

# Risky sexual behavior and associated factors among adolescents at high schools in Aksum town, Tigray, Ethiopia: A cross-sectional study

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## Research

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# Abstract

**Background:** World Health Organization has documented many health risks and complications secondary to unprotected sexual activity among adolescents. Even though the impact of risky sexual practice on the general health of adolescents is enormous, little attention has been given on identification and intervention plans. Therefore, the aim of this study was to find magnitude of risky sexual behavior and associated factors among adolescents in high schools at Aksum town, Tigray, Ethiopia.

**Methods:** we conducted a facility-based cross-sectional study at Aksum town. A systematic random sampling technique was applied. Data was collected with face to face interview and analyzed using statistical package for social science version 22. we have done bivariate and multivariate logistic regression. Adjusted Odds ratio at a p-value <0.05 with 95% confidence interval was taken to declare statistical significance.

**Result:** A total of 644 students were participated with a response rate of 97.7%. Prevalence of risky sexual behavior was found to be 17.2%. Factors like poor social support [AOR=5.59, 95% CI: 2.71-11.53], living out of family [AOR=1.93, 95% CI: 1.21-3.07], experiencing parental neglect [AOR=1.87, 95% CI: 1.18-2.94] and drinking alcohol [AOR=2.55, 95% CI: 1.55-4.20] were statistically associated with risky sexual behavior.

**Conclusion:** An alarming proportion of adolescent students have participated in risky sexual behavior. This can significantly affect health quality in the community and the country at large. Factors, like having poor social support, living out of the family, experiencing parental neglect and using alcoholic beverages are risk factors that increase the odds of risky sexual behavior among adolescent students.

## Background

Adolescents are at risk because they do not have the information, skills, health services and support they need to go through sexual development during adolescence (1). Many health risks and complications secondary to unprotected sexual activity among adolescents have been documented by the World Health Organization (WHO) (2, 3), for which interventions should be implemented promptly.

Today's adolescent and young adults constitute the largest cohort ever to enter the transition to adulthood. Evidence showed that nearly half of the global population was less than 25 years old and nearly 90% live in developing countries (4).

Studying the sexual behavior of youth is important because when compared to older adults, youth are at risk of contracting sexually transmitted diseases (5). Risky sexual behaviors encompass a variety of behaviors including premarital sex, multiple sexual partners, unprotected sex, and others, which likely result in contracting HIV/AIDS, unwanted pregnancies and unsafe abortions (6).

According to WHO, 333 million new cases of sexually transmitted diseases occur worldwide each year, and at least 111 million of these cases occur in people under age 25 years. In developing countries, nearly half of all HIV infections occur in men and women younger than 25 years this data show that up to 60% of all new HIV infections are among 15 to 24 years (7).

Unsafe sexual behavior and the associated exposure to infection is one of the major causes of preventable mortality in low-income countries (after childhood underweight and unsafe water) (8). It is the main mode of transmission of sexually transmitted infections, including HIV/AIDS, and human papillomavirus, which together kill annually more than one million people worldwide (9). Among the means of transmission for HIV/AIDS in each state of America, the primary one is risky sexual behavior (10).

Different literatures have measured and reported the magnitude of risky sexual behavior and it ranges from 21.6 to 42.1% using different screening tools (11-14). In one cross-sectional study conducted in the eastern part of Ethiopia among high school and preparatory students, they reported 13.7% prevalence of risky sexual behavior (15).

Few studies have revealed its association with smoking, alcohol and drug abuse, which are also considered risky behaviors or substance abuse. History of being abused and anti-social behaviors indicated a higher risk of engaging in sexual activity (16, 17).

Socioeconomic status, joblessness, sexually active friends, family instability, single-parent household, sibling sexual activity and each characteristics (race, gender, age, and puberty status) have all been associated with adolescent sexual outcomes (18).

Even though little is known regarding the magnitude of risky sexual behavior, its magnitude has been given little attention among adolescents. Understanding sexual behavior and its determinants among adolescents is crucial to come up with effective intervention. Therefore, this study investigated the magnitude of risky sexual behavior and its correlates among adolescents.

## Methods

### Study design

We conducted an institutional-based cross-sectional study design among adolescents at high schools in Aksum town, Tigray, Ethiopia.

### Study area and period

We conducted the study at high governmental high schools in Aksum town, Tigray, Ethiopia. There are three governmental high schools in Aksum town named Kedamay-Minilik secondary school, Atse-kaleb secondary school and Aksum secondary school. A total of 2579 grade nine and 2241 grade ten

students were attending their regular class in the three high schools. Data was collected from January 1-30, 2019.

### **Sample size determination and sampling procedure**

We calculated the sample size by using Single population proportion formula by taking the following assumptions; 1.96, Z (normal distribution), 95% confidence interval (CI) of certainty ( $\alpha=0.05$ ) and 5% marginal error. The proportion of risky sexual behavior was taken to be 51.3% from the previous study (19) and 10% non-response rate. Therefore, based on the assumptions the final sample size was taken to be 659.

A systematic random sampling technique was used to a total of 659 adolescent participants at school during the study period. We considered all adolescent students in Aksum town in 2019 as a source population and all students during the data collection period as a study population. All students who already registered on the list were included and those students who were critically sick during data collection and unable to communicate were excluded from the study.

## **Adolescents**

Adolescents for this study were taken to be students attending their regular class at governmental high schools in Aksum town who are specifically within the 15-19 years of age. The name list with their grade and age were taken from head department of each high school.

### **Outcome variable**

The outcome variable for this study was risky sexual behavior. It was measured by a five-item screening tool that was adopted from the sexual risk behavior scale (SRBS) was used to assess the lifetime risky sexual activities of the adolescents'. The items ask about the presence or absence of vaginal sexual intercourse, early sexual debut (before 14 years of age), having multiple sexual partners, having HIV testing and inconsistent condom use in their sexual practices. Adolescents having practiced in at least one was considered as positive for risky sexual behavior (15).

## **Independent variables**

### **Socio-demographic factors**

Socio-demographic variables included age, sex, religion, ethnicity, educational level, residence, number of children, educational status of mother, educational status of father, occupational status of fathers and mothers.

## Depression and parental neglect

Public health questionnaire 9 (PHQ-9) was used to assess depression which is a multi-purpose instrument for screening, diagnosing, monitoring and measuring the severity of depression. Those who scored >5 from PHQ-9 scale were considered as possible positive for depression (20). Adverse Childhood Experience Questionnaire which is a 10 items screening tool was used to assess parental neglect. Adverse Childhood Experience Questionnaire includes questions that assess emotional abuse and neglect, physical abuse and neglect, educational and medical neglect and sexual abuse (21).

## Social support and substance related factors

The level of social support was assessed by the Oslo 3 social support scale. The scale divides the level of social support into three as poor social support (3-8), moderate social support (9-14) and strong social support (12-14) (reliability Cronbach's  $\alpha = 0.91$ ) (22).

Substance use history (alcohol, khat and cigarette) was assessed by yes/no questions for current use and lifetime use.

## Data collection procedure

Data were collected as self-reported using a structured questionnaire. The study subjects were informed about the general information about the study objectives as well as the opportunities or benefits that this study could bring. Finally, the filled questionnaires were checked for consistency and completeness daily. To assure the data quality high emphasis was given in designing data collection instruments. Structured and pre-tested questionnaires were used to collect information. Training was given for data collectors and supervisors by the principal investigator on the methods of data collection for two days. The questionnaire was pretested one week before the actual data collection on 5% of the total same size that were not included in the main survey.

## Data processing and analysis

The entire Questionnaires were checked for completeness and entered into Epi-data 3.1 and, then it was exported to SPSS 22 version statistical software for analysis. Descriptive statistics, bivariate analysis, and multivariate logistic regression were conducted. The socio-demographic characteristics of respondents were analyzed by descriptive statistics. Bivariate analysis was used to see the association between risky sexual behavior and independent variables. Variables whose p-value is < 0.2 were entered to multivariate logistic regression to control confounding effect. The significance was declared at p-value <0.05. To determine the strength of association between dependent and independent variables adjusted odds ratio at 95% confidence interval was used.

## Results

### Socio-demographic characteristics

A total of 644 individuals were participated in the study with a response rate of 97.7%. More than half 55% (354) of the study participants were female students. The majority of participants, 78.6% (506) of study participants were orthodox Christian followers by religion. Regarding educational levels of students, 53.2% (336) were grade nine students and the rest 47.8% (308) of them were grade ten students. One third (67.1 %) of the study participants were from urban in their residence. (Table 1)

Table 1: socio-demographic characteristics of adolescents at high schools in Aksum town, Tigray, Ethiopia, 2019

Variables	Category	Frequency	percentage
Sex	Male	290	45
	Female	354	55
Educational level	Grade 9	336	52.2
	Grade 10	308	47.8
Religion	Orthodox	512	79.5
	Muslim	106	16.5
	protestant	26	4
Residence	Urban	432	67.1
	Rural	212	32.9
Fathers' educational status	Illiterate	86	13.4
	1-4thgrade	169	26.2
	5-8thgrade	146	22.7
	9-12thgrade	113	17.5
	Certificate and above	130	20.2
Mothers' educational status	Illiterate	180	28
	1-4thgrade	143	22.2
	5-8thgrade	128	19.9
	9-12thgrade	121	18.8
	Certificate and above	72	11.2
Fathers' occupation	Farmer	228	35.4
	Daily laborer	34	5.3
	Merchant	114	17.7
	Governmental/private employee	268	41.6
Mothers' occupation	Farmer	182	28.3
	Daily laborer	38	5.9
	Merchant	78	12.1
	Governmental/private employee	203	31.6
	Housewife	143	22.2

Family size	1-5	378	58.7
	>5	266	41.3

## Social support related factor

As measured by the three-item Oslo social support scale, 46.4% (299) of adolescents lay in the poor social support level followed by moderate social support which was 32% (206). The rest have been found to lay in a strong or good social support level. (Figure 1)

**Figure 1:** distribution of social support related factors among adolescents at high schools in Aksum town, Tigray Ethiopia, 2019

## Substance use-related factors

Among participants of this study, most students used alcoholic beverages both in their lifetime and within the last three months of the study time. (Figure 2)

Figure 2: Distribution of substance use-related factors among adolescents at high schools in Aksum town, Tigray Ethiopia, 2019

## Clinically related factors

Among the total participants of this study, 28.9% of them have been found to have possible depression as screened by PHQ-9. Parental treatments towards adolescents were also screened and the result indicated about 36.5% of the students reported as they are neglected by their parents, caregivers or guardians due the study time.

## Prevalence of risky sexual behavior and associated Factors

According to our study, the overall prevalence of risky sexual behavior among adolescents at high schools in Aksum town were found to be 17.2% (95% CI; 14.3%, 20.2%). Among the total 354 female participants, risky sexual behavior is 16.1% (57/354) whereas it is found to be 18.6% (54/290) in males. A high degree of occurrence in the prevalence of risky sexual behavior has been observed among those who were following grade nine when compared to those who were following grade ten during the study period. On the contrary, almost the same degree of occurrence of risky sexual behavior has been observed between those who were from urban and rural. (Figure 3)

Figure 3: distribution of prevalence of risky sexual behavior with sex of participants among adolescents at high schools in Aksum town, Tigray Ethiopia, 2019

Regarding factors associated with risky sexual behavior of study participants, bivariate logistic regression was done to identify candidate factors for multivariate logistic regression analysis. These factors have been selected at p-value <0.25. after controlling for confounding effect by multivariate logistic regression, factors like poor social support, living out of the family, experiencing parental neglect and current alcohol use are associated with risky sexual behavior of study participants at p-value <0.05.

Those adolescent students who have poor social support were 5.59 times more likely to participate in risky sexual behavior as compared to those who have strong social support [AOR=5.59, 95% CI: 2.71-11.53]. Another variable that was found to be associated with risky sexual behavior was living without a family member. Students who were living out of their family members were 1.93 times more likely to participate in risky sexual behavior when compared to those who were living with their family [AOR=1.93, 95% CI: 1.21-3.07].

Adolescent students who experienced parental neglect by their primary caregivers were also among those who were found to have a significant association with risky sexual behavior. The probability of participating in risky sexual behavior found to be increased by 87% in those who experienced parental neglect when compared to those students who didn't experience [AOR=1.87, 95% CI: 1.18-2.94].

Those who were drinking alcoholic beverages were 2.55 times more likely to have risky sexual behavior than those who didn't drink [AOR=2.55, 95% CI: 1.55-4.20]. (Table 2)

Table 2: bivariate and multivariate logistic analysis of factors associated with risky sexual behavior among adolescents at high schools in Aksum town, Tigray, Ethiopia, 2019

Variables	Category	Risky sexual behavior		COR (95% C.I.)	AOR (95% C.I.)
		Yes	No		
Educational level	Grade 9	65	271	1	1
	Grade 10	46	262	0.73(0.49, 1.11)	0.72(0.49, 1.13)
Social support	Poor	214	85	5.12(2.57, 10.22)	<b>5.59(2.71, 11.53)***</b>
	Moderate	190	16	1.09(0.48, 2.47)	1.27(0.54, 2.97)
	Strong	129	10	1	1
Living with family member	Yes	63	381	1	1
	No	48	152	1.91(1.26, 2.91)	<b>1.93(1.21, 3.07)**</b>
Depression	Yes	42	144	1.64(1.07, 2.52)	1.21(0.74, 1.98)
	No	69	389	1	1
Parental neglect	Yes	54	181	1.84(1.22, 2.79)	<b>1.87(1.18, 2.94)**</b>
	No	57	352	1	1
Current Alcohol use	Yes	41	104	2.42(1.56, 3.76)	<b>2.55(1.55, 4.20)***</b>
	No	70	429	1	1
Lifetime cigarette smoking	Yes	12	14	4.94(2.02, 10.01)	4.52(0.92, 22.19)
	No	99	519	1	1
Current cigarette smoking	Yes	8	12	3.37(1.35, 8.46)	0.29(0.05, 1.83)
	No	103	521	1	1
Fathers' educational status	Illiterate	15	71	1.75(0.80, 3.84)	0.86(0.36, 2.04)
	1-4 grade	27	142	1.58(0.79, 3.14)	1.04(0.49, 2.18)
	5-8 grade	26	120	1.80(0.89, 3.61)	1.15(0.54, 2.44)
	9-12 grade	29	84	2.86(1.43, 5.71)	1.92(0.89, 4.14)

5.74)

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\*\* P-value< 0.01    \*\*\* P-value<0.001

## Discussion

### Discussion on the prevalence of risky sexual behavior

Our study tried to add knowledge regarding the magnitude of risky sexual behavior and factors which may have an impact on the possibility of participating in such behavior among this special population.

The overall prevalence of risky sexual behavior among adolescent students in our study was 17.2%. Our study result is consistent with other study conducted on the northwest Ethiopia among high school students and reported 19.8% (23), and 17.9% on a study done at Bodti, Ethiopia (24). However, our study result regarding the prevalence of risky sexual behavior is lower than the previous studies conducted in different part on the world such as 51.3% in Mizan Tepi (19), Ethiopia, 43.1% in Addis Ababa (25), 44.9% at Bahir Dar, Ethiopia (6), 40.6% in another Bahir Dar, Ethiopia study (26) and 54% in rural part of Cameroon (27). This disparity might be due to difference in study participants, in which adult construction works and college-level students were mainly considered in studies conducted at Bahir Dar Ethiopia, preparatory students were also included in a study done at Mizan Tepi, Ethiopia, clinical patients in a study at Addis Ababa and it was only female students studied in a Cameroon study. Another possible reason for such difference might also be the cultural influence on adolescents and problems on their degree of openness to report their sexual practices even it was self-reporting.

On the other hand, the current study finding for risky sexual behavior was higher than the study conducted among adolescents at Humera, Ethiopia, 13.7%. This disparity might be due to the difference in the study participants, in which preparatory school students were also included in a study at Benishangul Gumuz, Ethiopia (23). This might also be due to the difference in sample size, in which only 422 students were included in the study conducted at Humera, Ethiopia (15).

### Discussion on factors associated with risky sexual behavior

Those adolescents who have poor social support were 5.59 times more likely to participate in risky sexual behavior when compared to those who have strong social support. This might be because absence of supportive and caring relationships with families and other school communities lead adolescents to poor academic achievement. This poor academic failure is one of the major contributing factors to participate in a risky health behavior (28). This is supported by different studies (29-31).

Adolescents who were living without their family were 1.93 times more likely to have risky sexual behavior when compared to those who live with their families. This might be because in the adolescent age group close family supervision hinders them from participating in different risky behaviors particularly sexual activities. This might also be due to the reason that peer pressures get stronger to influence and make them participating in such risky behaviors when their close family member is not around (32). This study was supported by different studies conducted earlier in different areas (15).

This study further explored that the risk of participating in risky sexual activities increased by 87% in those adolescents who experienced parental neglect by their primary caregiver when compared to those who didn't. This might be due to the increased emotional disturbances soon as they experience neglect which leads them to participate in risky behaviors as a defense mechanism (33, 34). Different studies conducted earlier are alongside of this study.

Moreover, this study declared as using alcohol beverages has a significant influence on the fate of participating in risky sexual activities. Those adolescents who used alcohol within three months before the start of the study period were 2.55 times more likely to participate in risky sexual activities than those who didn't use alcohol. This might be because almost all mental functions get lowered by the effects of alcohol. This doesn't give them the chance to comprehend things that put them at potential risk to engage in risky behaviors. This might also be because alcohol use has been linked to early sexual debut and increased likelihood of adolescents being sexually active while they are at school (35, 36). This study has been supported by other studies (35, 36).

## Conclusion and recommendation

This study has declared that an alarming proportion of adolescent students have participated in risky sexual behavior. This can significantly affect the quality of health in the community and the country at large. Factors, like having poor social support, living out of the family, experiencing parental neglect and using alcoholic beverages are risk factors that increase the odds of risky sexual behavior among adolescent students.

An action shall be taken which are against the factors found to increase the odds of risky sexual behavior to protect the health of students while they are at school. We would like also to recommend that the control of alcoholic beverages among adolescents must be enhanced and awareness creation must be made regarding its unpleasant consequences, especially on these special populations.

## Abbreviations

ACEQ: Adverse Childhood Experience Questionnaire, PHQ-9: Patient Health Questionnaire: WHO: world health organization, SRBS: sexual risk behavior scale, CI: confidence interval

## Declarations

# Ethical approval and consent to participate

Ethical approval 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 data included in the manuscript has been included in the form of tables. The non-identified raw data generated and/or analyzed during the current study are not publicly available due to confidentiality issue but are available from the corresponding author on reasonable request through email address of [mengusew@gmail.com](mailto:mengusew@gmail.com).

### Competing interests

The authors declare that they have no competing interest

### Funding

This study was funded by Aksum University for the process of data collection and analysis.

### Authors' Contributions

Mengesha Srahbzu and Enguday Tirfeneh 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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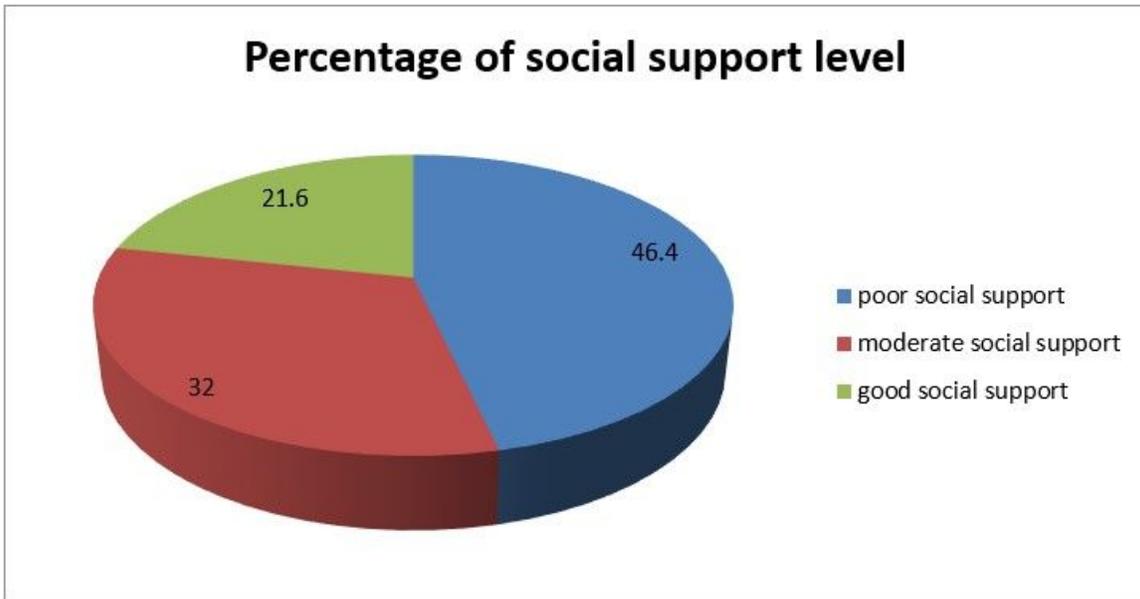
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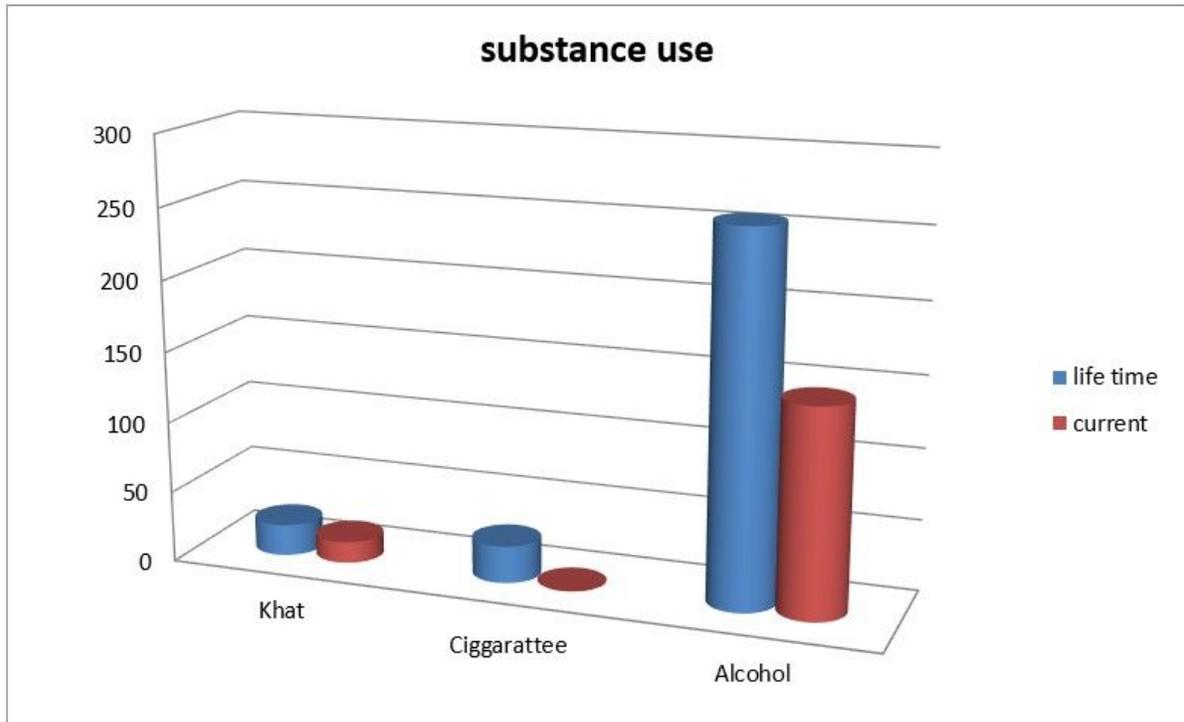
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## Figures



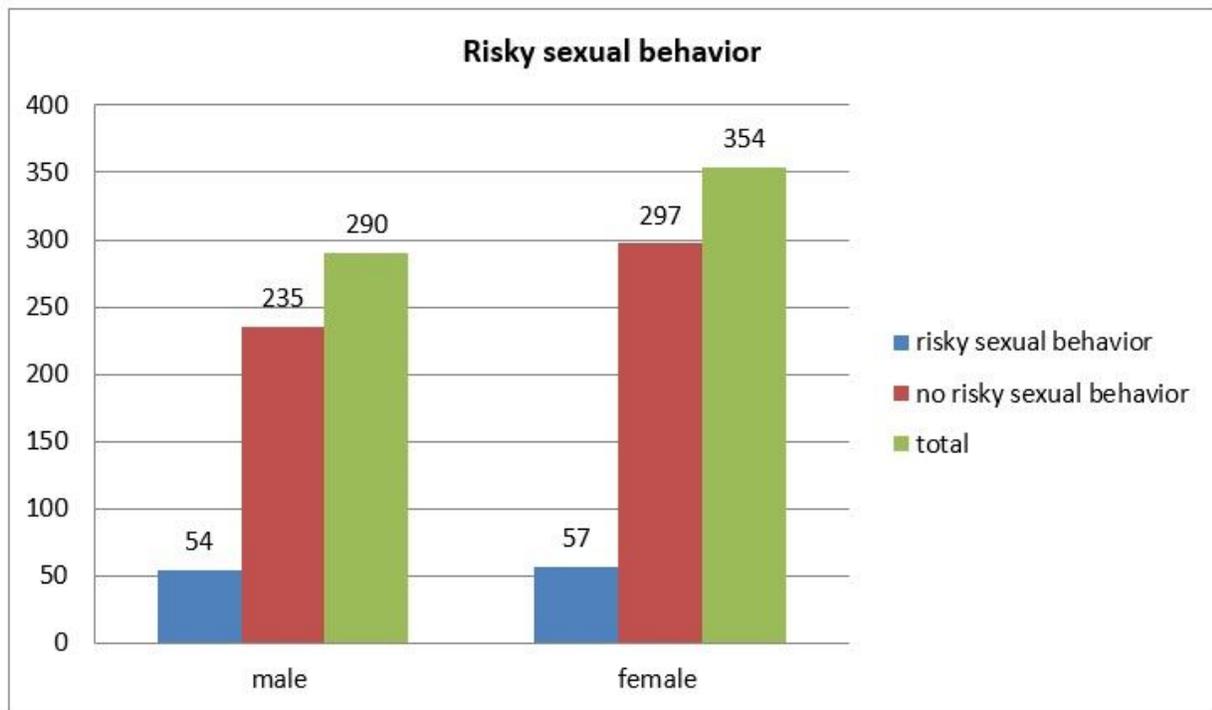
**Figure 2**

distribution of social support related factors among adolescents at high schools in Aksum town, Tigray Ethiopia, 2019



**Figure 4**

Distribution of substance use-related factors among adolescents at high schools in Aksum town, Tigray Ethiopia, 2019



**Figure 6**

distribution of prevalence of risky sexual behavior with sex of participants among adolescents at high schools in Aksum town, Tigray Ethiopia, 2019