessive and unusual happiness **[yes]**	601	62.7
	v) Strange/unusual behavior **[yes]**	697	72.8
7	vi) Excessive Feeling sad, tearful **[yes]**	594	62.0
	vii) Aggression/violence **[yes]**	669	69.8
	viii) Hearing and seeing things that are not there **[yes]**	693	72.3
	ix) Lack of sleep **[no]**	458	47.8
	x) Talkativeness **[yes]**	522	54.5
	xi) Trying to kill oneself **[yes]**	572	59.7
	xii) Isolating oneself **[yes]**	586	61.2
8	Older people may develop mental disorders **[yes]**	741	77.3
9	Children may develop mental disorders **[yes]**	685	71.5
10	Women may develop mental disorders equal to males **[yes]**	655	68.4

Continued

11	Lower socioeconomic class or poverty increases the risk of having mental health disorders **[yes]**	593	61.9
	Metal illness is due to:		
	i) Genetic reasons **[yes]**	527	55.0
	ii) Stress/tension **[yes]**	714	74.5
	iii) Accident/injury **[yes]**	716	74.7
	iv) Brain functional abnormality **[yes]**	751	78.4
	v) Family events/conflict **[yes]**	621	64.8
	vi) Conflict in marriage or family **[yes]**	609	63.6
12	vii) Worrying too much **[yes]**	703	73.4
	viii) Neurotransmitter imbalances **[yes]**	538	56.2
	ix) Witchcraft **[yes]**	586	61.2
	x) God's punishment for past sins **[no]**	440	45.9
	xi) Evil spirit possession **[yes]**	610	63.7
	xii) Personal weakness **[yes]**	462	48.2
	xiii) Poor nutrition **[yes]**	395	41.2
	xiv) Polluted atmosphere **[yes]**	309	32.3
	Mental illness can be treated:		
13	i) Traditional **[yes]**	511	53.3
	ii) Religious **[yes]**	636	66.4
	iii) Medical **[yes]**	803	83.8
14	Professional advice or counselling can be an effective treatment for people with mental illnesses **[yes]**	707	73.8
15	Medication can be an effective treatment for people with mental illnesses **[yes]**	708	73.9
16	Mental illness requires treatment from a psychiatric hospital **[yes]**	731	76.3
17	Mental illness can be successfully managed at home by families **[yes]**	402	42.0
18	Mental illness should be managed by witchdoctors **[no]**	785	81.9

The median overall knowledge score value was 28, with minimum and maximum values of 4 and 41 out of 44 knowledge items, respectively. The overall knowledge score indicated that 55.3% of the respondents (530 individuals) had an adequate understanding of mental health problems (Figure 1).

3.3. Factors Associated with Knowledge Regarding Mental Health Disorders

Univariate logistic regression analysis was used to test the associations between

sociodemographic factors and knowledge of mental health disorders. The logistic regression analysis results revealed that age group, gender, particularly male sex [p = 0.029], OR: 0.748 (0.576 - 0.971)] and locality of Tiko [p = 0.001, OR: 0.384 (0.226 - 0.670)], were significantly associated with knowledge of mental disorders, with a cut-off of <0.2 (Table 3).

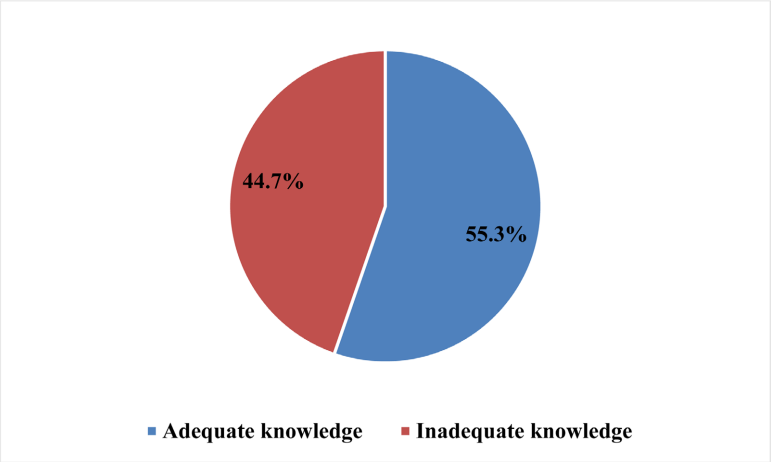

Figure 1. Distribution of participants' overall knowledge of mental health disorders.

Table 3. Univariate associations between demographic characteristics and knowledge of mental health disorders.

Variable	n	Knowledge of mental health disorders				COR (95%CI)	p value
		Yes	%	No	%		
Age group (15.41 ± 2.38)							
10 - 14	308	167	54.2	141	45.8	0.754 (0.372 - 1.528)	0.433
15 - 19	614	341	55.5	273	45.5	0.795 (0.399 - 1.583)	0.514
20 - 24	36	22	61.1	14	38.9	1	
Total	**958**	**530**	**55.3**	**428**	**44.7**		
Gender							
Male	373	190	50.9	183	49.1	**0.748 (0.576 - 0.971)**	**0.029**
Female	585	340	58.1	245	41.9	1	
Total	**958**	**530**	**55.3**	**428**	**44.7**		
Locality							
Buea	346	195	56.4	151	43.6	0.908 (0.619 - 1.333)	0.623
Limbe	370	213	57.6	157	42.4	0.954 (0.652 - 1.396)	0.809
Tiko	87	31	35.6	56	64.4	**0.384 (0.226 - 0.670)**	**0.001**
Mutengene	155	91	58.7	64	41.3	1	
Total	**958**	**530**	**55.3**	**428**	**44.7**		

Continued

Displacement status							
Internally displaced person	298	171	57.4	127	42.6	1.154 (0.590 - 2.256)	0.675
Host population	581	325	55.9	256	44.1	1.088 (0.568 - 2.086)	0.799
Refugee	40	13	32.5	27	67.5	0.413 (0.166 - 1.029)	0.058
Returnee	39	21	53.8	18	46.2	1	
Total	**958**	**530**	**55.3**	**428**	**44.7**		
Suicidal thoughts							
No problem	768	434	56.5	334	43.5	1.272 (0.926 - 1.749)	0.138
Problem with suicidal thoughts	190	96	50.5	94	49.5	1	
Total	**958**	**530**	**55.3**	**428**	**44.7**		

All factors significant in the univariate analysis were analysed via multivariate logistic regression analysis. The associations between sociodemographic factors and knowledge of mental health disorders were tested. The logistic regression analysis results revealed that sex, particularly male sex [p = 0.021), OR: 0.730 (0.559 - 0.954)] and locality of Tiko [p = 0.000), OR: 0.368 (0.213 - 0.639)], were significantly associated with knowledge of mental disorders (p < 0.05) (Table 4).

Table 4. Multivariate associations between demographic characteristics and knowledge of mental health disorders.

Variable	n	Knowledge of mental health disorders				AOR (95%CI)	p value
		Yes	%	No	%		
Gender							
Male	373	190	50.9	183	49.1	**0.730 (0.559 - 0.954)**	**0.021**
Female	585	340	58.1	245	41.9	1	
Total	**958**	**530**	**55.3**	**428**	**44.7**		
Locality							
Buea	346	195	56.4	151	43.6	0.896 (0.603 - 1.332)	0.587
Limbe	370	213	57.6	157	42.4	0.922 (0.624 - 1.361)	0.683
Tiko	87	31	35.6	56	64.4	**0.368 (0.213 - 0.639)**	**0.000**
Mutengene	155	91	58.7	64	41.3	1	
Total	**958**	**530**	**55.3**	**428**	**44.7**		
Displacement status							
Internally displaced person	298	171	57.4	127	42.6	1.229 (0.623 - 2.423)	0.552
Host population	581	325	55.9	256	44.1	1.165 (0.603 - 2.250)	0.649

Continued

Refugee	40	13	32.5	27	67.5	0.449 (0.177 - 1.138)	0.092
Returnee	39	21	53.8	18	46.2	1	
Total	**958**	**530**	**55.3**	**428**	**44.7**		
Suicidal thoughts							
No problem	768	434	56.5	334	43.5	1.249 (0.902 - 1.730)	0.181
Problem with suicidal thoughts	190	96	50.5	94	49.5	1	
Total	**958**	**530**	**55.3**	**428**	**44.7**		

3.4. Overall Prevalence of Mental Health Disorders and Associated Factors

Among the 958 participants in this study, 73.6% (705) of the participants had mental health disorders, with 54.7% suffering from anxiety disorders, 42.2% suffering from substance use disorders, 19.8% suffering from suicidal thoughts, and 54.7% suffering from depression (Figure 2, Table 5).

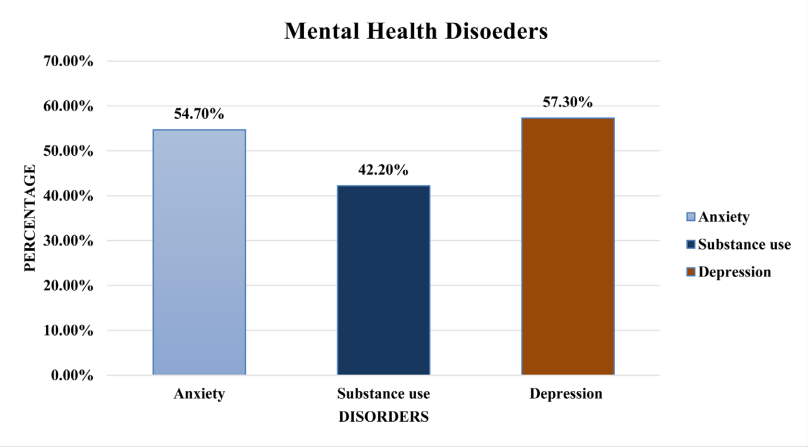

Figure 2. Mental health disorders among children and youths aged 10 - 24 years in the Fako Division.

Table 5. Mental disorders among children and youths aged 10 - 24 years in Fako Division (2024).

Variable	Frequency	Percentage
Anxiety screening		
Normal	434	45.3
Mild	315	32.9
Moderate	154	16.1
Severe	55	5.7
Total	**958**	**100.0**

Continued

Depression screening		
No depression	409	42.7
Mild depression	287	30.0
Moderate depression	178	18.6
Moderately severe depression	64	6.7
Severe depression	20	2.1
Total	**958**	**100.0**
Substance use screening		
No problem	554	57.8
Problem with substance use	404	44.2
Total	**958**	**100.0**
Suicidal thoughts		
No problem	768	80.2
Problem with suicidal thoughts	190	19.8
Total	**958**	**100.0**

3.5. Factors Associated with Mental Health Disorders

Univariate logistic regression analysis was used to test the associations between sociodemographic factors and knowledge of mental health disorders. The logistic regression analysis results revealed that the age groups 10 - 14 years (p = 0.020, OR: 0.180), 15 - 19 years (p = 0.036, OR: 0.215), sex (p = 0.188, OR: 0.811) and suicidal thoughts (p = 0.000, OR: 0.213) were significantly associated with knowledge of mental disorders, with cut-off values <0.2 (Table 6).

Table 6. Univariate associations between demographic characteristics and the prevalence of mental health disorders.

Variable	n	Prevalence of mental health disorders				COR (95%CI)	p value
		Yes	%	No	%		
Age group (15.41 ± 2.38)							
10 - 14	308	232	75.3	76	24.7	**0.180 (0.042 - 0.765)**	**0.020**
15 - 19	614	482	78.5	132	21.5	**0.215 (0.051 - 0.906)**	**0.036**
20 - 24	36	34	94.4	2	5.6	1	
Total	**958**	**748**	**78.1**	**210**	**21.9**		
Gender							
Male	373	283	75.9	90	24.1	**0.811 (0.595 - 1.107)**	**0.188**

Continued

Female	585	465	79.5	120	24.5	1	
Total	**958**	**748**	**78.1**	**210**	**21.9**		
Locality							
Buea	346	271	78.3	75	21.7	1.174 (0.751 - 1.834)	0.482
Limbe	370	290	78.4	80	21.6	1.177 (0.757 - 1.831)	0.469
Tiko	87	70	80.5	17	19.5	1.337 (0.702 - 2.547)	0.376
Mutengene	155	117	75.5	38	24.5	1	
Total	**958**	**748**	**78.1**	**210**	**21.9**		
Displacement status							
Internally displaced person	298	240	80.5	58	19.5	1.626 (0.756 - 3.456)	0.207
Host population	581	449	77.3	132	22.7	1.336 (0.648 - 2.756)	0.433
Refugee	40	31	77.5	9	22.5	1.353 (0.489 - 3.747)	0.561
Returnee	39	28	71.8	11	28.2	1	
Total	**958**	**748**	**78.1**	**210**	**21.9**		
Suicidal thoughts							
No problem	768	571	74.3	197	25.7	**0.213 (0.118 - 0.383)**	**0.000**
Problem with suicidal thoughts	190	177	93.2	13	6.8	1	
Total	**958**	**748**	**78.1**	**210**	**21.9**		

For all the factors that were significant in the univariate analysis, a multivariate logistic regression analysis was performed. The logistic regression analysis results, presented in Table 7 below, revealed that age groups 10 - 14 years (p = 0.025, OR: 0.188), 15 - 19 years (p = 0.040, OR: 0.219) and suicidal thoughts (p = 0.00, OR: 0.219) were significantly associated with the prevalence of mental health disorders, with p values <0.05 (Table 7).

Table 7. Multivariate associations between demographic characteristics and the prevalence of mental health disorders.

Variable	N	Prevalence of mental health disorders				AOR (95%CI)	p value
		Yes	%	No	%		
Age group (15.41±2.38)							
10 - 14	308	232	75.3	76	24.7	**0.188 (0.044 - 0.812)**	**0.025**
15 - 19	614	482	78.5	132	21.5	**0.219 (0.051 - 0.936)**	**0.040**
20 - 24	36	34	94.4	2	5.6	1	
Total	**958**	**748**	**78.1**	**210**	**21.9**		

Continued

Gender							
Male	373	283	75.9	90	24.1	0.807 (0.587 - 1.109)	0.187
Female	585	465	79.5	120	24.5	1	
Total	**958**	**748**	**78.1**	**210**	**21.9**		
Refugee	40	31	77.5	9	22.5		
Returnee	39	28	71.8	11	28.2		
Total	**958**	**748**	**78.1**	**210**	**21.9**		
Suicidal thoughts							
No problem	768	571	74.3	197	25.7	**0.219 (0.122 - 0.395)**	**0.000**
Problem with suicidal thoughts	190	177	93.2	13	6.8	1	
Total	**958**	**748**	**78.1**	**210**	**21.9**		

4. Discussion

This study aimed to assess the prevalence of anxiety, depression, and substance use disorders in secondary school students aged 10 - 24 years in several selected secondary schools in the Southwest Region of Cameroon.

The study population comprised 958 participants with a mean age of 15.41 years (range: 10 - 24 years). The majority of participants (64.1%) were between 15 and 19 years old, and 61.1% of the sample was female. In terms of location, 60.1% were from the host population, with 38.6% specifically from the locality of Limbe. The greater representation of females in our study sample is consistent with global trends, indicating that women are more likely to report anxiety symptoms and engage in substance use disorders [21].

4.1. Knowledge of Mental Health Disorders

Notably, 55.3% of secondary school students demonstrated adequate knowledge of mental health disorders. While this level of awareness is encouraging, it is lower than the 65.3% reported by Siddique *et al.* (2022) [22] among university students. This difference likely reflects the increasing exposure to mental health information and resources students receive at the university level. The identification of "talking or laughing alone" and "excessive or unusual happiness" as major symptoms by a significant number of participants was consistent with the findings of Tesfaye *et al.* (2021) [23]. This reveals the persistence of misconceptions and stigmatizing stereotypes surrounding mental health. While the understanding that mental health disorders are not contagious and that social isolation is not a helpful treatment provides a foundation for accurate knowledge, the observed misconceptions underscore the critical need for comprehensive and nuanced mental health education in secondary schools.

4.2. Factors Associated with Knowledge of Mental Health Disorders

Our analysis revealed a significant association between sex and knowledge of mental health disorders. Males presented significantly lower odds of possessing adequate knowledge than females did (OR = 0.730, 95% CI: 0.559 - 0.954). This finding aligns with existing research suggesting potential gender disparities in health literacy and access to health information. Sociocultural norms that discourage men from expressing vulnerability and seeking help for mental health concerns may contribute to this discrepancy [24].

Further investigations are warranted to explore the underlying causes and develop targeted interventions to improve mental health knowledge among male students. Furthermore, a significant association was found between locality and knowledge of mental health disorders. Residents of the locality of Tiko presented significantly lower odds of adequate knowledge than those from Limbe did (OR = 0.368, 95% CI: 0.213 - 0.639). This stark difference underscores the potential for disparities in access to mental health resources and information across different geographic areas within the Southwest Region. Factors such as the limited availability of healthcare professionals, transportation barriers, socioeconomic disadvantages, and variations in the quality of education may contribute to this knowledge gap [25]. Targeted interventions are needed to address these disparities and ensure equitable access to mental health information for all students, irrespective of their location. These interventions should include community-based mental health awareness campaigns and the integration of mental health education into school curricula.

4.3. Prevalence of Anxiety, Depression, and Substance Use Disorders

The overall prevalence of mental health disorders among the students in this study was 73.6%, which is alarmingly high. A substantial proportion of the sample experienced anxiety (54.7%), substance use disorders (42.2%), suicidal thoughts (19.8%), and depression (57.3%). This prevalence rate is significantly higher than the 50% reported by Sakthivel *et al.* (2021) [20] in a different population. This could be because our study evaluated a larger sample size. However, differences in population characteristics may have also contributed. This difference suggests a potentially greater burden of mental health issues among secondary school students in the Southwest Region of Cameroon, which may be related to the ongoing sociopolitical instability and associated trauma in the country. Prolonged conflict has resulted in displacement, economic hardship, and increased stress levels, all of which can significantly contribute to mental health problems, especially among vulnerable populations such as adolescents [19].

4.4. Factors Associated with Anxiety, Depression, and Substance Use Disorders

Multivariate logistic regression analysis revealed significant associations between

several factors and the prevalence of mental health disorders. Specifically, younger age groups (10 - 14 years: OR = 0.188, p = 0.025; 15 - 19 years: OR = 0.219, p = 0.040) and the presence of suicidal thoughts (OR = 0.219, p = 0.00) were less likely to develop mental health disorders. This may reflect their lesser vulnerability to environmental stressors and limited coping mechanisms. The strong association between suicidal thoughts and mental health disorders underscores the importance of early identification and intervention to prevent potential self-harm.

5. Conclusion

Overall, this study highlights the urgent need for targeted interventions to increase mental health literacy among youths in the southwest region of Cameroon. The high prevalence of mental health disorders, coupled with inadequate knowledge, underscores the importance of addressing cultural misconceptions such as attribution to witchcraft and evil spirit possession. By improving understanding and reducing stigma, stakeholders can create a supportive environment to encourage help-seeking behaviours, ultimately leading to better mental health outcomes for affected youths.

6. Limitations

- The study's reliance on self-reported data introduces the potential for response bias and inaccuracies. Students may be reluctant to disclose sensitive information about their mental health symptoms or substance use behaviours because of stigma, fear of judgment, or social desirability. Furthermore, some students may lack awareness of their symptoms or have difficulty accurately recalling past experiences.
- Sampling bias, as the study included only students who were willing to participate and may have missed those who were struggling the most or who were less likely to trust researchers.
- It was difficult to control for all potential confounding factors that may influence the relationship between conflict exposure and mental health outcomes. Other factors, such as preexisting mental health conditions, family dynamics, access to social support, socioeconomic status, and exposure to stressors, may also play a significant role and need to be considered when interpreting the findings.

7. Recommendations

- The government should commit to increasing investment in mental health services for young people in conflict-affected areas. This includes allocating funding for mental health programs, integrating mental health services into primary healthcare, and implementing policies that protect the rights of individuals with mental health conditions. Public awareness campaigns can be launched to mitigate mental illness and encourage help-seeking behavior.
- Students themselves should be empowered to prioritize their mental well-being through participation in mental health awareness programs, utilization of peer

support networks, and proactive help-seeking when experiencing symptoms of anxiety, depression, or substance use. Education should emphasize self-care strategies, stress management techniques, and the importance of open communication with trusted adults or mental health workers. Students should also be encouraged to challenge the stigma associated with mental illness and advocate for improved mental health resources within their schools and communities.

- Schools should prioritize creating a supportive and inclusive environment that promotes student mental health. This includes training teachers and staff to recognize signs of mental distress and provide initial support, hiring qualified school counselors or psychologists, and establishing confidential spaces where students can access mental health services.

Acknowledgements

Our sincere gratitude goes to Grand Challenges Canada for funding this study. We also acknowledge the efforts of the entire staff of the Lifafa Research Foundation for their sacrifices to ensure that this work is completed. We extend our gratitude to the participants and their parents for their responses, which enabled us to realize the results of this study.

Authors' Contributions

LK was the principal investigator, project lead, and main initiator of this research work from conception of the topic to execution and compilation for publication, and AL and AT ethical clearance application procedure. GG and DD participated in the initial draft of this paper, methodological assessment and design of the study. NC analysed the data and produced the result, and evaluated the objectives of the work as well as the final compilation. FK and AG contributed to the methodology and supervised the data collection. KZ checked this work and ensured that the aim of this work was achieved and covered in its entirety. FK also gave contributions to this paper, especially concerning the methodology checked for any grammatical errors on all the subsequent and final versions of the paper. KV Monitored and evaluated progress based on the methodology while VT compiled the references. All authors read and approved the final manuscript.

Availability of Data and Materials

The dataset used for the current study is available from the corresponding author on reasonable request.

Consent for Publication

Not applicable.

Funding

This study was funded by Grand Challenges Canada (Proof of concept).

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Hoteit, R., Bou-Hamad, I., Hijazi, S., Ayna, D., Romani, M. and El Morr, C. (2024) A Cross-Sectional Study of University Students' Mental Health and Lifestyle Practices Amidst the COVID-19 Pandemic. *PLOS ONE*, **19**, e0302265. https://doi.org/10.1371/journal.pone.0302265

[2] Mohler-Kuo, M., Dzemaili, S., Foster, S., Werlen, L. and Walitza, S. (2021) Stress and Mental Health among Children/Adolescents, Their Parents, and Young Adults during the First COVID-19 Lockdown in Switzerland. *International Journal of Environmental Research and Public Health*, **18**, Article 4668. https://doi.org/10.3390/ijerph18094668

[3] Buizza, C., Bazzoli, L. and Ghilardi, A. (2022) Changes in College Students Mental Health and Lifestyle during the COVID-19 Pandemic: A Systematic Review of Longitudinal Studies. *Adolescent Research Review*, **7**, 537-550. https://doi.org/10.1007/s40894-022-00192-7

[4] World Health Organization (2024) Mental Health of Adolescents. https://www.who.int/news-room/fact-sheets/detail/adolescent-mental-health#:~:text=Globally%2C%20one%20in%20seven%2010,illness%20and%20disability%20among%20adolescents

[5] National Institute on Drug Abuse (2024) Co-Occurring Disorders and Health Conditions. https://nida.nih.gov/research-topics/co-occurring-disorders-health-conditions

[6] Ahinkorah, B.O., Aboagye, R.G., Arthur-Holmes, F., Hagan, J.E., Okyere, J., Budu, E., *et al*. (2021) A Multi-Country Analysis of Prevalence of Anxiety-Induced Sleep Disturbance and Its Associated Factors among In-School Adolescents in Sub-Saharan Africa Using the Global School-Based Health Survey. *Healthcare*, **9**, Article 234. https://doi.org/10.3390/healthcare9020234

[7] Vitasari, P., Wahab, M.N.A., Othman, A., Herawan, T. and Sinnadurai, S.K. (2010) The Relationship between Study Anxiety and Academic Performance among Engineering Students. *Procedia-Social and Behavioral Sciences*, **8**, 490-497. https://doi.org/10.1016/j.sbspro.2010.12.067

[8] Liu, X., Yang, F., Huang, N., Zhang, S. and Guo, J. (2024) Thirty-Year Trends of Anxiety Disorders among Adolescents Based on the 2019 Global Burden of Disease Study. *General Psychiatry*, **37**, e101288. https://doi.org/10.1136/gpsych-2023-101288

[9] Alharbi, R., Alsuhaibani, K., Almarshad, A. and Alyahya, A. (2019) Depression and Anxiety among High School Student at Qassim Region. *Journal of Family Medicine and Primary Care*, **8**, 504-510. https://doi.org/10.4103/jfmpc.jfmpc_383_18

[10] Azasu, E.K., Babatunde, A., Amoako, E.O., Achulo, S. and Kugbey, N. (2024) Factors Contributing to Anxiety among Final Year Junior High School Students in Ghana: Implications for Supporting Mental Well-Being during Basic Education Certificate Examination. *Discover Psychology*, **4**, Article No. 128. https://doi.org/10.1007/s44202-024-00217-3

[11] American Psychiatric Association. What Is Depression? https://www.psychiatry.org/patients-families/depression/what-is-depression

[12] Abu Ruz, M.E., Al-Akash, H.Y. and Jarrah, S. (2018) Persistent (Anxiety and Depression) Affected Academic Achievement and Absenteeism in Nursing Students. *The*

Open Nursing Journal, **12**, 171-179. https://doi.org/10.2174/1874434601812010171

[13] Okeke, N.G., Okenyi, J.O., Ohanu, E.C. and Okeke, C. (2023) Prevalence of Depression among Senior Secondary School Students in Enugu Metropolis. medRxiv Preprint. https://doi.org/10.1101/2023.10.12.23296984

[14] Njim, T., Mbanga, C., Mouemba, D., Makebe, H., Toukam, L., Kika, B., *et al*. (2020) Determinants of Depression among Nursing Students in Cameroon: A Cross-Sectional Analysis. *BMC Nursing*, **19**, Article No. 26. https://doi.org/10.1186/s12912-020-00424-y

[15] Kerner, B. (2015) Comorbid Substance Use Disorders in Schizophrenia: A Latent Class Approach. *Psychiatry Research*, **225**, 395-401. https://doi.org/10.1016/j.psychres.2014.12.006

[16] SAMHSA, Center for Behavioral Health Statistics and Quality. Key Substance Use and Mental Health Indicators in the United States: Results from the 2019 National Survey on Drug Use and Health. https://library.samhsa.gov/product/results-2019-national-survey-drug-use-and-health-nsduh-key-substance-use-and-mental-health

[17] Kugbey, N. (2023) Prevalence and Correlates of Substance Use among School-Going Adolescents (11-18years) in Eight Sub-Saharan Africa Countries. *Substance Abuse Treatment, Prevention, and Policy*, **18**, Article No. 44. https://doi.org/10.1186/s13011-023-00542-1

[18] Mengistu, N., Madoro, D. and Molla, W. (2021) Association of Conflict-Affected Environment on Ethiopian Students' Mental Health and Its Correlates during COVID-19 Era. *Neuropsychiatric Disease and Treatment*, **17**, 3283-3292. https://doi.org/10.2147/ndt.s338073

[19] ReliefWeb Response. Cameroon: Réseau Genre—Assessments. https://response.reliefweb.int/cameroon/reseau-genre/assessments

[20] Kannappan, S., Sakthivel, A. and Panicker, A. (2021) Prevalence of Mental Health Problems among High School Students. *Indian Journal of Community Medicine*, **46**, Article 574. https://doi.org/10.4103/ijcm.ijcm_1041_20

[21] McLean, C.P., Asnaani, A., Litz, B.T. and Hofmann, S.G. (2011) Gender Differences in Anxiety Disorders: Prevalence, Course of Illness, Comorbidity and Burden of Illness. *Journal of Psychiatric Research*, **45**, 1027-1035. https://doi.org/10.1016/j.jpsychires.2011.03.006

[22] Siddique, M.A.B., Ovi, M.R., Ahammed, T., Chowdhury, M.A.B. and Uddin, M.J. (2022) Mental Health Knowledge and Awareness among University Students in Bangladesh. *Heliyon*, **8**, e11084. https://doi.org/10.1016/j.heliyon.2022.e11084

[23] Tesfaye, Y., Agenagnew, L., Anand, S., Tucho, G.T., Birhanu, Z., Ahmed, G., *et al*. (2021) Knowledge of the Community Regarding Mental Health Problems: A Cross-Sectional Study. *BMC Psychology*, **9**, Article No. 106. https://doi.org/10.1186/s40359-021-00607-5

[24] Zhu, A. (2025) Addressing the Stigma of Men Seeking Therapy. Heritage. https://www.heritagecounseling.net/blogs/addressing-the-stigma-of-men-seeking-therapy

[25] Qin, X. and Hsieh, C. (2020) Understanding and Addressing the Treatment Gap in Mental Healthcare: Economic Perspectives and Evidence from China. *INQUIRY*: *The Journal of Health Care Organization, Provision, and Financing*, **57**, 1-15.