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Psychoactive substance: Determining its harmful and dependent use patterns and associated level of risks among high school students in Afar region, Ethiopia

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This research investigates psychoactive substance abuse that causes significant health problems in its various chemical effects. It also determines the patterns of its use and level of risk of harm assessment to humans. Harmful determination is dependent upon patterns used in psychoactive substance and its associated level of risk among high school students in Afar region, Ethiopia. The study described a survey of 400 high school students in Afar region, with the adoption of Multistage sampling technique on student's selection. Data collected from Jan-Feb/2017 using an instrument called Alcohol, Smoking, and Substance Involvement Screening Test (ASSIST), showed 400 students whose responses were 100% effective. Among the study participants, majority of them 231 (60.5%) were males. The result of the study revealed a dependent use pattern with 36.4% for Khat, 14.1% for tobacco products and 4.7% for alcohol beverages, which indicated high risk of problems related to psychoactive substances used requires more intensive treatment. The result also indicated that there is 31.4% harmful used pattern for alcohol beverages followed by khat (13.1%) and tobacco products (9.4%) which was associated with moderate risk of harm from their addiction. The result of independent t-test showed that there was a significant mean difference in alcoholic beverages abuse between male and female students, while no significant mean difference was observed in abuse of khat and tobacco products between male and female students. Relatively, ANOVA result revealed that religion of the respondents had a significant effect on abuse of alcoholic beverages, while no significant mean differences were observed in abusing psychoactive substance like tobacco products and khat across participants upon religion. Generally, the present study revealed a greater percentage of students whose daily dosage of harmful psychoactive substances instigated high and moderate risks. The outcome of this study is there is an urgent need for Government intervention to curtail the menace of harmful psychoactive substances and many other toxicants circulating in the society which are detrimental to health, social, financial, legal and peaceful relationship.

Key words: Patterns, psychoactive substance, harmful, risks, students.

INTRODUCTION

Globally, in spite of the fact that the extent of psychoactive substance use among the world population has remained stable over the past four years; over 29 million people are estimated to suffer from psychoactive

substance use dependence and disorders. Due to this, it has continued to be a topic of many researchers concern (World Drug Report, 2016).

Psychoactive substance use is also associated with a significant public health burden (Drug Abuse Warning Network, 2011). According to World Health Organization (2003), for instance, psychoactive substances use like tobacco, alcohol and illicit drugs are among the top 20 risk factors for ill-health identified by the organization. It is estimated that tobacco is responsible for 8.8% of all deaths and for 4.1% of the global burden of all disease, while alcohol is responsible for 3.2% of deaths. In addition, illicit drugs are also responsible for 0.4% of deaths (Henry-Edwards et al., 2003; Humeniuk et al., 2010).

Substance use is a major public health concern that affects all segments of societies, of which, adolescents are the most vulnerable age group for developing substance use problems. According to many researchers' findings, this is because age represents a time in biological and social development associated with increased risk-taking behaviors; as such, experimentation with drugs and alcohol often begins in adolescence (Hagell, 2013; Schulte and Hser, 2014).

In Africa, there are substantial evidences that revealed a prevalent use and abuse of psychoactive substance among adolescents in the region (Adelekan and Ndom, 1996; Gikonyo, 2005; Makanjuola et al., 2007; Alti-Muazu and Aliyu, 2008; Atwoli et al., 2011; James, 2014; Gudaji and Habib, 2016). For instance, a study done in Western Kenya among college students revealed that the prevalence of lifetime alcohol use was 51.9% (Atwoli et al., 2011). Surprisingly, another study conducted in quite the same country by Gilkonyo (2005) revealed that majority (56.1%) of adolescents had drug abusing parents. In addition, in Botswana, 18.6% of school children were found to abuse tobacco, alcohol (16.6%), cannabis (14.9%) and snuff (13.8%) (Botswana Youth Risk Behavioral Surveillance, 2011). Furthermore, of several important studies conducted in Nigeria (Alti-Muazu and Aliyu, 2008; Iribhogbe and Odai, 2009; James, 2014), a study done among commercial motorcyclists by Alti-Muazu and Aliyu (2008); exposed that there are 25.8% marijuana, 24.5% solution, 15.8% caffeine (Kola) and coffee 4.8% use. In addition, a report on commercial tricycle riders in Nigeria found a 29% prevalence of marijuana, 17% of alcohol and two local intoxicants known as Gadangi (14.8%) and Zagami (10.4%) (James, 2014). More recently a study conducted among registered commercial motorcycle operators in Kano, North Western Nigeria, revealed an overall prevalence of psychoactive substance use which accounts for 19.3% (Gudaji and Habib, 2016).

In Ethiopia, substance use among adolescents is a growing problem, as in many African countries. Several studies which were done in Ethiopian universities and High Schools among adolescents were evidences for this (Dawit et al., 2006; Lemma, 2009; Alem et al., 2010; Teferi, 2011; Reda et al., 2012; Gebreslassie et al., 2013; Kidane, 2014; Tadesse, 2014; Kassa and Deyno, 2014; Eticha and Kidane, 2014; Mossie et al., 2015; Tadesse et al., 2016). For instance, to indicate few, a study done on cigarette smoking among undergraduate students at Hawassa University revealed a lifetime prevalence that accounts for 14.8% and current prevalence of 7.5% (Kassa and Deyno, 2014). Similarly, a research done in quite the same year in Ethiopia among Dilla University students showed that the prevalence of alcohol drinking, chewing khat, and cigarette smoking was 64.7, 41.8, and 19.17%, respectively (Tadesse, 2014). Moreover, Mossie et al. (2015) in their research conducted among undergraduate University students in Adigrat explored 16.7% magnitude of substance abuse.

However, various studies were conducted on psychoactive substances in Ethiopia, they failed to look into different patterns of psychoactive substance use and its associated level of risks (Lemma, 2009; Deressa and Azazh, 2011; Reda et al., 2012; Gebreslassie et al., 2013; Tesfaye et al., 2014; Eticha and Kidane, 2014; Tadesse, 2014; Kassa and Deyno, 2014; Tadesse et al., 2016). Thus, little is known about patterns of psychoactive substance use and level of risks associated with the use in the country, Ethiopia, in general and in Afar region in particular. This is a major gap in knowledge that the researcher thought which severely limited the policy makers, government, local decision makers, and other relevant agencies' capacity to make evidence based decisions about the extent of need for interventions. By realizing this gap, this study was intended to determine harmful and dependent use patterns of psychoactive substance and associated level of risks among high school students in Afar region. Therefore, this study aimed at addressing the following basic research questions:

(1) To what extent do high school students in Afar region engage in harmful and dependent use patterns of psychoactive substances?
(2) What levels of associated risks are linked with the high school students' patterns of psychoactive substance use in Afar region?
(3) Is there any statistically significant mean difference

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Table 1. Tabular presentation of population and sample size.

School	Population			Sample		
	Male	Female	Total	Male	Female	Total
Gewane Secondary and Preparatory School	83	35	118	10	4	14
Awash Nemalefane Secondary and Preparatory School	226	194	420	26	23	49
Dewe Mohammed Bodaye Secondary and Preparatory School	147	128	275	17	15	32
Aba'ala Secondary and Preparatory School	681	347	1028	79	41	120
Asayta Mohammed Hanfere Secondary and Preparatory School	966	603	1569	113	72	184
Total	**2103**	**1307**	**3410**	**245**	155	**400**

in psychoactive substance abuse across socio-demographic characteristics of students in the study area?

METHODOLOGY

Research design

This descriptive research, survey type, was conducted in January 11 to February 13/ 2017 in Afar Regional State, Ethiopia.

Research setting

The present study was conducted in Afar Regional State. It is one of the nine regional states of Ethiopia and geographically located in north eastern part of Ethiopia. Since it is in part of east African rift valley, most parts of the region are arid and semi-arid areas with hot climatic conditions.

In Afar region, there are a total of 33 districts. Among these, some districts have no full cycle secondary schools, while few have. Depending on this, five districts with secondary and preparatory schools (full cycle secondary schools or high schools) were included in the study.

Research participants and procedure

The source population was all secondary school students of afar regional state enrolled for 2016/2017 academic year. The research participants were all students enrolled in the five purposely selected full cycle secondary schools during the specified study period. According to the data from regional education bureau, these full cycle secondary schools were enrolling about 2103 males and 1307 females, totally 3410 students during the study period.

Multistage sampling technique was employed so as to select study participants. At first stage, schools with full cycle were purposely included in the study. Accordingly, Awash Nemalefane Secondary and Preparatory School, Dawe Mohammed Bodeya Secondary and Preparatory School, Gewane Secondary and Preparatory School, Ab'ala Secondary and Preparatory School and Asayta Mohammed Hanfre Secondary and Preparatory School were included. To select participants, stratified sampling technique was employed so as to divide students into two by sex. The calculated sample size was proportionally allocated over five purposely selected schools with respect to sex. Finally, proportionally allocated sample was selected using systematic random sampling technique from each school. Finally, having the name list of students in their respective schools, questionnaire was distributed to students in the classroom jumping one chair until the required sample size was achieved.

Sample size and sampling technique

To determine the sample size, the formula which was developed by Yamane (1967) was used since it is appropriate and suggested to be applied for population that is well known as:

$$n = \frac{N}{1 + N(e)^2}$$

Where, n= expected sample size, N = population size, 1 = constant, e = 0.05 level of precision.

Thus, the total sample size was calculated as:

$$no = \frac{3410}{1 + (3410)(0.05)^2} = 358 \text{ and this was rounded up to } 400$$

Therefore, the required sample size was 400 (Table 1).

Instrument

Alcohol, Smoking and Substance Involvement Screening Test (ASSIST)

ASSIST was developed by WHO and an international group of specialist addiction researchers as a method of screening for hazardous, harmful and dependent use patterns of alcohol, tobacco and other psychoactive substances and their associated level of risk (Henry-Edwards et al., 2003). It comprises 10 categories of psychoactive substances and contains 8 items most of which were asked for each substance and provides substance-specific risk scores. An ASSIST lower scores $3\leq$ (10 for alcohol) are likely to indicate low risk related to occasional or non-problematic patterns of substance use. Mid range scores between 4 (11 for alcohol) and 26 for any substance are an indication of moderate risk due to harmful patterns of substance use or abuse (more regular use). While ASSIST scores of 27 or higher for any substance strongly suggest high risk of dependence due to frequent high-risk use or dependent patterns of use (Humeniuk et al., 2010). Each of the

Table 2. Socio-demographic characteristics of high school students, Afar-Ethiopia February 2017.

Variable	Category	Frequency (n=382)	Percentage
Age	≤18	48	12.0
	19-24	252	63.0
	≥25	100	25.0
	Total	**400**	**100%**
Sex	Male	238	59.5
	Female	162	40.5
	Total	**400**	**100%**
Religion	Muslim	286	71.5
	Orthodox	108	27.0
	Other*	6	1.5
	Total	**400**	**100%**

*Other faiths (Protestant, Catholic, Jehovah Witness, and Traditional).

ASSIST items had strong reliability with Kappa coefficients of agreement K-levels ranged from 0.58 to 0.90 and it is valid significantly correlating with other measures MINI-Plus with r=0.76, at p<0.01 and the Addiction Severity Index with r=0.84, p<0.01 (WHO ASSIST Working Group, 2002; Henry-Edwards et al., 2003). The ASSIT instrument has been used in research works in Brazil (Lucchese et al., 2016).

Data analysis

A descriptive survey was carried out among high school students in Afar region and the data were collected from Jan-Feb/2017 using a self-administered questionnaire. After coding, entering, cleaning the collected data, descriptive statistics (like frequency, percentages) were used to determine harmful and dependent use patterns of psychoactive substances using ASSIST Scores Cut off points and inferential statistics (like independent sample t- test, and ANOVA) were used to see the effect of socio-demographic variables on students' psychoactive substance abuse using SPSS version 20.

Ethical consideration

A formal letter was written to all districts education offices and permission was obtained at all level of the procedure. Written and verbal informed consent was obtained from each respondent after explaining the purpose of the study. Participants were informed that they have full right to continue, discontinue, or refuse to participate in the study. The responses were kept confidential and anonymous.

RESULTS AND DISCUSSION

Socio-demographic characteristics of study participants

A total of 400 questionnaires were distributed and filled

consistently and completely with 100% response rate. Majority 252 (63.0%) of the students were aged between 19-24 years. Among the study subjects, 238 (59.5%) were males and 162 (40.5%) were females. Concerning the religious status of participants, 286 (71.5%) were Muslim, 108 (27.0%) were Orthodox Christians and the rest 6 (1.5%) were other faith followers (Table 2).

Harmful and dependent patterns of psychoactive substance use and its associated level of risk

As it can be depicted from Table 3, 34.7, 14.0, and 4.7% of students were found to have dependent use pattern for khat, tobacco products and alcohol beverages reflecting ASSIST dependence scores respectively. This pattern of psychoactive substance dependence is associated with high level of risk of harm. This study also showed 31.3, 9.8, and 13.3% of students to have had harmful use or an abuse pattern reflecting ASSIST abuse scores which is an indication of moderate risk of harm from alcohol beverages, tobacco products and khat abuse respectively. Majority of the participants, 52.0% for khat, 76.2% for tobacco products, and 64.0% for alcohol beverages were found to have had occasional or non-problematic use for reported substances and are not currently experiencing any problems related to substance use. Thus, they are at low risk of developing health related problems. Other substances that were not more regularly or frequently used were not analyzed. Therefore, tobacco, alcoholic beverages and khat were substances that were deeply investigated and analyzed in this study with regard to students' harmful and dependent use

Table 3. Patterns of Psychoactive Substance Use and Level of risks among study participants, February 2017.

Psychoactive substances	Values	Patterns of use	Levels of risk	Frequency (n=400)	Percentage (100%)
Khat	27+	Dependent use	High risk	139	34.7
	4-26	Harmful use (abuse)	Moderate risk	53	13.3
	0-3	Non problematic use	Low risk	208	52.0
Tobacco products	27+	Dependent use	High risk	56	14.0
	4-26	Harmful use (abuse)	Moderate risk	39	9.8
	0-3	Non problematic use	Low risk	305	76.2
Alcohol beverages	27+	Dependent use	High risk	19	4.7
	11-26	Harmful use (abuse)	Moderate risk	125	31.3
	0-10	Non problematic use	Low risk	256	64.0

Table 4. ASSIST Abuse Score of Independent T-Test across Students' Sex.

Variable	Category	N	M	SD	T	Df	Sig.
Alcoholic beverages	Male	238	20.3950	7.57602	6.207	398	0.000
	Female	162	15.6667	7.33324			
Tobacco products	Male	238	20.5126	4.75539	1.142	398	0.254
	Female	162	19.9444	5.07246			
Khat	Male	238	20.8992	5.86543	0.362	398	0.718
	Female	162	20.6975	4.82371			

*Significance level 0.05.

patterns.

Comparisons of psychoactive substances abuse (harmful use) across students' sex

A test for differences using the independent sample t-test was performed to determine if there was any statistical significant difference in abuse of alcoholic beverages, tobacco products and Khat between male and female students. As can be verified from Table 4, male students on the average abuse more alcoholic beverages (M = 20.3950) than female students (M = 15.6667). The Levene's Test for Equality of variances was used to determine whether the difference in the abuse of alcoholic beverages between males and females is significant. The test indicated that the variances for the two groups – male and female students were equal $F(398) = 0.051$, p= 0.822, hence a test for equal variances was satisfied.

From Table 4, the mean of male students (M = 20.3950, SD = 7.57602) is statistically and significantly higher (t = 6.207, df = 398, at $p < 0.05$) than the mean of female students. This implies that there is significant difference in abuse of alcoholic beverages between male and female students. As captured in the Table 4, the difference was in favour of males, meaning that they abuse alcoholic beverages than females. This is evident in the fact that the mean scores recorded were 20.3950 and 15.6667 for males and females respectively. The conclusion is that males abuse alcoholic beverages than females. However, the result of independent t-test for Khat and tobacco products indicates that there is no statistically significant mean difference in abusing indicated substances.

Comparisons of psychoactive substances abuse (harmful use) across students' religion

As can be seen from Table 5, the mean abuse scores of Orthodox students (M=20.61, SD=7.54) was higher than Muslim students (M = 17.73, SD=7.53), and other faiths

Table 5. ASSIST Abuse score of One Way ANOVA- across Students' Religion.

	Category	N	M	SD	F	Sig.
Alcoholic beverages	Muslim	286	17.7343	7.54444		0.003
	Orthodox	108	20.6111	8.19258	5.833	
	Others	6	15.6667	7.94145		
	Total	400	18.4800	7.82257		
Tobacco products	Muslim	286	20.3392	4.48393	0.206	0.814
	Orthodox	108	20.0833	5.93914		
	Others	6	21.1667	1.94079		
	Total	400	20.2825	4.88799		
Khat	Muslim	286	20.6643	5.38086	0.408	0.665
	Orthodox	108	21.2222	5.78159		
	Others	6	20.8333	3.18852		
	Total	400	20.8175	5.46203		

* Significance level 0.05.

(M=15.66, SD=7.94) regarding abuse or harmful use of alcoholic beverages. The difference was a statistically significant (F (2, 397) =5.833, p < 0.05). Furthermore, the Bonferroni post hoc multiple comparisons result shows that Orthodox students reported highly significant mean difference on ASSIST abuse scores for alcoholic beverages as compared to Muslim students (p < 0.05), and other faiths (p < 0.05). On the other hand, Muslim students had no mean difference on abuse or harmful use of alcoholic beverages as compared to other faiths (p > 0.05). As it is shown from Table 5, statistical significant mean differences were not observed in abusing tobacco products and khat (F (2, 397) =.206, .408 p>0.05 respectively) across religion.

DISCUSSION

This study aims to determine harmful and dependent patterns of psychoactive substance use and associated level of risk among high school students in Afar region. The results of the analysis showed that 34.7% of students were found to have dependent use pattern for khat. This finding seems to differ from an earlier study by Abdelwahab et al. (2015) who found 70.5 % dependence on khat chewing in Saudi Arabia. The possible explanation for this variation can be cultural differences and the tools used in studies. In addition, a 4.7% dependent use pattern for alcohol among study participants was also found going well together with the study conducted in United States (3.5%) (Esser et al., study conducted in United States (3.5%) (Esser et al., 2014) and New Mexico (1.8%) (Woerle et al., 2007).

Furthermore, a similar pattern of use has been found

for tobacco products which account for 14.1% among the study participants. This finding is far away much lower than a study conducted in Egypt Port-said City which found 46% Cigarette Smoking and Nicotine dependency (Abo et al., 2014). The observed difference may appear to be due to methodological difference specifically in the psychometric properties of the measurements. However, the observed patterns of psychoactive substance use (dependent use) in the present study suggest that the participants may be at high risk of dependence on substance and are probably associated with experiencing health, social, financial, legal and relationship risks or problems as a result of such patterns of use (Humeniuk et al., 2010).

Apart from the above finding, the present study also showed 13.3 and 9.8% harmful patterns of khat and tobacco products use which is equivalent to abuse pattern (Humeniuk et al., 2010). These findings were closely pertinent to a research conducted in Mekelle University by Areha (2011) who found an abuse for alcohol (14.8%), cigarette (8.8%). However, the harmful pattern of students' psychoactive substance use in the study area is probably an indication of moderate risk of harm from their current pattern of psychoactive substance use (Henry-Edwards et al., 2003). Beside, 31.3% harmful patterns of use was also found for alcohol beverages use which is much lower than a study conducted in Nigeria, Kano State which accounts for 81.1%.This difference may be due to the difference in study area and period (Yunusa et al., 2017). Because gender and religion are an important factor to consider when examining patterns of substance abuse, this study also considered gender and religion.

Differences in abuse of alcoholic beverages, tobacco products and Khat were tested across participants'

gender and religion. The result of independent t-test result showed that there was a significant mean difference in alcoholic beverages abuse between male and female students in concordance with literatures (Bijl et al., 2002; Hao et al., 2004; World Health Organization, 2014); while no significant mean difference was observed in abuse of khat and tobacco products between male and female students. Relatively, ANOVA result revealed that religion of the respondents had a significant effect on abuse of alcoholic beverages that goes in line with the finding that indicated religiosity is differentially associated with alcohol use or problem drinking (Brown et al., 2001); while no significant mean differences were observed in abusing psychoactive substance like tobacco products and khat across participants upon religion.

Conclusion

This study was carried out to determine harmful and dependent patterns of Khat, tobacco and alcohol beverages use and associated level of risk among high school students in Afar region. The average age of participants was 24 years and 60.5% were males. Specific Drug Involvement scores for each substance were calculated by adding the response scores to questions 2-7 of ASSIST for drugs which are used in the region. The present study showed that 36.4, 14.1, and 4.7% of students in the study area were found to be at high risk of problems related to khat, tobacco products and alcohol beverages respectively. This pattern of students' psychoactive substance use in ASSIST is also associated with dependence and experiencing health, social, financial, legal and relationship problems.

On the other hand, this study also revealed that 31.4% of the participants were at moderate risk of health and other problems as revealed from current pattern of alcohol beverages use. Similarly, 13.1 and 9.4% of students were found to be at moderate risk of harm for khat and tobacco products, respectively. This study also considered whether gender differences in abuse of alcoholic beverages, tobacco products and Khat exists between male and female high school students in Afar region. Result from comparisons of psychoactive substances abuse between male and female students showed that there is statistical significant difference in abuse for alcoholic beverages. By implication, male students abuse more than their female counterparts on alcoholic beverages. From this result, we can understand that the degree of risk for harm due to use of alcohol varies with the drinker's sex. Thus, it is important to consider gender factor when designing interventions for substance abuse problems if treatments are different for both sex. On the other hand, the result of independent t-test for Khat and tobacco products indicates that there is no statistically significant mean difference in abusing indicated substances. Besides, ANOVA result revealed

that religion of the respondents had a significant effect on abuse of alcoholic beverages. However, statistical significant mean differences were not observed between the two groups in abusing psychoactive substance like tobacco products and khat across participants' religion.

Generally, the present study revealed a greater percentage of students whose daily dosage of harmful psychoactive substances instigated high and moderate risks. The outcome of this study is there is an urgent need for Government intervention to curtail the menace of harmful psychoactive substances and many other toxicants circulating in the society which are detrimental to health, social, financial, legal and peaceful relationship.

Limitations

(1) This study was conducted among in school students without including out of school youth in Afar region; therefore, a generalized conclusion cannot be drawn to reflect the true situation of patterns of psychoactive substance abuse and dependence in the region in general.
(2) Because this study focused only on high schools students, some districts which had no full cycle secondary schools were excluded in this study and five districts with secondary and preparatory schools were included in the study; therefore further studies should look into other districts' secondary school students' substance abuse and dependence problems.
(3) Due to limited national and local studies or literatures, dependence pattern figures became hard to compare and contrast.
(4) Lastly, three psychoactive substances which were reported to have been used, were only covered to reflect the situation of patterns of psychoactive substance and level of associated risks; therefore further studies should look into other psychoactive substances in some other areas.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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