

Prevalence of depression and its association with parental neglect among adolescents at governmental high schools of Aksum town, Tigray, Ethiopia, 2019: A cross sectional study

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Abstract

Background depression is one of the most serious and prevalent mental illnesses that can result in serious disability and ending life by committing suicide and homicide. The risks of having depression are substantially higher in persons who have parental neglect when compared to the general population.

Objective To detect prevalence of depression and its association with parental neglect among adolescents in governmental high schools at Aksum town, Tigray, Ethiopia 2019

Method A facility based cross-sectional study was conducted from January 1-30/2019 at Aksum town high schools. Public health questionnaire was used in this study to detect Depression. Study participants were selected using simple random sampling technique. Data was collected with face to face interview. Data was analyzed using statistical package for social science version 22. Bivariate and multivariate logistic regressions were used to see the association between depression and parental neglect. Adjusted Odds ratio at a p-value <0.05 with 95% confidence interval was taken to declare statistical significance of variables.

Background

Adolescence (10–19 years) is among age group which highly experiences several factors in their day to day activities (1). Adolescent age group is also a time that individuals will experience physical changes and take different responsibilities which may give rise to get mental disorders as it is a new environment for them. Youths constitute almost one-third of the world's population and among that one-third of them live in the developing world, where they form up to half of the population (2).

Child or adolescent abuse is an issue concerning millions of youths and their families worldwide. Maltreatment of youths can be defined as an act of omission or commission by others who are caregivers that may have danger, possible for danger or threats of danger to adolescents (3). Parental neglect involves an act of omission, and it is defined as a failure by a caregiver to address the adolescents' basic physical, emotional, medical/dental or educational needs (4, 5).

The burden of psychiatric disorders on youths is enormous and covers a great number of people in all types of societies. The majority of psychiatric disorders begin at an early age (12–24), even though they are supposed to be experienced in older individuals later in life. Depression is the most common and severe psychiatric disorder that leads to magnifying problems in an adolescent's capacity to take care of his or her everyday responsibilities and functionalities. Depressive disorders in adolescents result in a horrible consequences even to other healthy components. It may lead to educational impairment, comorbid psychoactive substance abuse, behavioral difficulties and risky reproductive and sexual practices (6).

A mental health service for adolescents' mental health problems is not adequate yet, even in the developed world. Age-related stigma is among the major contributory factors for unmet mental health

needs in youths (7). Currently, depression is recognized as the first psychiatric disorder of youths which is related to its common presentation, episodic nature and its ability to cause significant complications and impairment. According to the 2009 discussion paper released by world health organization (WHO), among 66 million individuals experiencing depression; 85% live in the developing world (8).

Some statistics indicate that depression is as frequent as 20% common in adolescents (9) and 43.4% of high school students in Tehran to be depressed (10). A study which was conducted between China and America using the Chinese version of the beck depression inventory reported that 15% of participants had depression among 503 subjects (11). Another study in New York revealed the magnitude of depression in high school students to be 34% (12). Another survey, using a summarized self-administered Beck's questionnaire, reported severe depression in 18% of 8,206 adolescents (13).

A school-based cross-sectional survey was conducted in South India to estimate the prevalence of depression among school-going adolescents. In this, a total of 2432 school-going adolescents were included in the study and 25% of them have been found to have depression (14).

Though depression is one of the major diseases that cause failure to socialize among youths, it is often neglected and has not been given adequate attention it needs. The scarcity services to emotional and other mental problems of children and adolescents make this study necessary for strong emphasis to be given for the support of mental health in Ethiopia for the sake of mental and behavioral welfare of growing children and adolescents (15).

Methods

Study design, period and setting

We conducted a facility-based cross-sectional study from January 1-30/2019. The study targeted adolescents at Aksum Town high schools. Aksum is located in the Tigray region which is 1024 Km far from Addis Ababa. There are three high schools in Aksum town currently named Aksum secondary school, Atse Kaleb secondary school and Kedamay Minilik secondary school and there are a total of 2579 grade nine and 2241 grade ten students in the three high schools.

Sample size calculation and sampling procedure

We calculated the sample size using a single population proportion formula and we took the following assumptions; 95% confidence interval and 4% marginal error. The proportion of depression is: (39.3%) from the previous study (16) and a non-response rate of 10%. The final sample size was taken to be 630. All governmental high schools found at Aksum town were included in our study. Students were accessed from each high school proportionally to their total number of students. Finally, respondents were selected for the study by simple random sampling i.e. lottery method.

Data collection instrument and techniques

Data was collected by face to face interview. Initially, screening tools and other developed structured questionnaire in English language was translated to Amharic and Tigrigna and back to English by independent person to check for consistency and understandability of the tool. Data was collected by six bachelor degree holder health professionals. The data collection process was supervised by the principal investigators. Training was given for data collectors for two days by the principal investigator regarding the process and techniques of data collection.

PHQ-9 was used to assess depression which is a multi-purpose instrument for screening, diagnosing, monitoring and measuring the severity of depression. PHQ 9 score of greater than or equal to 10 has sensitivity and a specificity of 88% for major depression. Adverse Childhood Experience Questionnaire (ACEQ) which is a 10 items screening tool was used to assess parental neglect. ACEQ includes questions that assess emotional abuse and neglect, physical abuse and neglect, educational and medical neglect and sexual abuse (17).

The Oslo 3 social support scale was applied to know the level of social support towards adolescents. The scale divides the level of social support into three as poor social support (3-8), moderate social support (9-11) and strong social support (12-14) (reliability Cronbach's $\alpha = 0.91$) (18).

OPERATIONAL DEFINITIONS

Adolescents: - For this study, a school-attending person specifically within the 15-19 years of age.

Depression: -Those who score great than 5 from the PHQ-9 scale (19).

Parental Neglect: - ACEQ which is a self-report instrument covering 10 items, to rate the severity of emotional abuse and neglect, physical abuse and neglect and sexual abuse (17).

Social support: - according to the Oslo-3 social support scale, a score of 3-8 is taken as poor support, 9-11 as moderate support and 12 and 14 as strong support (18).

Data analysis and interpretation

After the questionnaire was checked for cleanliness; data was entered using Epi-data 3.1 and exported to SPSS 22 statistical software for analysis. Socio-demographic characteristics of respondents were analyzed by descriptive statistics and presented in percentage, mean and standard deviations. Bivariate analysis was used to see the association between outcome and independent variable. Multivariate logistic regression was done for those variables whose p-value is less than 0.2. The significance of variables was considered at p-value < 0.05 and 95% CI of their respected adjusted odd ratio.

Result

Socio-demographic characteristics

A total of 624 participants with a response rate of 99.05% were included in the study. Among this 339 (54.3%) were females. The age of the majority of students 246 (39.4%) were known to be 15 years followed by 16 years of age 217(34.8%) and more than half 328 (52.6%) were grade 9 students. More than three fourth of participants 494 (79.2%) were orthodox Christian religion followers. (Table 1)

Table 1- Distribution of Socio-demographic factors in high school students at Aksum town (n=624)

Variable		frequency	Percent (%)
Sex	Male	285	45.7
	Female	339	54.3
Age	15	246	39.4
	16	217	34.8
	17	78	12.5
	18	63	10.1
	19	20	3.2
Grade	grade9	328	52.6
	grade10	296	47.4
Religion	Orthodox	494	79.2
	Muslim	101	16.2
	Protestant	24	3.8
	Other	5	.8
Family size	1-5	372	59.6
	>5	252	40.4
Residence	Urban	422	67.6
	Rural	202	32.4
Father's occupation	Farmer	220	35.3
	Labor work	32	5.1
	Merchant	112	17.9
	Government Employee	158	25.3
	Private Employee	102	16.3
Mother's occupation	Farmer	175	28.0
	Labor work	38	6.1
	Merchant	76	12.2
	Government employee	107	17.1
	Private employee	93	14.9
	housewife	135	21.6

Father's educational status	Illiterate	83	13.3
	1-4thgrade	162	26.0
	5-8thgrade	143	22.9
	9-12thgrade	112	17.9
	Certificate & Above	124	19.9
Mother's educational status	Illiterate	176	28.2
	1-4thgrade	136	21.8
	5-8thgrade	124	19.9
	9-12thgrade	117	18.8
	Certificate & Above	71	11.4

Social support related variables

Among participants, the level of social support was measured. Based on the result of this study majority of 256 (41%) students have been found to have poor social support followed by moderate social support 217 (34.8%) and only 151 (24.2%) of students were under good social support. (Figure 1)

Figure 1: - Distribution of the level of social support among high school students at Aksum town, 2019 (n=624)

Substance-related variables

Regarding substance use among high school students at Aksum town, only 22(3.5%) have chewed khat within their lifetime whereas only 14 (2.2%) of students chewed khat within the last 3 months. 247 (39.6%) of participants reported alcohol drinking in their lifetime while only 138 (22.1%) of students drunk alcohol within the last 3 months. Regarding cigarette smoking, 26 (4.2%) of the total participants smoke within their lifetime and 20(3.2%) smoke cigarettes within the last 3 months. (Figure 2)

Figure 2: -Distribution of substance-related factors among high school students at Aksum town, 2019 (n=624)

Parental neglect related variables

Parental neglect among adolescents was assessed using the adverse childhood experience questionnaire in which the neglected part assessed physical and emotional neglect. Among the 624 adolescents who participated in this study, 334 (53.5%) of the participants answered yes to one or more questions among the total 10 items of the adverse childhood experience questionnaire and females account 190 (56.9%) of

the total response. Among this figure of students experiencing parental neglect more than half 175 (52.4%) of them were grade 9 students. (Table 2)

Table 2:- Distribution of Adverse Childhood Experience questionnaire by sex and educational level among adolescents in the sampled governmental high schools in Aksum town, Ethiopia, 2019 (n=624)

Variables		Male (n, %)	Female (n, %)	Grade 9(n, %)	Grade 10(n, %)	Total (n, %)
Physically Hurt	Yes	74 (11.9)	116 (18.6)	98 (51.6)	92 (48.4)	190 (30.5)
	No	211 (33.8)	223 (35.7)	230 (53)	204 (47)	434 (69.5)
Hit you Marks of Injury	Yes	34 (5.5)	58 (9.3)	48 (52.2)	44 (47.8)	92 (14.7)
	No	251 (40.2)	281 (45)	280 (52.6)	252 (47.4)	532 (85.3)
Sexual Abuse	Yes	26 (4.2)	45 (7.2)	41 (57.7)	30 (42.3)	71 (11.4)
	No	259 (41.5)	294 (47.1)	287 (51.9)	286 (48.1)	553 (88.6)
No Love	Yes	41 (6.6)	67 (10.7)	51(47.2)	57 (52.8)	108 (17.3)
	No	244 (39.1)	272 (43.6)	277 (53.7)	237 (46.3)	516 (82.7)
Not Enough Food or Protection	Yes	35 (5.6)	44 (7)	43 (54.4)	36 (45.6)	79 (12.6)
	No	250 (40.1)	295 (47.3)	285 (52.3)	260 (47.7)	545 (87.4)
Divorced Parents	Yes	31 (5)	49 (7.9)	41 (51.3)	39 (48.7)	80 (12.8)
	No	254 (40.7)	290 (46.5)	287(52.8)	257(47.2)	544 (87.2)
Abuse with Gun or Knife	Yes	20 (3.2)	29 (4.6)	28 (57.1)	21 (42.9)	49 (7.8)
	No	265 (42.6)	310 (49.6)	300 (52.2)	275 (47.8)	575 (92.2)
Live With Alcoholic or Drug User	Yes	29 (4.6)	42 (6.7)	40 (56.3)	31 (43.7)	71 (11.3)
	No	256 (41)	297 (47.6)	288 (52.1)	265 (47.9)	553 (88.7)
Depressed or Attempted Suicide HH Member	Yes	19 (3)	28 (4.5)	31 (66)	16 (34)	47 (7.5)
	No	266 (42.5)	311 (49.8)	297 (51.5)	280 (48.5)	577 (92.5)
Household Member in Prison	Yes	41	46 (7.4)	50 (57.5)	37 (42.5)	87 (14)

		(6.6)				
	No	244 (39.1)	293 (47)	278 (51.8)	259 (48.2)	537 (86)
Parental neglect	Yes	144 (23.1)	190 (30.4)	175(52.4)	159(47.6)	334 (53.5)
	No	141 (22.6)	149 (23.9)	153(52.8)	137(47.2)	290 (46.5)

Prevalence of depression

The study showed that the prevalence of depression was 226 (36.2%) with 95% CI (32.3, 40.2). The prevalence rate was higher among grade 10 students since 110/296 (37.2%) of grade 10 students met the screening criteria for depression which is higher when compared to 116/328(35.4%) of grade 9 students met the screening criteria for depression in the study. According to the PHQ-9 severity classification from the total students under depression, 133 (21.3%) of students lie in mild depression category whereas 74 (11.4%), 15 (2.4%) and 7 (1.1%) of students were found to have moderate, moderately severe and severe depression respectively. (Figure 3)

Figure 3:- characterization of depression severity among adolescents in governmental high schools at Aksum town, 2019 (n=624)

Association between depression and parental neglect

Adverse childhood questionnaire which assesses physical neglect, educational neglect, emotional neglect, and medical neglect was used to assess the main independent variable. Physical neglect refers to parents' negligence to provide adequately nutritious meals consistently, or it might mean that a parent has abandoned their child. Educational neglect is a failure to provide a child with adequate education in the form of enrolling them in school or providing adequate homeschooling. Emotional neglect is consistently ignoring, rejecting, verbally abusing, teasing, withholding love, isolating or terrorizing a child. Medical neglect is, in turn, the failure to provide appropriate health care for a child (although financially able to do so) (20).

The adverse childhood experience questionnaire was checked for co-linearity between each item using the Pearson correlation coefficient at the p-value of <0.05. As a result, there was no co-linearity found between each item of the screening tool. A reliability test was conducted among the 10 items and it has been found to have high reliability (Cronbach's alpha=0.83). After it is checked for co-linearity it was entered into logistic regression analysis and it is found to have a p-value of <0.25 on bivariate analysis crude odd ratio (COR=2.75, 95% CI (1.95, 3.89), p-value=0.000).

In addition to parental neglect, bivariate analysis was done for other explanatory variables for depression and the result revealed that explanatory variables; sex, family size, father education, mother education, social support and current use of alcohol were found to have p-value <0.2 (Table 3).

These factors were entered into multivariate logistic regression for further analysis to control confounding effects. As a result being female, poor social support, mother educational status and parental neglect are found to be statistically significant for depression at p-value <0.05.

The odds of developing depression among those who had parental neglect were 2.61 times higher as compared to those who haven't parental neglect (AOR=2.61, 95% CI: (1.83,3.72)). (Table 3)

Table 3:- bivariate and multivariate logistic analysis of factors associated with depression among adolescents in the sampled governmental high schools in Aksum town, Ethiopia, 2019 (n=624)

Variable	Category	Depression		COR (95% CI)	AOR (95% CI)	p-value
		yes	No			
Sex	Male	83	202	1	1	
	Female	226	398	1.78(1.27, 2.48)	1.48(1.03, 2.13)	.034*
Family size	<=5	143	229	1	1	
	>5	83	169	0.79(0.56,1.10)	0.77 (0.53,1.10)	.150
Social support	Poor	107	149	1.86(1.21,2.88)	1.69(1.07,2.69)	.026*
	Moderate	77	140	1.43(0.91,2.24)	1.56(0.97,2.52)	.067
	Good	42	109	1	1	
Current alcohol	Yes	98	149	1.28(0.918,1.784)	0.73 (.51,1.06)	.100
	No	128	249	1	1	
Mother education	Illiterate	75	99	2.07(1.13, 3.80)	2.21 (1.09,4.49)	.028*
	1-4	49	86	1.56(0.83,2.93)	1.45 (0.70, 3.01)	.317
	5-8	47	79	1.63(0.861,3.08)	1.67(0.83,3.35)	.153
	9-12	36	82	1.20(0.62,2.31)	1.27 (.64,2.56)	.496
	College and above	19	52	1	1	
Father education	Illiterate	35	46	1.81(1.01,3.24)	1.11(.56,2.20)	.768
	1-4	62	101	1.46(0.89, 2.40)	0.92(.495, 1.706)	.789
	5-8	56	87	1.53 (0.92,2.55)	1.11 (0.61,2.03)	.730
	9-12	36	76	1.13(0.65,1.96)	1.00(.55,1.83)	.997
	College and above	37	88	1	1	
Parental neglect	Yes	156	178	2.75(1.95,3.89)	2.61 (1.83,3.72)	.000***
	No	70	220	1	1	

a = 0.05 * P-value<0.05 ** P-value< 0.01 *** P-value<0.001

Discussion on the prevalence of depression

The study revealed that the prevalence of depression was 36.2%. This result was in line with studies conducted at Addis Ababa (39.3%) among adolescents in governmental high schools (16) and Northern Iran 34% among high school and pre-university adolescents using Beck's questionnaire (21).

However, the current study finding for depression was higher than the studies conducted among adolescents at Korea 20.6% (22), Saudi Arabia 23.8 (23), Egypt 28.6% (24), Malaysia 10.3% (25) and Trinidad 25.3% (26). The reason for the above difference might be due to difference in adolescents age which was only 13-19 in Trinidad (26), study population who were only boys in Korea (22), type of study conducted which was a large survey in Ethiopia (27), screening tool which was BDI II in a study conducted at Saudi Arabia (23) and the children's depression inventory in a study at Malaysia (25) and sample size which was 1373 in Egypt (24).

On the other hand, the finding of this study on the prevalence of depression was lower than a study conducted at Can Tho-City, Vietnam 41.1% (28) and China Hong Kong 50% (29). This difference might be attributed to time point the studies conducted which was a long-term study in Hong Kong (29), difference in study subjects in which only those adolescents who are abused physically and emotionally were studied and difference in sample size in which large sample size was used in Vietnam i.e. 1159 students (28).

The above difference might also be due to differences in screening tools used to determine depression in which the Center for Epidemiology Studies Depression Scale (CES-D) was used in a study conducted at Can Tho-City, Vietnam (28).

Regarding the severity of depression, the prevalence of mild depression was in line with a study conducted in Egypt which was 21.5%. However, the result of this study for moderate and severe depression is higher than a study conducted in Egypt which was 7.1% and 0% in Egypt respectively (24) and Iran 5.7% and 0.3% respectively (21).

The result of this study on mild depression is also found to be lower than a study conducted in Iran among high school and pre-university adolescents which was 28% (21). A possible reason for the difference might be difference screening tools used to determine depression such as CES-D was applied in Iran (21) and sample size which was 1373 in Egypt (24).

Discussion on the association between depression and parental neglect

Parental neglect which is the main independent variable is found to be statistically associated with depression at $p\text{-value} < 0.05$. It was tried to analyze the students' parental neglect with other explanatory variables to control for confounding variables. After multivariate analysis, the strength of association between depression and parental neglect doesn't show a significant difference i.e. $COR=2.75$ and $AOR=2.61$.

Students who were experiencing parental neglect were 2.61 times more likely to develop depression than those who didn't experience parental neglect. This study is in line with a study conducted at Addis Ababa (AOR=2.9) (16). This may be because among the most common outcomes of neglect is the failure to succeed. Breakdown to succeed is a term that is normally applied to explain kids with a strange prototype of weight gain or weight loss, or experiencing inadequate growth patterns (both mental and physical health) per a kid's age and developmental phase. This situation can occur when a child does not get sufficient diet or necessary medical consideration essential for appropriate bodily development (30); which may later hinder adolescents' overall physical health including mental health and lead them to depression.

In more tremendous cases breakdown to succeed can also influence children over their entire existence course by really destructing his/her cognitive progress and his/her immune system due to inadequate calorie intake or lack of therapeutic consideration, making the child lose developmental milestones to a great extent and a great extent prone to poor health even afterward adulthood and give way to depression (30).

It might also be because a preponderance of neglected kids displays attachment disorder manifestations and finally form timid connections even to their close families. This disturbed attachment to their primary caregiver alters their upcoming interaction with peers by making them emotional and physically isolated from others and this intern reducing the possibility of forming true relations. Moreover, as a result of their precedent abuse, neglected children experience that forming close relationships with others loses their control in life and exposes them by raising their susceptibility (31).

Neglectful parents and caregivers give poor interaction and positivity for their belongings which is linked to increased levels of shame called shame-proneness (32). Shame-proneness may increase neglected adolescent's risk for depressive symptoms since they try to suppress such an aversive feeling. Shame suppression, in turn, may lead to sadness, social isolation and withdrawal and lastly to depression (33, 34).

The development of the brain may continue beyond adolescence age group. Therefore, neglectful experiences may impose a lasting effect on the continuing need for optimal conditions for development of some structures concerned with attention, emotional regulation, which contributes for the heightened occurrence of depression on victims (35).

The increased occurrence of depression in those who are experiencing parental neglect might also be due to the reason that neglected children show trouble in regulating their feeling, appreciate others' emotional expression and trouble in differentiating emotions which amplify their susceptibility for developing depression. Youth with a history of neglect during their early ages may also have stressful reminders which contributes to their current depressive state by suppressing and leads to deregulation of their emotion (36).

The higher prevalence of depression may also be a result of the injured hippocampus, as there are elevated levels of stress hormones such as cortisol due to increased stress levels in youths who had experienced neglect. This increased release of stress hormone is assumed to have an injury on the hippocampus; cortical area implicated in diverse brain function and this, in turn, gives rise for developing depression in youths (37).

Conclusions And Recommendations

In the current study, the prevalence of depression is found to be high when compared to other populations. A significant and strong association is also determined between parental neglect and depression.

To school teachers

It is good if school teachers give emphasize to those students who seem psychologically unwell. It is better if school teachers exercise recommending such students to school psychologists.

To researchers

It is good to conduct a prospective cohort study to investigate the temporal relationship between factors and depression.

To Aksum university comprehensive hospital

It is good if Aksum university comprehensive hospital start campaign which will teach about the effect of parental neglect on the adolescent's mental health. Then, it is good to start clinic service for students who are psychologically unwell including consultation service.

Abbreviations

ACEQ: Adverse Childhood Experience Questionnaire, AOR: Adjusted Odd Ratio, CDI: childhood depression inventory, CES-D: Center for Epidemiology Studies Depression scale, CI: Confidence Interval, COR: Crude Odd Ratio, PHQ-9: Patient Health Questionnaire, SPSS 22: Statistical Package for Social Science Version 22, WHO: World Health Organization

Declarations

Ethics approval and consent to participate

Ethical clearance was obtained from the ethical review board of the Institute of Health, Aksum University. Written consent was asked from each selected student after they are informed about the nature, purposes, benefits and adverse effects of the study and invited to participate. Written assent was also obtained from those who are under 18 years old from their parents/guardians/teachers. Confidentiality

was ensured. Participants were strictly informed as they have the right to refuse or discontinue participation at any time.

Consent for publication

Not applicable

Availability of data and materials

All the data included in the manuscript can be accessed from the corresponding author Mengesha Srahbzu upon request through email address of mengusew@gmail.com.

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Competing interests

The authors declare that they have no competing interest

Authors' Contributions

ET and MS originated the idea and wrote the proposal, participated in data collection, analyzed the data and drafted the paper. All authors read and approved the final version of the manuscript.

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Figures

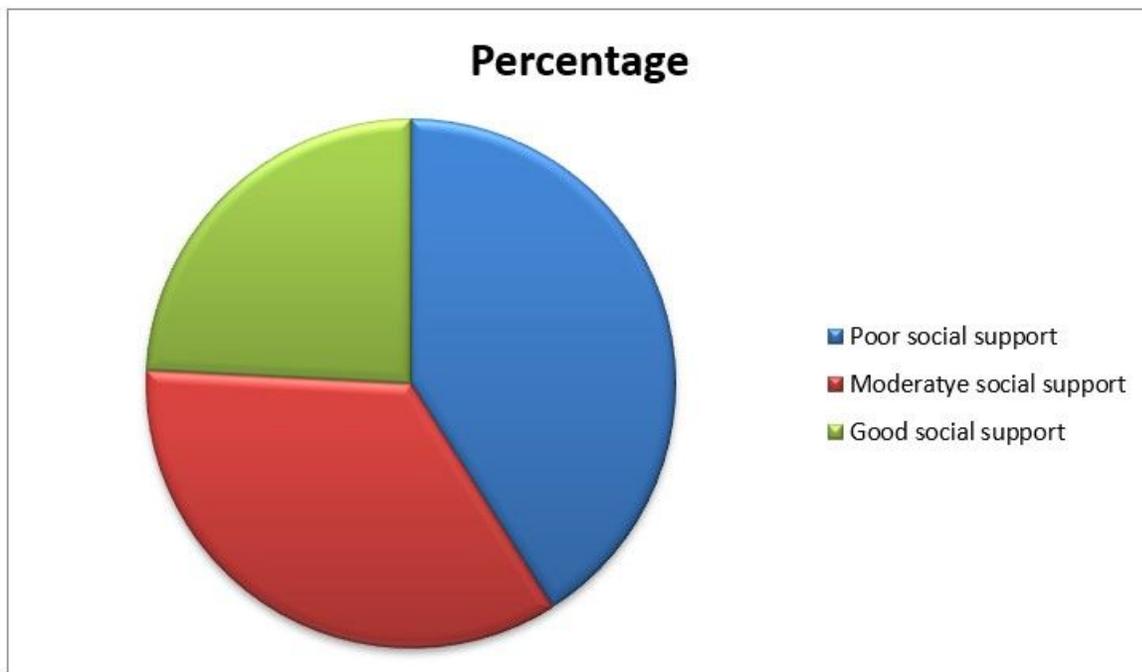


Figure 1

Distribution of the level of social support among high school students at Aksum town, 2019 (n=624)

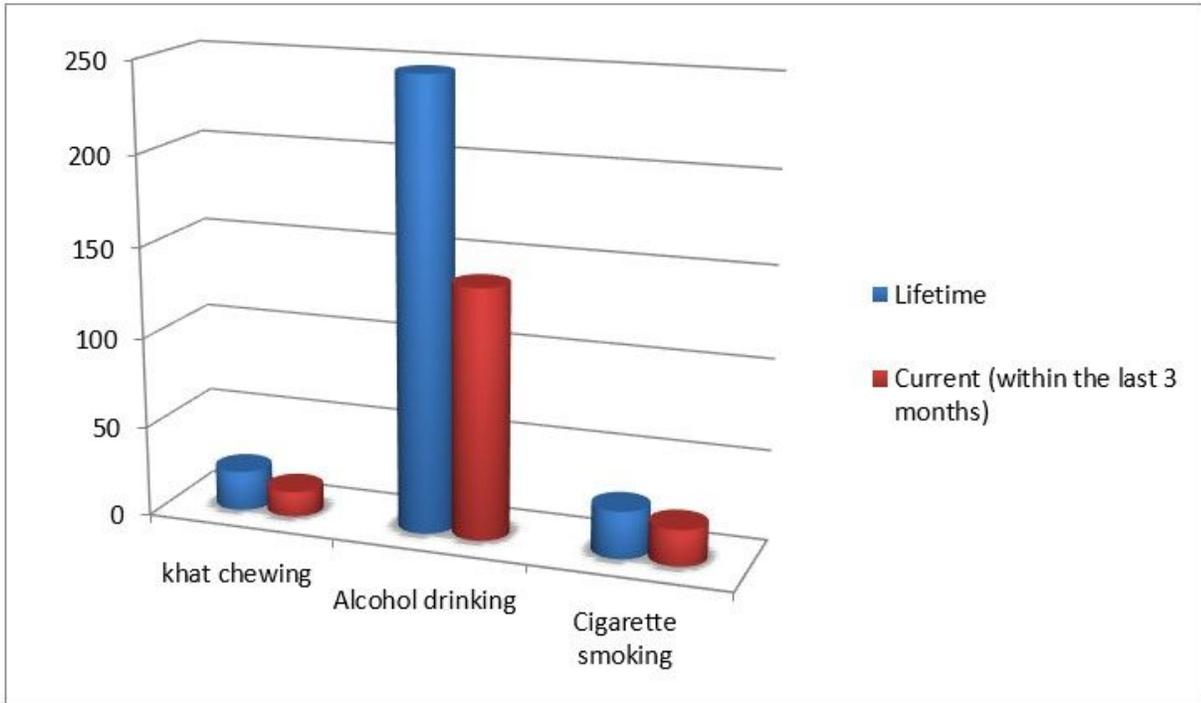


Figure 2

Distribution of substance-related factors among high school students at Aksum town, 2019 (n=624)

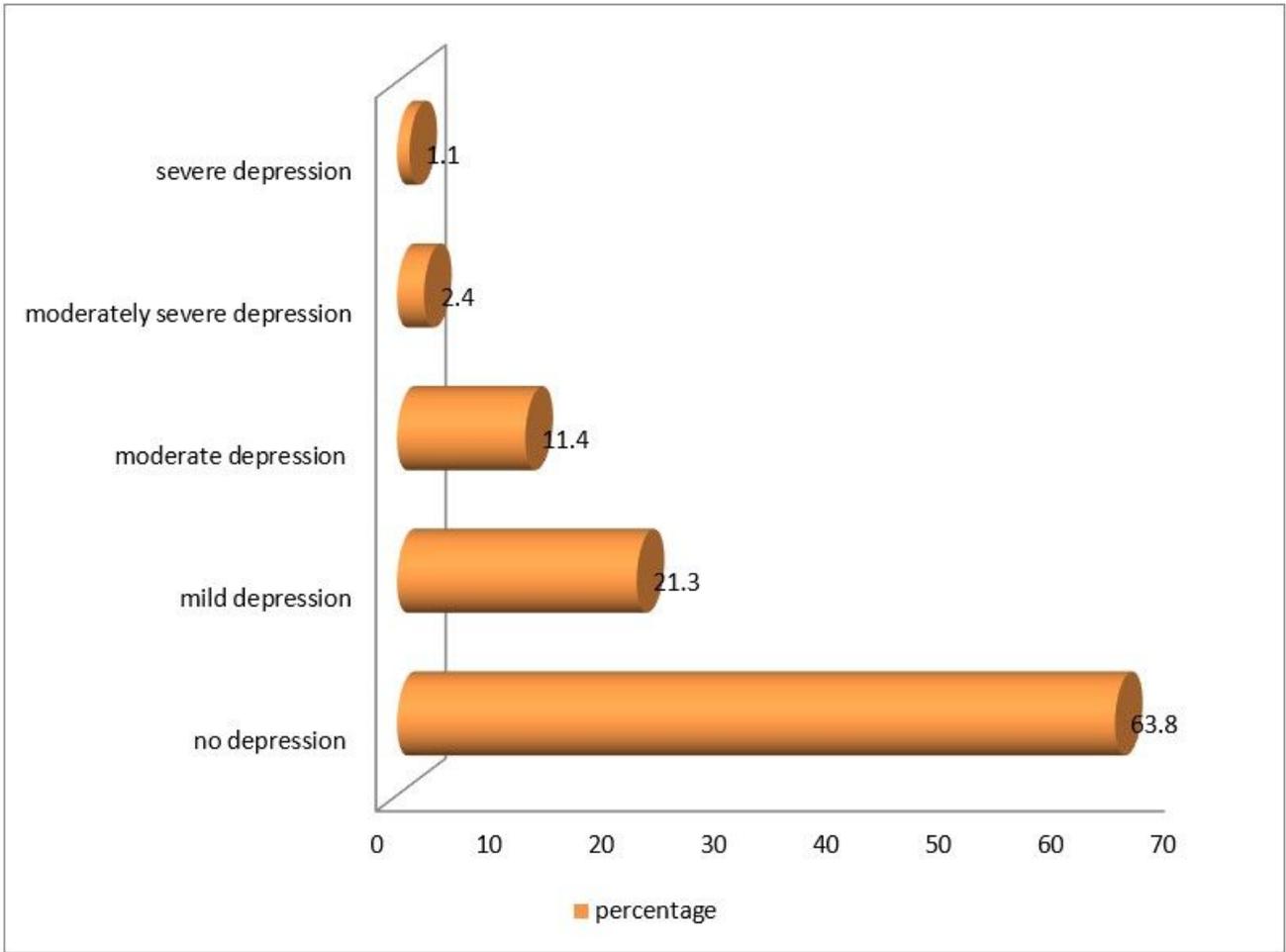


Figure 3

characterization of depression severity among adolescents in governmental high schools at Aksum town, 2019 (n=624)