

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

Enguday Tirfeneh

Aksum university

Mengesha Srahbzu (✉ mengusew@gmail.com)

Aksum university <https://orcid.org/0000-0002-6486-3732>

Research article

Keywords: Depression, high school, parental neglect

Posted Date: August 28th, 2019

DOI: <https://doi.org/10.21203/rs.2.10865/v1>

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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. Result A total of 624 students were participated in the study yielding a response rate of 99.05%. Prevalence of depression was found to be 36.2%. Depression among adolescents was found to have significant and strong association with parental neglect ((AOR=2.61, 95% CI (1.83, 3.72), p-value=0.000). Conclusion and recommendation In the current study the prevalence of depression is found to be high when compared to other population. Significant and strong association is also determined between parental neglect and depression. It is good if school teachers give emphasize for those students who seems psychologically unwell. It is better if school teachers exercise linking such students to school psychologists. It is good to conduct prospective cohort study to investigate temporal relationship between factors and depression. 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. Key words: Depression, high school, parental neglect

Background

Adolescence (10–19 years) is among age group which highly experiences a number of 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 develop mental disorders as it is new environment for them. youths constitute almost a one third of the world's population and among those 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 a close care givers that may have danger, possible for danger or threats of danger to adolescents (3). Parental neglect involves act of omission, and it is defined as 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 the societies. Majority of psychiatric disorders begin in the early ages (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 adolescents capacity to take care of his or her everyday responsibilities and functionalities. Depressive disorders in adolescents results in a horrible consequences even to other health components. It may leads 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 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).

In 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 makes 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 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 single population proportion formula and we take the following assumptions; 95% confidence interval, 4% marginal error and proportion of depression is: (39.3%) from previous study (16) and 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 tools and 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. 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 multipurpose instrument for screening, diagnosing, monitoring and measuring the severity of depression. PHQ 9 score of > 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 access parental neglect. ACEQ assess include questions which assesses 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 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 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 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.

Results

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 Sociodemographic 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 256 (41%) of students have been found to have poor social support followed by moderate social support 217 (34.8%) and only 151 (24.2%) of students are 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 with in their life time where as 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 cigarette 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 neglect part assessed about physical and emotional neglects. 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)
Do you have 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)
Do you 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)
Do you have 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)
Household 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)
Household Member With Alcoholic or Drug Abuser	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)
Household Member Depressed or Attempted Suicide	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 (6.6)	46 (7.4)	50 (57.5)	37 (42.5)	87 (14)
	No	244 (39.1)	293 (47)	278 (51.8)	259 (48.2)	537 (86)
Household Member with Mental Health Issues	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 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 where as 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 literally abandoned their child. Educational neglect is failure to provide a child with adequate education in the form of enrolling them in school or providing adequate home schooling. 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 were checked for co-linearity between each item using Pearson correlation coefficient at p-value of <0.05. But there was no co-linearity found between each item of the screening tool. 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 to logistic regression analysis and it is found to have 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 in order 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	
Parental 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

Discussion on 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 17.5% (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 CDI in a study conducted at Dubai (23) and the children's depression inventory in a study at Malaysia (28) and sample size which was 1373 in Egypt (29).

On the other hand the finding of this study on prevalence of depression was lower than a study conducted at Can Tho-City, Vietnam 41.1% (30) and China Hong Kong 50% (31). This difference might be attributed to time point the studies conducted which was a long-term study in Hong Kong (31), difference in study subjects in which only those adolescents who are abused physically and emotionally were studied in Vietnam (30) and difference in sample size in which large sample size was used in Vietnam i.e.1159 students (30).

The above difference might also be due to difference in screening tool used to determine depression in which Center for Epidemiology Studies Depression Scale (CES-D) was used in a study conducted at Can Tho-City, Vietnam (30).

Regarding severity of depression, prevalence of mild depression was in line with a study conducted at Egypt which was 21.5%. However the result of this study for moderate and severe depression is higher than a study conducted at Egypt which was 7.1% and 0% in Egypt respectively (29) 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 at Iran among high school and pre-university adolescents which was 28%(21). 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 (29).

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 due to the fact that among the most common outcomes of neglect is 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) in accordance with a kid's age and developmental phase. These situation can occur when a child does not get sufficient diet or necessary medical consideration essential for appropriate bodily development (32-34); 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 to a great extent prone to poor health even afterward adulthood and give way to depression (34).

It might also be due to the fact that 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 (35-37).

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 (38). youth with history of neglect during their early ages may also have stressful reminders which contributes for their current depressive state by suppressing and leads to dysregulation of their emotion (37).

The higher prevalence of depression may also be a result of injured hippocampus, as there are elevated levels of stress hormone such as cortisol due to increased stress level in youths who had experienced neglect. This increased release of stress hormone is assumed to have injury on hippocampus; cortical area implicated in diverse brain function and this in turn gives rise for developing depression in youths (39, 40).

The subiculum is distinctively situated to influence depression. It accepts output from the hippocampus, helps to establish both behavioral and biochemical responses to stress. But it is also participated in maintaining another brain system that when overacting during persistent elevated stress such as neglect, releases lethal amount of neuro chemicals that kill brain cells particularly in the hippocampus. This might contribute for the higher prevalence of depression in those students who were neglected by their parents.

Conclusions And Recommendations

In the current study the prevalence of depression is found to be high when compared to other population. Significant and strong association is also determined between parental neglect and depression. To school teachers It is good if school teachers give emphasize for those students who seems psychologically unwell. It is better if school teachers exercise recommending such students to school psychologists. To researchers It is good to conduct prospective cohort study to investigate 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 after, 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 ethical review board of Institute of Health, Aksum University. Written consent was asked from each selected students after they are informed about 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 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 up on request through email address of mengusew@gmail.com.

Funding

No specific fund is secured for this study.

Competing interests

The author's 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.

Acknowledgement

First we would like to thank Aksum University for granting the research financially and materially. We would like to extend our heartfelt thanks to Aksum University College of health science research office and ethical review committee for their timely cooperation.

We would like also to praise our thanks to Aksum town education office and each governmental high school head offices for their cooperation during data collection period. Finally we would like to extend our thanks to study participants.

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Figures

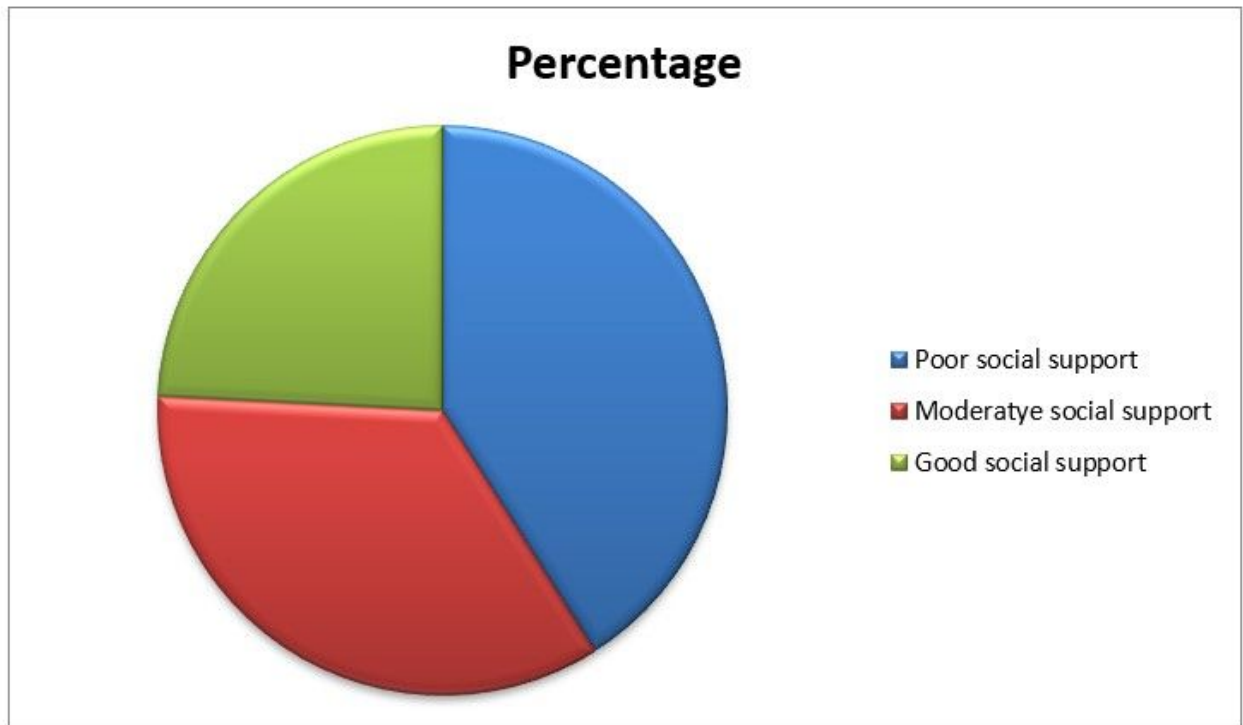


Figure 1

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

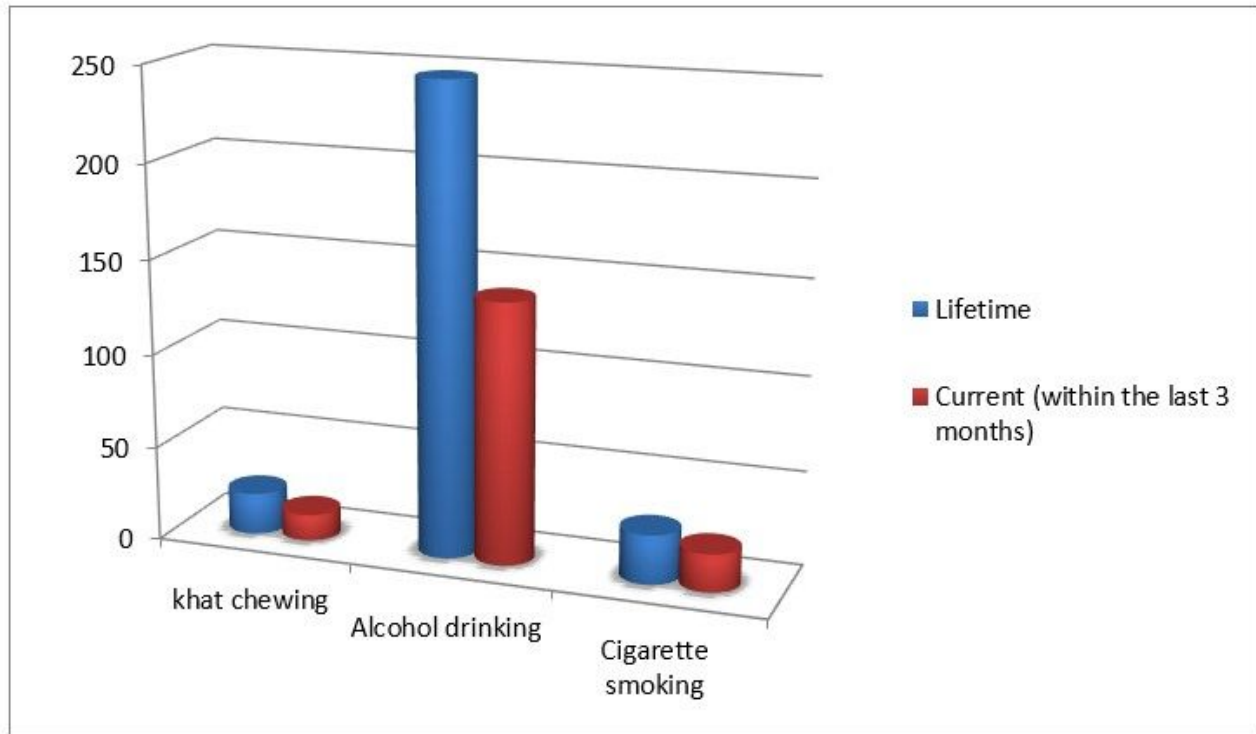


Figure 2

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

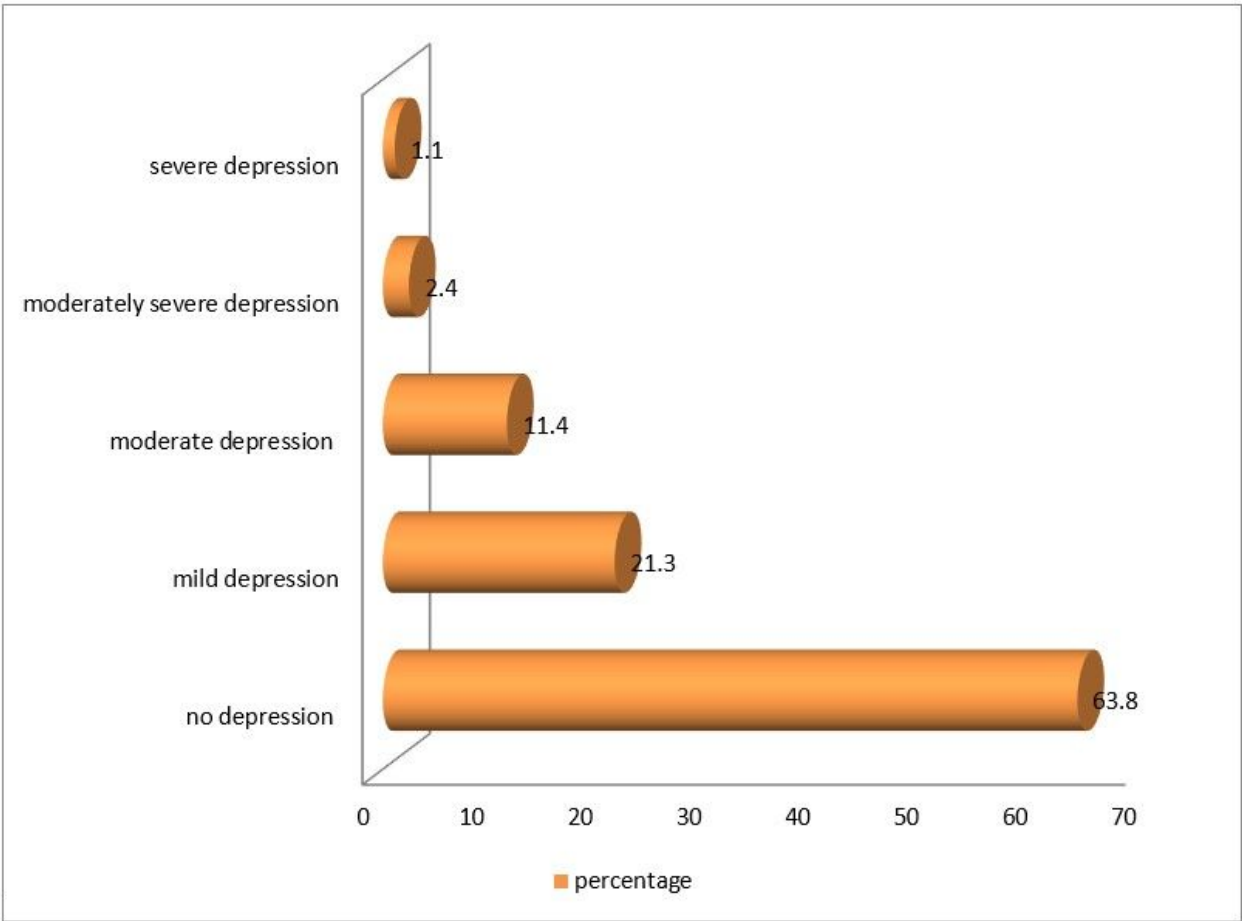


Figure 3

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