

# Drugs (Alcohol/Khat) Use Stimulants and as Risk Factor for HIV/AIDS Infection, Among Provider Initiated Counselling and Testing (PICT) Visitors in Gore Town, Oromia, Ethiopia

Tesfalem Atnafu Waldegabrel\*, Ayelign Melesse Wubetie

Department of Biology, Mettu University, Mettu, Ethiopia

## Email address:

tesfalem\_atnafu@yahoo.com (Tesfalem A. W.), melesseayelign@gmail.com (Ayelign M. W.)

## To cite this article:

Tesfalem Atnafu Waldegabrel, Ayelign Melesse Wubetie. Drugs (Alcohol/Khat) Use Stimulants and as Risk Factor for HIV/AIDS Infection, Among Provider Initiated Counseling and Testing (PICT) Visitors in Gore Town, Oromia, Ethiopia. *American Journal of Health Research*. Vol. 3, No. 5, 2015, pp. 643-649. doi: 10.11648/j.sjph.20150305.18

---

**Abstract:** Background: HIV/AIDS infection is currently a major challenge for the world especially for the developing nations. Different scholars reported that infection prevalence is higher among substance abusers. Methods: Cross-sectional study was conducted at Gore Health Center, Ethiopia. A total of 256 samples collected from patients visiting PICT center for HIV/AIDS test. The data were gathered through interview with the respondents and the HIV test results were recorded in the laboratory through investigating the blood sample of respondents at PICT. The data were analyzed using SPSS version 20. Intake of alcohol and Khat showed a significant association with HIV infection. Results: This study output implicates triples chance of infection among the Khat [OR & (95%CI) 3.512 (1.695, 7.278)] and alcohol [OR & (95% CI) = 3.285 (1.576, 6.847)] and six times both users [OR & (95% CI) = 6.615 (3.096, 14.134)] over those of control groups. Sex analysis depicts females were found 2 times males likely for HIV infection [OR (95% CI) = 2.03 (0.603, 2.515)]. None educated were 1.94 times [OR (95% CI) = 1.944] as compared with secondary and above educational level. Conclusion: Substance abuse (khat and alcohol) found as major risk factor exposing for HIV/AIDS infection. Peer and social pressure is critical way that indulges people's for addicted use of alcohol and khat. In most cases khat use accompanied by alcohol that triggers chain of addictions and harmful consequences. Recommendation: Develop abusing drug use models (measures, control, demand and supply reduction, and creating awareness) for addressing effective prevention and control mechanisms.

**Keywords:** HIV, AIDS, Alcohol, Khat, PICT, Gore, Cases & Controls

---

## 1. Introduction

HIV/AIDS is currently a global threat especially in developing countries; beyond 60 million infected with the virus [1]. In Sub-Saharan Africa HIV/AIDS is the most prevalent and major causing for death [1]. Ethiopia one of the Sub-Saharan country HIV/AIDS prevalence is the highest following South Africa and Nigeria [2]. Prevalence of HIV/AIDS in Ethiopia was currently estimated about 2.3% (urban 7.7%, rural 0.9%, male 1.9% and female 1.8%) [3].

Khat (*Catha edulis*) is evergreen seedless plant that grows mainly in Ethiopia, Yemen and other African countries along the coast of the Indian Ocean [4]. Grow in a wide range of agro-climatic conditions and cultivated as bush or small tree [5]. Khat has different names: Kenya (*Mirra*, *khat*, *muringi*, *meongi*, *muraa*, *chat*, *tschat*), Somalia (*Jaad*), and Yemen (*Qat*), Uganda (*musutate*,

*mutabungwa*, *ngongo*, *kitandwe*), Tanzania (*mlonge*, *mulungi*, *warfo*), South Africa (bushman tea) [6]. In Ethiopia khat has several formal and slang names. In Amharic it is called as "*khat*, *chat* or *ጃጉ*" and in oromifaa "*Jimaa*" and slang: *belechu*. Also, different name based on the location at which khat is collected e.g., *gelemsoo kaht*, *wollega khat* and so on.

Khat leaves have different compounds alkaloids, terpenoids, flavonoids, sterols, glycosides, tannins, amino acids, vitamins, minerals including others [7]. Khat psycho-stimulant impact is due to the alkaloid ingredient cathinone and cathine that has analogues chemical structure to amphetamine [8, 9].

In antique time Khat leaves were considered for several purpose: Ethiopia (divine food), Egyptians (metamorphic

process transcend to apotheosis), Alexander the great (drug has medicinal value to treat soldiers), Yemen (leaves boiled to use as tea), and some other as a means of simulating alertness [4].

Several scientists revealed a serious health, social and economic impact associated with khat chewing and alcohol consumption. Pharmacological impact of khat includes gastro intestinal and nervous system, constipation, urine retention, cardiovascular, arrhythmias and an increase in blood pressure and chronic hypertension, dental and gastrointestinal adverse effects [7, 10]. And, usual consumption of khat brings influence on physical and psychological wellbeing of user [11], tooth decay or discoloration and gum problems [12].

The use of psychoactive substance (like Khat) has different impact on changing ones mood, sentimental activity, excitement or increased levels of energy, increased self-esteem, euphoria, increased libido, excitement, and increased proclivity for social interaction [4,13]. Similar to khat consumption, alcohol has negative consequences such as decrease academic achievements; enhance risk of HIV infection, insomnia, lethargy and other socio-economic impacts [14]. As a result, individuals swathed with drugs impair their ability to think that results harmful consequences of unsafe sexual interaction that expose for HIV/AIDS infection [15].

Around the world there are over 10 million peoples chewing khat daily [16]. In Ethiopia the prevalence of khat (*Catha edulis*) chewing among men and women during 2011 is 28% and 11% respectively [17]. Likewise, according to [18] Ethiopia is categorized in group E based on fermented and other beverage alcohol intake with a total of 7.1 L/adult and independent pattern of drinking [19]. [17] Alcohol consumption rates 45% for women and 53% for men.

In Ethiopia khat cultivation is estimated about 93,000 hectares that ranks second cash crop based on arable land coverage [20]. The replacement of other nutritional crops by khat leads to declining foreign investment, due to khat is illegal in U.S.A and most of Europe countries [5].

Khat in contrast to its negative impact, other groups argue its benefit. Economic value: Khat is a cash crop; a lot of peoples are involved in harvesting, growing, and earning income [21]. Ethiopia is one of the leading khat producers and earns high in exporting. Even though the largest portion of khat produced is consumed within the country one third of the product exported to Djibouti and Somalia [22]. The income generated from commercializing khat is not simple; even in Harar khat revenue is greater than other cash crops. The study conducted in Jimma zone, Ethiopia, on the revenue earned from khat indicated that from 500-3000 USD/year [23].

Most HIV/AIDS infection results from sexual intercourse. But, the outbreaks reported elsewhere, where the majority of new infections occur among drug users [1]. There is high consumption of alcohol and Khat in these areas. This study was conducted to study the magnitude of risky sexual

behavior and its association with Khat and alcohol consumption in Gore town.

## 2. Materials and Methods

### 2.1. Study Area

This study was conducted in Gore Town, Ilu Aba Bora zone, Oromia regional state, Ethiopia during January-May 2013. Gore town, about 618 km far from Addis Ababa, Ethiopia. The study was undertaken from governmental institutions; clinical health centers located at Gore town. Institution based case control study was conducted to assess alcohol and Khat use as risk factors of HIV infection among PICT visitors.

Case is PICT users whose HIV test result was positive (HIV+ve) while controls are PICT users whose HIV test result was negative (HIV-ve). Both cases and controls were those people who visited PICT at Gore health center for HIV counseling and testing purposes during the study period.

### 2.2. Sample Size and Sampling

A cross-sectional study was conducted to determine the prevalence of khat and alcohol as risky factor for HIV infection. Sample size was calculated using the “single population proportion”, 90% confidence level. Thus a total sample size of 256 respondents (36 cases and 220 controls) was selected. A person whose age is below 15 years or non-volunteer to participate in the study was excluded. Only those who fulfill age limit (above 15 year) and volunteer to involve were included in this study without discrimination for other factors like religion, occupation, race, height, and weight.

### 2.3. Data Collection

Data was collected during the pre-test counseling and before the sero-status of the individuals is known. The collection of data was continued until the required number of cases is identified. Data was collected using structured questionnaires. The designed questionnaire was translated first into the local language (Afan Oromo) and official language (Amharic) and back translated to English to ensure its consistency.

The questionnaires were pretested in similar settings two weeks before the actual data collection. The collected data was checked for completeness, accuracy, clarity and consistency by a supervisor and the principal investigator on daily basis. Any error or ambiguity and incompleteness were corrected before the individual was told the test result in his/her visit for the posttest counseling. HIV sero status (HIV sero-positive, or sero-negative) was considered as the outcome or dependent variable, while socio-demographic variables (age, sex, residence, religion, ethnicity), socio-economic variables (income, occupation), and risky behaviors (number of sexual partners, Khat and alcohol use, frequency and history of sexually transmitted diseases) was considered as independent variables.

## 2.4. Data Analysis

Analysis of the collected data was carried out using IBMSPSS version 20 software. Proportions, percentages, and graphs were used for description of the data as appropriate. Multivariable logistic regression with odds ratio (OR) at 95% confidence intervals (CI),  $p$ -value of 0.05 was set as a cut-off point for determining degree of the association between dependent and independent variables.

## 2.5. Ethical Clearance

Before beginning of this study, ethical clearance was obtained from relevant bodies and authorities. During the interview, each individual was told about the aim of the study and on the possible outcomes of the study so as to provide us sufficient required information. The participation of the respondents was completely voluntary based and the information obtained was kept confidential. A letter of agreement was attached to the questioner in order to obtain written and oral consent for participation in the study.

## 3. Results

### 3.1. Socio-Demography of PICT Visitors at Gore Health Center

From a total of 321 potential respondents about 256 were considered in this study based on methods and ethical consideration. The majority of population investigated was from urban 70.31% and the remaining 29.69% from rural area. The percentage of educational level was relatively closer among study groups. HIV/AIDS cases prevalence was up to 7% from the total population.

Considering HIV cases only in Gore town, the risk of HIV/AIDS infection is more prevalent among people whose ages 20-24, which is about 53%. Individual's ages 15-19 and above 24 recorded as 28% and 19% respectively. Also among HIV sero-negative studied groups the majorities were in the age of 20-24 (34%) than lower (15-19) and beyond age (above 24) groups as shown in table 3.1.

In terms of sex: the females (53.91%) more visitors at PICT center relative to males (46.09%) at Gore PICT center. HIV sero-status cases output implicates slight difference of infection among both sex (9% females & 5% males). However, this study result shows females were 2 times [OR (95% CI) = 2.03 (0.603, 2.515)] at potential risk of HIV infection than males.

When we look at the educational level of participant in this research at Gore PICT center, levels of education was reversely related with educational status. Majority were primary level (35.16%) followed by non-educated (31.25%), secondary and above (30.47%).

The crude OR (95% of CI) result also showed none educated were 1.94 times [OR (95% CI) = 1.944] and primary 1.34 times [OR (95% CI) = 1.34] potentially at risk of HIV/AIDS infection as compared with secondary and above educational status. This implies non-educated groups

are more likely to be affected by HIV/AIDS than the educated.

The other main components studied in this research at Gore PICT center were the marital status of individuals married, unmarried and divorced or separated. HIV sero-status cases decline from married (31% control, 6% cases) to unmarried (29% control, 4% cases). Furthermore, the OR (95% CI) result shows married 1.6 times [OR & 95% CI= 1.56] and divorced or separated were 1.5 times [OR & (95% CI) = 1.47] at the possible risk of HIV/AIDS infection compared with unmarried person.

This implies divorced and unmarried individuals were more exposed for risk of HIV/AIDS infection as compared with married ones. But in contrary to this we suggest that marriage by itself could not be a risk factor for HIV infection but absence of disclosure for marriage partner could be a longing cause for escalated figure of HIV infection.

**Table 3.1.** Determination of socio-demographic characteristics of the respondents at Gore PICT Center.

Characters	Controls		cases		Cases + controls	
	n	n%	n	n%	total	% total
<b>Age</b>						
15-19	61	24	10	4	71	27.73
20-24	86	34	19	7	105	41.02
Above 24	73	29	7	3	80	33.98
<b>Educational level</b>						
Non educated	72	28	16	6	88	31.25
Primary education	78	30	12	5	90	35.16
Secondary and above	70	27	8	3	78	30.47
<b>Marital status</b>						
Married	79	31	15	6	94	36.72
Unmarried	74	29	9	4	83	32.42
Divorced	67	26	12	5	79	30.86
<b>Sex</b>						
Male	103	40	15	6	118	46.09
Female	117	46	21	8	138	53.91
<b>Residence</b>						
Urban	156	61	24	9	180	70.31
Rural	64	25	12	5	76	29.69

NB: 95%CI stands for 95% of confidence interval and OR= odd ratios.

### 3.2. Effect of Confounding Factors for HIV Infections at Gore PICT Center

In Gore PICT cases (9% were alcohol users and nonusers 5%) and control (56% non-users & 30% users) were found. If the values are compared among case groups excluding controls, it shows alcohol users were 64% and non-users 36% of prevalence. This demonstrates prevalence of HIV infection among alcohol drinkers were double times than non-drinkers. Alcohol users are 3 times [OR (95% of CI) = 3.28] more likely to be infected by HIV/AIDS than none users.

Similarly, khat chewers were found more at risk for HIV/AIDS infection than the non-chewers. Majority of khat chewers were HIV infected compared with non-chewers. Control groups were 59% non-chewers and 27% chewers. Within in observed sero-status positive group 61% and 39% were chewers and non-chewers respectively. Hence, among

cases the largest number of individual was consuming khat. The overall result guides the use of khat considers a potential risk for HIV/AIDS infection, which is about 3.5 times [OR and 95% of CI=3.51] than non-chewers.

Both alcohol and khat users were at the highest potential risk of HIV/AIDS infection than either khat or alcohol users. For instance, 67% of cases detected among both users. Both alcohol and khat users were 6.6 times [OR 95% of CI =6.6] at likely risk of infection than none users of both factors.

Major proportion of the respondents' reason out peer pressure (45%) and tension relief (18%) as major factor engage them to use drugs (alcohol and khat). Unlike to this access to drugs (7%) and other contribute less.

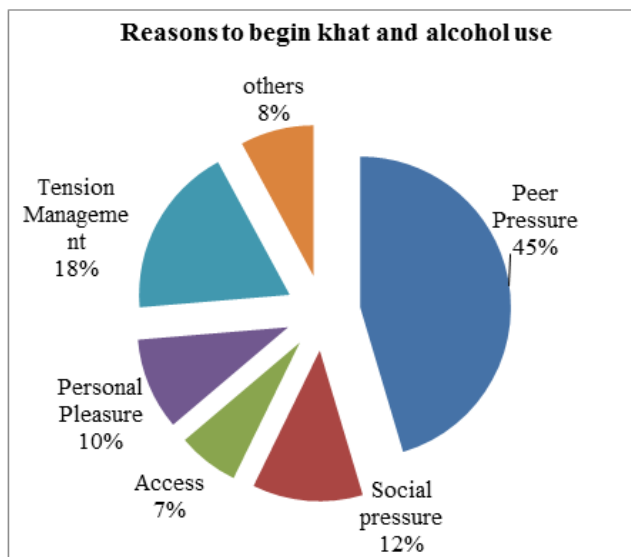
When asked, why do you use drug? Response inclined for good reason; for instance, to get relief from anger/tension, to

be alert, to enjoy euphoria obtained, to entertain during boring and depression period. Did you know that using drugs could leads to bad consequences? As well the majority replay, it matters on the amount of intake, if you use beyond the personal limit level it may otherwise not. Here is one of the confusion over drug use, personal limit means what? According to majority of respondents, it is situation where one could neglect itself and unable to control its own emotion. For example, it is state of unable to act in a usual manner, not able to walk properly or control oneself etc. Also, euphoria and pleasure obtained from drugs accepted as having no risk at all. Some other groups, view in respect to the household budget. The use of drugs unless it disrupts household economy there could be no effect.

**Table 3.2.** Determination of alcohol and khat as risk factor for HIV/AIDS infection at Gore PICT Center.

Confounding factors		HIV Sero-status						OR (95%CI)
		Cases		Controls		Total		
		n	n%	n	%	Total	%	
Alcohol use								
	Yes	23	9%	77	30%	100	39.06%	3.285 (1.576, 6.847)
	No	13	5%	143	56%	156	60.94%	1
Khat use								
	Yes	22	9%	68	27%	90	35.16%	3.512 (1.695, 7.278)
	No	14	5%	152	59%	166	64.84%	1
Both Khat and Alcohol users								
	Yes	24	9%	52	20%	76	29.69%	6.615 (3.096, 14.134)
	No	12	5%	172	67%	184	71.88%	1

NB: 95%CI stands for 95% of confidence interval and OR= odd ratios



**Figure 1.** How do you start to use drugs (khat & alcohol)?

## 4. Discussion

### 4.1. Socio-Demographic Factors and HIV/AIDS

In this research based on the marital status of individual, the prevalence of HIV/AIDS infection was found significant among married than those living as single. As a result it is found that the risk of infection is likely to be 1.6 times for

married and 1.5 times divorced than those of unmarried. It is in agreement with study in Gamo Gofa, married 3 times and divorced 5 times more likely to be infected with HIV virus than those who are single, never married or living alone [24]. But it is against [25] married are less risky by 2.97 times than non-married.

One factor that contributes HIV infection more among the married individuals were absence of disclosure for their partner. This could be due privatizing HIV/AIDS cases. The disclosure of HIV/AIDS sero-positive cases among women to sex partners in study area Gore, and Mettu were 69% [26]. Unlike to this in individuals living alone or as single there is less likely to be sluttish for sexual abuse.

The risk of HIV/AIDS infection was in reverse association with education. Illiterate individual were 2 times and primary level of education were 1.34 times likely to be infected with HIV virus compared secondary and above. In agreement with this finding, in Uganda Zambia and Thailand the prevalence of infection is low in highly educated societies but slight change in Tanzania. Overall, in Africa the risk of HIV infection is associated with higher risk of infection; while the new infection occurrence incline towards less educated [27]. In contrast to the findings of [15] the risk of infection is more prevalent among the educated societies than those who do not have educational status. The HIV attainment consists of linear relationship with education [28]. Education and clinical malaria record has less association with HIV infection [29]. The possible reason contributing for this

occurrence of HIV infection more prevalent among none educated could be due to lack of awareness and knowledge for taking care of HIV infection. Even though, none educated could recognize HIV/AIDS transmitted via sexual intercourse, there could be less understanding and perception as compared with educated peoples. This fact is supported by [24] people that are more knowledgeable could take care of HIV infection, as they easily understood both the transmission and prevention methods.

In relation with sex: females were found to be more exposed for HIV/AIDS infection as compared to males. This research finding entails females were two times more at risk of infection than males. It is in agreement with [24, 15] and against [30]. There are different grounds contributing for such varies high risk of infection in relation to gender. Among these: girls were exposed for higher sexual pressure, educational background, social including economic factors influence. Also this is in line with the findings of [24, 31] suggested that girls are at a much greater risk at early ages because of both biological and cultural factors such as early age at sexual debut, early marriage, sexual abuse and violence. Unlike [25] there is no significant difference between cases and controls in terms of sex and residence.

In this finding the risk of HIV/AIDS infection in terms of ages indicated that individuals whose ages were between 20-24 were found 1.5 times more likely to be infected with HIV/AIDS as compared with individual those ages were between 15 and 19. This could be ages between 20 up to 24 are more Khat chewers and alcohol users as compared to 15 - 19 ages. This can be economic potential or capacity to afford alcohol and Khat expense among 20 and above ages relative to 15 and 19 year individuals. [30] 36.8% of the HIV test visitors were aged 15-19 years, and 63.1% were 20-24 age. Also, this is supported by [24] peoples in the range of 15-19 were three times less infected as compared to 20 and above years. Khat chewing is most familiar among youth, those had pocket money [32].

#### **4.2. Khat as a Confounding Factor for HIV/AIDS Infection**

In this study among case group 61% were found khat users. The rate of Khat chewing was 41% among the HIV negative individuals and 59% among HIV positives [25]. Khat users were 3.5 times at risk of HIV infection as compared with non-users. Youth chew khat were three-two times to initiate early sexual intercourse [31].

The majority of cases were identified among the khat chewers. HIV/AIDS exposure for Khat consumers increase was due to different causalities associated with Khat chewing. For instance, the respondents reply that during Khat chewing there is high tendency to chew with opposite sex partner that leads to the possibility of having unplanned and unsafe sex with multiple partners. And this opportunity enhances the risk for HIV/AIDS infection. Similar with that of alcohol, the use of Khat had possible exposure as a risk factor for HIV/AIDS infection. This finding is further supported by [15, 25] where Khat consumption was positively associated with that of HIV/AIDS infection among the study groups.

Khat users among total study population were 35.16% chewers and 64.84% non-chewers. According to EDHS, 2011 reported the prevalence of khat chewing men (28%) and female (11%). Among females khat chewing differs in places of residence (12% in rural versus 7% in urban) but no marked difference in males. More than 74% of seropositive among alcohol drinkers was due to it increases their desire for sex and leads to HIV infection [25]. If we observe khat chewing habit in cross-cultural terms: In Saudi Arabia prevalence of khat chewing among males, at 33.1% (95% CI: 31.16–35.08), than among females 4.3% (95% C.I.: 3.39–5.31) ( $P < 0.001$ ) [26].

#### **4.3. Factors Related with How and Why to Use Drugs**

Why do you chew khat/drink alcohol? In summary about 78% of the respondents reply for enhancing work efficiency with different reason in their opinion: to get energy for work; to increase their performance while doing business; to spend time and use it as recreational act; some agree with enjoyment with the ceremony of chewing with different companion. However, the reaming 22% implicated use of khat to forget bad memories due to khat give them pleasure and euphoria.

Other findings also support this statement; different factors are involved in use of khat, for example for social recreation and sometimes as medicine. Also it is used by students for exam, by drivers for alertness, as well by soldiers to enhance performance [33]. Most youths chew khat for increasing energy and enhancing mood for accelerating work performance without thinking its consequential impact [3].

How do you start to chew/drink? The most stimulant factors for drug use were peer pressure and tension relief; while social and access play less role. For instance, 45% because of peer influence, followed by 18% for worry and tension management: to get delight and pleasure from khat that gives relief from worry and tension. Environmental influence this means easy access for khat, harvested and shipped in surrounding nearby areas, at work or job related including personnel pleasure and others accounts 7-10%. In support of this finding [32] peer pressure significantly account for initiating khat chewing.

#### **4.4. Alcohol as a Risky Factor for HIV/AIDS Infection**

Alcohol prevalence from total population was found 39.06%, considering only drinkers about 64% were acquired HIV. In Addis Ababa the majority of cases were from drinkers (55.1%) while the overall prevalence of drinkers from the total participant was 45% [34]. Likewise, another study revealed drinkers have 57% probable risk of HIV infection when the potential cofounders controlled in multivariate analysis [35]. Alcohol intake strongly associated with unprotected sex [36].

Substance abuse (such as Alcohol and drug) has strong interconnection with trauma and Sexual risks [37]. The use of alcohol among adolescents can be harmful, leading to decreased academic performance, increased risk of contracting HIV, and other sexually transmitted diseases, or other psychiatric disorders such as lethargy, hopelessness and

insomnia [14]. Various alcohols related psychological factors, social factors and environmental factors placed individuals at risk of HIV infection [38]. Different Sub-Saharan countries exhibit high level of alcohol consumption simultaneously with high HIV/AIDS prevalence, which is one of the most risky behavior associated with viral infection [19].

#### 4.5. Both Alcohol and Khat Users

Khat or alcohol consumption has serious contribution as risk factor for HIV infection. This is further enhanced with the dual use of alcohol and Khat, when both combined the effect escalates twice. It results loose of sexual behavior and leading to unprotected intercourse. Both users were found 6 times at risk than non-users, which is by far twice than either khat or alcohol user. Likewise [39] the probability of HIV-sero positive were threefold for chewers and two fold for drinkers relative to their counterparts and using alcohol daily having a threefold odds compared to not users [36].

[15, 25] reported that khat use and its associated behavior such as alcohol consumption were linked with exposing individual for HIV/AIDS infection by leading to loss of inhibition and participating in risky sexual activities like unprotected sex, different sex patterns and prolonged or traumatic sex including injection of drugs. The chance of getting HIV/AIDS infection increase in individuals proximal for risk factors like drug injection, substance abuse such as alcohol, Khat and other drugs that may result in unprotected sexual intercourse [40].

## 5. Conclusion

In this research, alcohol and Khat were found as an independent risk factor for HIV/AIDS infection. Specifically the effect of alcohol and Khat were detected in school age young community. The findings of this research clearly demonstrate strong association between HIV/AIDS cases with the co-founding factors. The problem accelerate during the use of alcohol mingles with khat that intensify the chance of HIV infection by stimulating desire for sexual intercourse and leads toward un-protected sex. The major driver for stimulating drugs use were peer pressure followed by need for stress relief.

This research output recommend the need to create awareness that bears concrete understanding among the young societies most prone for HIV/AIDS infection. That demands behavioral changes. Finally, we impressively urge the need for modeling vicious circle problems of chewing Khat and consumption of alcohol on: social, economic, and health impact, especially in developing context to effectively address the issue.

## Acknowledgment

We would like to acknowledge Mettu University (MeU) for the financial grant to undertake this research. Our gratitude also extends to Gore Health center health officers for their indebted work and cooperation throughout the research process.

## References

- [1] UNAIDS/WHO, AIDS epidemic update, December 2007. Geneva, Switzerland, 2007.
- [2] MOH, AIDS in Ethiopia. Disease Prevention and Control Department, Ministry of Health, third Edition, November 2000.
- [3] Federal HIV/AIDS prevention and control office, federal ministry of Health. Single Point HIV prevalence Estimate. Addis Ababa, Ethiopia. 2007:8-17.
- [4] Kalix P. Khat: scientific knowledge and policy issues. *Br J Addict* 1987; 82: 47-53.
- [5] NasirTajureWabe. Chemistry, Pharmacology, and Toxicology of Khat (*Catha Edulis* Forsk): A Review. *Addict & Health*, Summer & Autumn. 2011; 3: 3-4.
- [6] Nencin IP, Grassi MC, Botan AA, Asseyr AF, Paoli E. Khat chewing spread to the Somali community in Rome. *Drug Alcohol Depend.* 1988; 23: 255-258.
- [7] Halbach H. Medical aspects of the chewing of Khat leaves. *Bulletin of the World Health Organization.* 1972; 47: 21-9. 2.
- [8] Kalix P: The pharmacology of Khat. *Gen Pharmacol.* 1984, 15:179-187.
- [9] Michael, O. Chronic khat use and psychotic dis-orders: A review of the literature and future prospects. *Konstanzer Online-Publikations-System (KOPS).* 2007.
- [10] Bizuayehu Walle Birhane, Muluken Walle Birhane. The Effect of Khat (*Catha edulis*) Chewing on Blood Pressure among Male Adult Chewers, Bahir Dar, North West Ethiopia. *Science Journal of Public Health.*2014; 2(5): 461-468.
- [11] Hussein, M. and Ageely, A. Health and socio-economic hazards associated with khat consumption. *Journal of Family Community Medicine.* 2008; 15: 3-11.
- [12] Marelign Tilahun Malaju, Gistane Ayele Asale. Association of Khat and Alcohol Use with HIV Infection among Youths in Southern Ethiopia: A Case Control Study. *Science Journal of Public Health.* 2013; 1(2):97-101.
- [13] Al-Motareb A, Baker K, Broadley KJ: Khat: Pharmacological and medical aspects and its social use in Yemen, A review article. *Phytotherapy Research.* 2002; 16:403-413.
- [14] Deressa and Azazh. Substance use and its predictors among undergraduate medical students of Addis Ababa University in Ethiopia. *BMC Public Health.* 2011; 11:660.
- [15] Dawit Abebe, Asfaw Debella, Amare Dejene, Ambaye Degefa, Almaz Abebe, Kelbessa Urga, Lemma Ketema. Khat chewing habit as a possible risk behavior for HIV infection. *Ethiop.J.Health Dev.* 2005; 19(3):174-181.
- [16] Bongard S, Absi M, Khalil N and Habori M. Khat Use and Trait Anger: Effects on Affect Regulation during an acute Stressful Challenge, Research Report University of Minnesota, *Eur. Addict Res.*2011; 17:285-291.
- [17] Ethiopia Demographic and Health Survey (EDHS): Central Statistical Agency (CSA) Addis Ababa, Ethiopia and ICF Macro Calverton, Maryland, U.S.A. March 2012. 2011.

- [18] WHO: Global Status Report on Alcohol. Geneva, WHO, Substance Abuse Department. 1999.
- [19] Rehm, J., Rehn, N., Room, R., Monteiro, M., Gmel, G., Jernigan, D., Frickil, U. Alcohol as a risk factor for global burden of disease. *European Addiction Research*. 2003; 9:157-164.
- [20] Tefera TL, Kirsten JK, Perret S. Market Incentives, Farmers' Response and A Policy Dilemma: A Case Study of Khat Production in the Eastern Ethiopian Highlands. *Agrekon*. 2003; 42 (3):213–27.
- [21] Lemessa, D. Khat (*Catha edulis*): Botany, Distribution, Cultivation, Usage and Economics in Ethiopia. UN-Emergencies Unit for Ethiopia Addis Ababa. 2001.
- [22] TayeHailuFeyisa, J.B.A. Khat expansion in the Ethiopian highlands: Effects on the farming system in Habro district. *Mountain Research and Development*. 2003; 23:185-189.
- [23] BerhanuMegerssa, AregashEsayas, Aliy Mohamed. Socio-Economic Impact of Khat in Mana District, Jimma Zone, South Western Ethiopia *Journal of Agriculture and Food Sciences*. ISSN: 2346-7002. 2014; 2(2): 21-32
- [24] Marelign Tilahun Malaju, Gistane Ayele Asale. Association of Khat and Alcohol Use with HIV Infection among Youths in Southern Ethiopia: A Case Control Study. *Science Journal of Public Health*. 2013; 1(2): 97-101.
- [25] Assefa S., Damen H, Alemayehu W. The association between substance abuse and HIV infection among people visiting HIV counseling and testing center in Addis Ababa, Ethiopia. *Journal of health development*. 2005; 19(2):116-125
- [26] Kebede Deribe Kassaye, Wassie Lingerh, Yismaw Dejene. Determinants and outcomes of disclosing HIV-sero positive status to sexual partners among women in Mettu and Gore towns, Illubabor Zone southwest Ethiopia. *Ethiop.J. Health Dev*. 2005; 19(2):126-130
- [27] Hargreaves J.R. and Glynn J. R. Educational attainment and HIV-1 infection in developing countries: a systematic review. *Tropical Medicine and International Health* 2002; 7(6): 489–498.
- [28] Adebayo S. B., Olukolade R. I., Idogho O. , Anyanti J., Ankomah1A. (2013). Marital Status and HIV Prevalence in Nigeria: Implications for Effective Prevention Programs for Women. *Advances in Infectious Diseases* 3: 210-218.
- [29] Christian Isichei, Pamela Brown, Mercy Isichei, Jean Njab, Tinuade Oyeboode, Prosper Okonkwo. HIV Prevalence and Associated Risk Factors among Rural Pregnant Women in North Central Nigeria. *American Journal of Heath Research*. 2015; 3(1): 18-23.
- [30] Hibret Alemu, Damen Haile Mariam, Kassahun Abate Belay, and Gail Davey. Factors Predisposing Out-of-School Youths to HIV/AIDS-related Risky Sexual Behaviour in Northwest Ethiopia. *J HEALTH POPUL NUTR*. 2007; 25(3):344-350
- [31] Fekadu Mazengia and Alemayehu Worku. Age at sexual initiation and factors associated with it among youths in North East Ethiopia. *Ethiop. J. Health Dev*. 2009; 23(2):154-162
- [32] Yeshalem Mulugeta. Khat Chewing and Its Associated Factor among College Students in Bahir Dar Town, Ethiopia. *Science Journal of Public Health*. 2013; 1(5): 209-214.
- [33] Arnett JJ. The developmental context of substance use in emerging adulthood. *J Drug Issues*. 2005; 35: 235–254.
- [34] Assefa Seme, Damen Haile Mariam, Alemayehu Worku. The association between substance abuse and HIV infection among people visiting HIV counseling and testing centers in Addis Ababa, Ethiopia. *Ethiop.J.Health Dev*. 2005; 19(2): 116-125
- [35] Fisher JC, Bang H, Kapiga SH. The association between HIV infection and alcohol use: a systematic review and Meta-analysis of African studies. *Global health Science Literature digest*. 2007; 34(11):856-63
- [36] Derege K, Ataly A, Getnet M, Fikre E, Frehiwot B. Khat and alcohol use and risky sexual behavior among in school and out of school youth in Ethiopia. *BMC Public Health*. 2005;5:109
- [37] Simoni JM, Sehgal S, Walters KL. Triangle of risk: urban American Indian women's sexual trauma, injection drug use, and HIV sexual risk behaviors. *AIDS Behav*. 2004; 8:33–45.
- [38] WHO. Alcohol use and sexual risk behavior. A qualitative study in eight cross cultural countries, Geneva, Switzerland. 2005.
- [39] Fantahun Ayenew. Alcohol and Khat use as risk factors for HIV infection. *J Addict Res Ther*. 2013, 4:4
- [40] USAID, USAID Health: HIV/AIDS, Global AIDS 101. December 29, 2009.