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Prevalence of substance use and associated factors among preparatory school adolescents in Dire Dawa City, eastern Ethiopia: A school based cross-sectional study

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Abstract

Background: Substance use is a phenomenon which can be observed in different forms all around the world. Its use puts a heavy burden on individuals, families, and society. Substance use at early age is associated with many psychosocial problems like behavior pattern, psychiatric disorder, family system, peer relationship, leisure/recreation and work adjustment in later adulthood life different studies conducted elsewhere reported inconsistent findings and there is lack of evidence in the study area.

Objective: To assess the prevalence of substance, use and associated factors among adolescents in Dire Dawa preparatory schools in 2023.

Method: School based cross- sectional study was conducted from Jan 2023 to Jun 2023 among adolescents in government secondary schools in Dire Dawa with a sample size of 417. According to the selection criteria four high schools were selected randomly. The data was collected using a self-administered questioner. Data entry, cleaning and analysis were done using SPSS version 23. Descriptive statistics was used to describe the data. Accordingly, frequency, percentage, graphs used.

Results: A total of 417 subjects were included in the study. The prevalence of substance use among preparatory school adolescents was 35.5%. The most frequently used substance was khat (17.7%) followed by alcoholic beverages 11.0%. The factors sex, availability, and accessibility of substance use, the reasons to use substance and perceived benefit were found to be associated with substance use with AOR and 95% CI of 2.1 (1.17,3.77), 3.3 (1.03,10.96), 6.1 (1.2, 31.5) and 7.0 (1.82, 26.93), respectively.

Conclusion: The prevalence of adolescent substance use in Dire Dawa was high when compared to other studies. It's recommended to the government and school community work to prevent substances use to minimize the availability of substances use around schools

Keywords: - Associated factors, Prevalence, substance use, Dire Dawa, Ethiopia

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1. Introduction

1.1 Background

The use of substance such as khat, alcohol or cigarette smoking among adolescents are a global phenomenon that can lead to decreased academic performance, increased risk of contracting HIV (human immune virus) and sexually transmitted disease (STD) [1].

Adolescence as defined by the World Health Organization (WHO) as the second decade of life (10–19 years of age) is a time when significant physical, psychological, and social changes occur. Factors that are frequently sensitized in previous studies to be associated with adolescent substance use, sex, academic performance, peer pressure, availability of substances and family substance use [2].

One of the key impacts of substance use on society is the negative health consequences experienced by its members. Drug use also puts a heavy financial burden on individuals, families, and society. Substance use at early age is associated with many psychosocial problems like behavior pattern, psychiatric disorder, family system, peer relationship, leisure/recreation and work adjustment in later adulthood life [3]. The adverse effect of substance use manifests as poor sleeping habits, suicidal ideation and planning as part of psychiatric problem. The reciprocal effect of substance use and mental disorders that means adolescents with co morbid previous mental disorders have a higher tendency to use substances [4].

The adolescent use of tobacco smoking is known to damage pulmonary functions through changing the airway and pulmonary parenchyma, which increases the risk of respiratory and systemic infection, because of structural changes and immunological responses of the respiratory system. Smoking generates various substances that cause bronchial inflammation, fibrosis, and the increased permeability of airway mucous membrane; these substances also decrease the mucociliary clearance of airway mucous membrane, making it difficult to remove pathogens, thereby leading to infection have adverse effect on different parts of the body system. Upper and lower respiratory system, immature lung development, cardiovascular system, metabolic factors [5]. There is a lack of evidence in the area in the Dire Dawa city administration despite the high prevalence of substance use among high school students as studied in different parts of our country. For this reason, this study aimed to determine the prevalence and associated factors among high school Adolescents in Dire Dawa Administration.

2. Methods and Materials

2.1 Study area and period

The study was conducted at Dire Dawa city that is the second federal administration located 515km away from Addis Ababa in east of Ethiopia from January 2023 to Jun 2023. It has border with eastern Oromia and Somali regional state, more over it lies within 300km away from Djibouti. Based on Dire Dawa Administration, the town consists of 09 urban and 38 rural kebeles. The current metro area population of Dire Dawa (UN Projection for 2020) is 408,000, out of which about 277,400 (68%) are urban inhabitants. In Dire Dawa Administration in 2022 the total number of adolescents who were enrolled for their secondary education is 23307. The proportions of male to female students were 54 and 46% respectively. There are about nine governmental high schools in Dire Dawa., from March 2023 to April 2023 [6].

2.2 Study design

School based cross- sectional study design was conducted.

2.3 Populations

Source population

The source population was all adolescents attending government preparatory schools in Dire Dawa administration.

Study population

The study population was in all selected governmental preparatory schools in Dire Dawa administration.

2.4 Inclusion and exclusion criteria

Inclusion criteria: adolescent students available during the data collection period and willing to give consent to participate in the study.

Exclusion criteria: students who were severely ill during the data collection period were excluded.

2.5 Variables

Dependent variable: substance use (yes/no)

Independent variables: Socio demographic factors (Age, sex, religion parental education, family income, having Peer pressure using substance)

Environmental factors (availability of substance on residential area, community drug favored norms)

Social influencing factors (peer pressure, parental connectedness, family history of substance use, social support)

Knowledge and Attitude perception (low perceived heath) social norms

2.6 Operational definitions

Adolescent_ The second decade of life (10–19 years of age) [7].

Psychoactive substance _ are substances that, when taken in or administered into one's system, affect mental processes, e.g. perception, consciousness, cognition or mood and emotions, the four commonly used substances: Alcohol, cigarette, shisha and khat produces in this context [7].

Substance use_ Taking any of the four commonly used psychoactive substances (alcohol, cigarette, shisha and/or khat) [8].

Current use_ Taking of any of the four commonly used psycho active substances 30 days prior to data collection [8].

Ever use_ Taking of any of the four commonly used psycho active substances at least one time at any age of one's life [8].

Secondary school: for this study it includes students currently attending grade 11^{th} and 12^{th} [9].

2.7 Sample size determination

Sample size for specific objective one

The sample size calculation uses one population proportion formula using the following assumption and formula.

P= 47.9% (Expected prevalence of substance use among Adolescents from previous study in Ethiopia) [1].

Zα/2= critical value of Z score at 95% confidence interval of certainty

d= Assumption of precision

$$n = \frac{Z\alpha/2^2 * p * q}{d^2} = \frac{(1.96)^2 * 0.48 * 0.52}{(0.05)^2}$$

n=384 plus 10% non-response rate the final sample size was, n=422

Sample size for the second specific objective

The following sample size is calculated using open Epi software considering the variables that were shown to be statistically significant in the Addis Ababa study [10]. Based on this, the sample size that was determined using the single population proportion formula was used as the study's final sample size. To search for maximum sample size and accommodate the factors associated with dependent variables sample size was determined for the second objective.

Table 1 lists of calculated sample size using factors by specific factors, Dire Dawa,2023

Variables	Substance Use		OR	Sample size
	yes	No		
Sex				
Male	64	116	3.326	352
Female	35	159		
Family member chew chat				
Yes	28	36	2.866	378
No	71	239		
Family member drink Alcohol				
Yes	46	25	3.98	351
No	53	250		
substance available at regional area				
Yes	81	110	2.93	376
No	18	165		

2.8 Sampling procedure

A simple random sampling technique was used to select the schools. There are nine governmental high schools in Dire Dawa and four were selected randomly. The number of students were proportionally allocated to the size of the schools. The actual study participants were selected using stratified random sampling method. Lists of all students from each section served as a sampling frame. The calculated sampling Interval (Kth value) is 11 and a random number between 1 and 11 was selected to determine the first student. Based on this the random number is 2. Students in the sampling frame and situated at 2, 13, 24, 35… was included for data collection

Table 2: Stratification of Students in the Selected Governmental preparatory Schools, by stream, Dire Dawa, 2023

School	**Stream**	**Grade level**	**Section**	**Total Number of students**	**Sample allocation**
D.D Compressive	Social	11	5	255	23
		12	10	573	52
	Natural	11	4	238	22
		12	10	652	59
Mariam Sefer	Social	11	2	147	13
		12	3	181	17
	Natural	11	1	57	5
		12	2	114	10

Addisu	Social	11	2	100	9
		12	1	76	7
	Natural	11	1	51	5
		12	1	48	4
Sabian	Social	11	6	462	42
		12	12	792	72
	Natural	11	6	390	35
		12	8	514	47
Total			73	4650	**422**

N.B After comparing sample size calculated based on both objectives the final sample size was 422.

2.9 Data collection tools and Procedures

The data for this study was collected using a pre-tested substance use questionnaire adopted from Modified ASSIST. The questionnaire specifically constitutes socio-demographic variables, participants' substance use, and associated factors such as family and environmental factors that influence substance use of students. The role of facilitators includes time arrangement to reach-out secondary schools students, informing the students about the purpose of the study, taking consent from the students, providing explanation for some questions raised by the students during filling of the questionnaire, collecting the filled questionnaire from the students, and checking completeness of each questionnaire. The data collection tool was prepared in English and then translated into Amharic to collect data. Self-administered questioner was used for collecting data from selected study participants.

2.10 Data quality control

Standardized and validated data collection tool was used. To assure the quality of data orientation was provided to data facilitators. Prior to the actual data collection, the questionnaire was pre-tested at school that is not part of the sampled schools using 5% of the sample size and possible amendments were taken accordingly. The principal investigator provided 2-day training for 2 data collection facilitators who were nurses professionally and closely follow-up with them during the data collection process. During data collection closer supervision was assured by the principal investigator. Completeness of the questionnaires was checked, and feedback was given to the data collectors for necessary corrections before the next day of data collection.

2.11 Data processing and analysis procedure

Data was entered using Epi Info version 7 and after selecting important predictors, data cleaning, coding, and recoding of all variables, categorization of continuous variables was done before any analysis is commenced. Data was exported to SPSS Version 26 for analysis. Descriptive statistics was conducted for all variables. Accordingly, frequencies and percentages were reported to describe the data and distribution of explanatory variables. Whenever reporting the measure of central tendency and dispersion normality test was conducted.

The associations between substance use and categorical predictors were examined using the chi-square test of association. Bivariate logistic regression analysis was conducted to estimate crude odds ratio and to select candidate variables for multivariable analysis and the variables that was significant less than equal to 25% levels was considered possible candidates. This technique help us to keep as many significant variables as possible. But at the model selection level (multivariable logistic regression) P value of less than or equal to 0.05 was used as a level of statistical significance.

The logistic regression models were run to estimate the effect of predictors on substance use controlling other factors. Multivariable logistic regression model was used to estimate adjusted odds of use while adjusting for potential confounders. The goodness of fit of the model is assessed using the Hosmer-Lemeshow test.

3. Results

3.1 Socio-demographic characteristics

A total of 417 participants were included in this study with a response rate of 98.8%. Majority of the subjects 210 (50.4) were ≤18 while the remaining 207 (49.6%) >18 years old with of 18±1.39 mean and SD respectively. From the respondents 216 (51.7%) were males and 201 (48.2%) were females. Most of the respondents (70%) were born in urban areas the rest 30% were from rural areas. The majority of respondents' mothers completed primary education (43.2%) but other wise 23% has no education. Likewise, 25.7% of their fathers have no education and 23.5% completed primary education.

Table 3: Socio-demographic characteristics of adolescents in Dire Dawa preparatory schools

Variables	Frequency (N=417)	Percent (%)
Sex		
Male	216	51.7
Female	201	48.2
Age		
≤ 18 Years	210	50.4
>18 Years	207	49.6
Grade		
11	235	56.4
12	182	43.6
Place of birth		
Urban	292	70.0
Rural	125	30.0
Religion		
Orthodox	167	40.0
Muslim	165	39.6
Protestant	71	17.0
Other	14	3.4
Mother's educational status		
No education	96	23.0
Primary	180	43.2
Secondary /preparatory	102	24.5
Collage and above	39	9.4
Father's educational status		
No education	107	25.7
Primary	98	23.5
Secondary /preparatory	92	22.1
Collage and above	120	28.8

*Others – Jovany, wuhabeyi

3.2 Prevalence of substance use among high school students.

The prevalence of substance use among preparatory school adolescents was 35.5% with CI (29.7-39.1). The most frequently used substance is khat (17.7%) followed by alcoholic beverages recorded 11.0%.

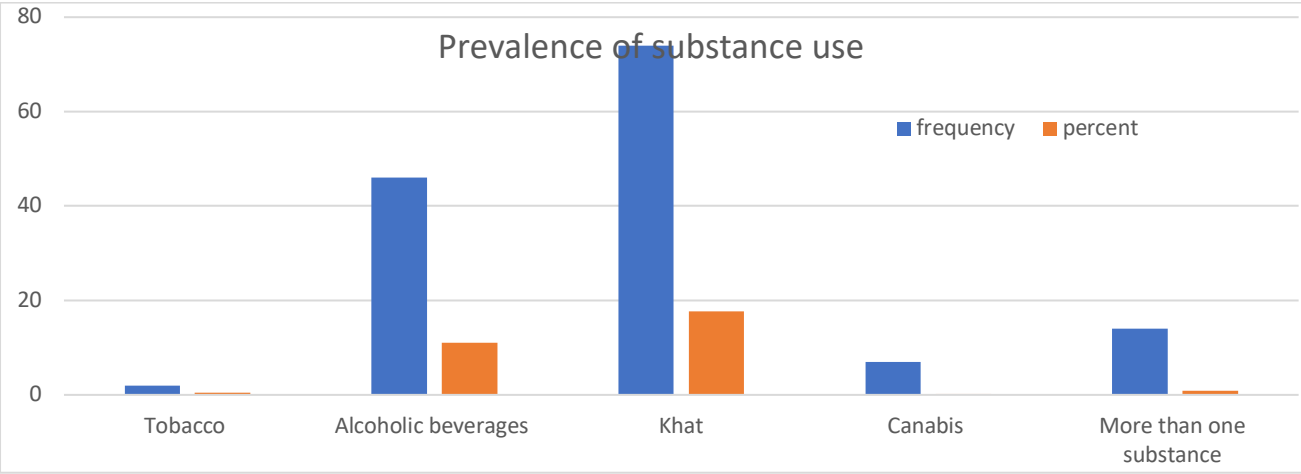

Figure 1: The prevalence of substance use with the type of substances among preparatory school adolescents in Dire Dawa

3.3 Knowledge and attitude factors of respondents on impact of substance use

The majority of respondents know the ill effect of substance use 336 (80.6%) of this 263 (63.6%) responded that they know health problems as ill effect of substance use. Most of the participants 253 (60.67) mentioned mental illness as a negative impact of substance use while only few 17(4.07%) thinks substance use resulted in poor academic performance. In contrast to the above-mentioned result most of participant's perceived using substance can result in increased ability to focus/concentrate.

Table 4: Knowledge and attitude towards substance use among adolescents Dire Dawa preparatory school

Variable	Frequency (N=417)	Percent (%)
Negative impact of substance		
Getting diseases	39	9.4
Mental illness	253	60.7
Road accident	8	1.9
Aggressive behavior	35	8.4
Poor academic performance	27	6.5
Don't know	55	13.2
Ill effect of substance use		
Yes	336	80.6
No	65	15.6
Perceived benefits of substance		
Hallucination /feeling high	62	14.9
Ability to focus/concentrate.	56	13.4
Drowsiness	19	4.6
Ability to work hard for long period	56	13.4
Feeling accepted and trusted by peers		
Others	32	7.7
Nothing		
	38	9.1
	154	36.9

Table 5: Social and environmental factors related to substance use among adolescents in Dire Dawa preparatory schools

Variable	Frequency (N=417)	Percent (%)
Family History of substance use		
Yes	54	12.9
No	274	65.7
Family member with substance use		
Mother	22	5.3
Father	13	3.1
Siblings	7	1.7
Other	12	3.1
Accessing substance		
No access to substance	187	44.8
Peer offer	32	7.7
Adult abuser offer	11	2.6
Buying individually	76	18.2
Buying jointly	64	15.3
Stealing	47	11.3
Reasons for using substance		
Peer influence	44	19.1
Easily accessibility/affordability	42	18.3
Poor parental supervision	28	12.2
Pleasure and brevity seeking	76	33
Curiosity	40	17.4

3.4 Bivariate and multivariable logistic regression analysis of variables

Each variable was tested with the dependent variable substance use at significant level of < 0.25. Eight of them were found to be statistically significant and transferred to multivariable regression. From socio-demographic characteristics sex, age, students grade and place of birth, from social and environmental factors. Accessibility and reasons for using substance use, and also from knowledge and attitude factors knowing negative impact and perceived benefit of substance use is found to be statically significant. From bivariate analysis those variables with significant level of 0.25 transferred to multivariable analysis, and four of them were found to be statistically significant when adjusted to other factors at significant level of ≤0.05. Sex, accessibility of substance use, the reason for substance and perceived benefit of substance use were showed significant association with substance use.

The results shows that being male has 2 times higher chance to use substance than being females with AOR (95% CI) of 2.1 (1.17, 3.8). Adolescents who have access to substances from adult abuser have a three times larger tendency to use substance comparing to those who have no access to substances AOR 3.3 (1.03, 10.96). Abusers who perceive their reasons to use substance as peer pressure have six times more chance to use substance with AOR of 6.1 (1.2,31.5) comparing to those who claims have no reason. Similarly, those who perceives using substance benefit to increase ability to focus have 7 times more likely to use substance with AOR of 7.0 (1.82, 26.93).

Table 6: Bivariate and multivariable logistic regression analysis of substance use

Variable	Substance use		COR(95% CI)	P value	AOR (95%CI)	P value
	Yes	No				
Sex						
Male	92(62.2%)	124(46.1%)	1.92(1.27,2.89)	0.002	2.10(1.17,3.77)	0.01
Female	56(37.8%)	145(53.9%)	1		1	
Age						
≤18 years	60(40.5%)	150(55.8%)	1.84(1.23,2.77)	0.003	1.47(0.80,2.68)	0.20
>18 years	88(59.5%)	119(44.2%)	1			
Grade						
11th	70(47.3%)	165(61.3%)	0.566(0.377,0.84)	0.006	0.63(0.34,1.13)	0.12
12th	78(52.7%)	104(38.7%)				
Place of birth						
Urban	95(64.2%)	197(73.2%)	0.65(0.42,1.008)	0.054	0.74(0.38,1.44)	0.38
Rural	53(35.8%)	72(26.8%)				
Accessibility of substance use						
Peer offer	17	15	10.64(4.56,24.83)	0.001	4.10(0.73,22.96)	0.10
Adult abuser offers	7	4	16.43(4.38,61.57)	0.001	3.3(1.03,10.96)	0.04
Buying individually	55	21	24.59(12.22,49.48)	0.001	9.5(1.5,60.70)	0.01

Buying jointly	34	30	10.64(5.33,21.23)	0.001	2.2(0.79,6.14)	0.12
Stealing	17	30	5.32(2.46,11.47)	0.001	1.8(0.65,5.17)	0.24
No access	18	169	1		1	
Reasons for using substance						
Peer influence	25	19	15.7(7.08,34.8)	0.001	17.3(3.27,91.62)	0.001
Easily accessibility/affordability	15	27	6.63(2.91,15.08)	0.001	6.19(1.21,31.55)	0.028
Poor parental supervision	18	10	21.48(8.42,54.74)	0.001	27.46(4.8,155.36)	0.001
Pleasure and brevity	62	14	52.84(24.14,115.69)	0.001	44.3(8.1,242,6)	0.001
Curiosity	13	20	7.75(3.23,18.60)	0.001	11.6(2.0,65.3)	0.005
No reason	15	179	1		1	
Negative impact of substance						
Getting diseases	8	31	0.89(0.35,2.3)	0.82	3.73(0.94,14.72)	0.06
Mental illness	96	157	0.37(0.12,1.11)	0.07	0.61(0.15,2.42)	0.48
Road accident	3	5	0.88(0.39,1.99)	0.77	0.64(0.21,1.90)	0.42
Aggressive behavior	9	26	0.87(0.17,4.42)	0.87	1.51(0.19,11.9)	0.69
Poor academic performance	11	16	0.50(0.17,1.48)	0.21	0.42(0.11,1.59)	0.20
Don't know	21	34	1		1	
Perceived benefit of substance						
Hallucination/feeling high	20	42	4.10(1.95,8.63)		2.35(0.66,8.30)	0.18
Ability to focus	39	17	19.78(9.16,42.72)		7.0(1.82,26.93)	0.005
Drowsiness	9	10	7.76(2.74,21.93)		3.47(0.74,16.32)	0.115
To work hard for long period	37	19	16.79(7.87,35.82)		10(2.84,37.39)	0.001
Feeling accepted by peers	12	20	5.17(2.14.12.51)		4.3(1.12,16.71)	0.03
Other	15	23	5.62(2.45,12.91)		5.0(1.34,18.89)	0.01
Nothing	16	138	1		1	

4. Discussion

The result of this study shows that the overall prevalence of substance use is 35.5%. From this Khat users dominate with a frequency of 17.7 % followed by alcohol users 11.0% while tobacco and cannabis users remain very few with a frequency of 0.5% and 1.7%, respectively.

The prevalence of substance users from current study is higher when compared to similar studies done in different regions of Ethiopia. It's a bit higher than a study from North Showa which was 30.4% CI(25.3-38.3) [11]. and almost consistent with the study done in northern Amhara region Wollo which reported a life time prevalence of 34.6% CI (28.7-39.5) [12].

Though relatively lower frequency seen when compared to this study with studies from Bale, Nekemete, Debremarkos and Addis Ababa which reported a lifetime prevalence of substance use as 21%, 19.1%, 14.1% and 26.5%, respectively [3, 13, 14]. Similarly, lower comparison is observed from studies outside Ethiopia, study from Tanzania 19.7%, Zimbabwe 28.8%,and Thailand 16.7% [2, 14, 15].The prevalence of khat users is also relatively higher than similar studies mentioned above, study from bale zone prevalence of chat users is (12%), Nekemete (9.4%) and Addis Ababa (9.4%). The prevalence in current study is also relatively higher when compared to similar studies from other African countries Tanzania (19.4%) and Nigeria (9.4%) [8,11].

The reason for the reported high prevalence in this study could be due to the local availability of substances like Khat. The positive social norms towards substance use in our study area, Dire Dawa town in contrast Khat chewing is culturally forbidden in other most parts of Ethiopia could also contribute to the reported elevated prevalence. In contrast a study from Woreta town reported a higher prevalence of 65.4% CI (56.1- 69.4) compared to this study, the difference could be the larger sample size of the other study [16].

The socio-demographic factor sex, have statistically significant association with adolescent substance in current study. In our study the prevalence of substance use is higher in male than female. Males have two times higher tendency to use substance with AOR and CI of 2.10 (1.17, 3.77) when compared to females.

This finding is in consistence with other similar studies in different parts of the world including Ethiopia [17,6, 11, 19]. The cultural taboos towards substance use among females in our country and males' tendency to try new things from curiosity could be mentioned as a speculated reason for this specific finding. The fact that males have a higher exposure to substances and the vicious cycle of peer pressure that males have pressure to male peer could also be identify as another reason.

Accessibility of substance use is another factor found to be associated with substance use. Those abusers whose adult abuser offers them have a three times higher tendency to use substance than those who have no access to substance with AOR of 3.3 (1.03, 10.96). This result agrees with studies done in other parts of Ethiopia ,Addis Ababa city and Debremarkos city, this studies reported that availability and easily accessibility of substances is more likely to increase the use of substances among adolescents [18,6].

From the finding in this study adolescents who claimed the reason for their substance use as peer pressure and easily accessibility and affordability have six times larger chance to use substances with AOR (CI) of 6.19 (1.21,31.55). Other studies across different parts of the world also reported peer pressure to be highly associated with adolescent's substance use. Studies from Ethiopia also revealed parallel associations [3, 20, 16]. A study from central Thailand reports adolescents under peer pressure have 3.28 times higher odds while a study from Zimbabwe reported 2.8 higher odds [2,14]. This association could be explained by the fact that adolescents who's at their early young age are highly influenced by their peers and friends around them, they are also tending to be involved with similar activities as their peer friends.

The other factor found in this study is adolescents' perceived benefit towards substance use. Thinking that using substance benefits to increase ability to focus results seven times higher tendency to use substance 7.0 (1.82, 26.93) while working hard results ten folds 10 (2.84,37.39). This association can be explained by the fact that some substances like khat stimulant properties by the time when they are taken are perceived by users as a benefit and encourages to use it [21].

Even though many previous studies show an association between substance use and the presence of family member who uses substances, knowledge and attitude factors and parental supervision [16, 14,18] (,the finding from this study didn't show a statistically significant association. This variance could be the difference in study design and sample size in the current study.

Strength and Limitation of the study

The strength of the study is it addresses a sensitive public health issue, adolescent substance use which is common in the study area. The limitation of the study is that the study population being limited to preparatory school students could underestimate the results.

5. Conclusion

The prevalence of substance use among preparatory school adolescents in Dire Dawa is high compared to previous studies with the use of Khat and alcohol being the most common types. Socio-demographic factor like sex has an association with substance use in addition easily accessibility and affordability of substance use, peer pressure and using substance with perceived reason of pleasure and brevity seeking associate to the increased prevalence of substance use. The finding of this study indicates that adolescent substance use is a result of multiple factors, therefore collective solutions from respective stakeholders is required to compact the problem.

6. Recommendations

Based on the finding of this study the researcher made the following recommendations by respective stakeholders.

The government

The government at large and public health institutions as specific should give emphasis regarding the prevention of adolescent substance use.

The schools

The school community should design school-based substance use prevention programs to decrease the current prevalence of substance use.

Male and younger age specific substance use prevention strategies should be designed at school and community level

The school management should design platform on educating students on how to resist negative peer influence.

The school community should work to minimize the availability of substance use around the school area.

The family and community

Families and the community collectively, should work to minimize the accessibility of substance to adolescents in the residential area

The researchers

Researchers should give attention to adolescent substance use with a stronger study design to address associated factors.

Declaration

Ethical approval

Ethical clearance was obtained from Research Institutional Review Board of Dire Dawa University and permission letter was received from the Dire Dawa education bureau and selected preparatory high schools in the city. All study participants was informed about the objective of the study and verbal informed consent procedure was approved. Additionally, the study subjects were informed that confidentiality and privacy of the information were maintained throughout the study.

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Conflicts of Interest

We also like to declare that no conflict of interest raised between the authors.

Authors' Contributions

YM &SK conceived the idea of the study, prepared the study proposal, collected data in the field performed the data analysis, and drafted the manuscript with the preparation of the proposal and the interpretation of data, participated in data analysis, and critically reviewed the manuscript. BY participated in the critical comments of the proposal and manuscript preparation. All authors read and approved the final manuscript.

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