

Substance Use among Clients of HIV Counseling and Testing Centers in East Gojjam, Ethiopia: Determinants and Its Association with HIV Infection

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Abstract

Introduction: Substance use is a persistent major public health problem worldwide. Alcohol and other substances have been associated with an increased likelihood of various other health risk behaviors. This study aimed to assess factors associated with substance use and whether substance use is associated with increased risk of HIV infection among clients of HIV counseling and testing centers (HCTs) in East Gojjam Ethiopia.

Methods: A case control study was conducted among 953 sexually active persons ages 15-49 visiting the HCTs between December 2015 and February 2016. Interviewer-administered questionnaires and HIV testing were used to obtain the required data. Bivariate and multivariate analysis was used to identify the predictors of substance use as well as the relationship of substance use and HIV infection.

Results: 70.1% of the entire sample reported using at least one type of substance studied by present study. The multivariate analysis indicated that substance users had higher odds of being male (AOR: 3.04; 95% CI (1.37, 6.77)), living in households with low income (AOR: 2.00; 95% CI (1.36, 2.93)), engaging in exchange of sex for money or other gifts (AOR: 3.22; 95% CI (1.57, 6.58)) and violence history within relationships (AOR: 3.52; 95% CI (1.30, 9.55)). Using both alcohol and khat within the last year was associated with three-fold increased odds of HIV infection (AOR: 3.04, 95% CI (1.37, 6.77)).

Conclusion: This research underscores that past-year substance use is an important predictor of current HIV status in service-seeking clients of East Gojjam HCTs. Hence, adopting a comprehensive approach that can alter the contextual factors associated with both substance use and HIV focusing on addressing risk behaviors, gender differences as well as differences in socioeconomic and cultural issues is important.

Keywords: Substance use; Alcohol; Khat; Risk behaviors; HIV/AIDS prevention; HIV testing and counselling services

Introduction

HIV/AIDS is a major threat to the world's population, disproportionately affected the Sub-Saharan African countries [1]. In Ethiopia, approximately 1.2 million people are infected with HIV at the end of 2010 [2]. In Sub Saharan Africa, more than 85% of HIV transmissions are caused by heterosexual contact. Other routes include prenatal transmission and through exposure to contaminated blood, which account for the remaining 15% of the transmission [1].

Studies have suggested that substance use, abuse, and dependence may be associated with an increased likelihood of various other health risk behaviors such as sexual risk factors for HIV transmission and unintended pregnancies, mental health disorders and sexual violence and other coercive behaviors [3-5]. Although injection drug use is a direct route of transmission, drinking, smoking, ingesting, or inhaling drugs such as alcohol, cocaine, cannabis are also associated with increased risk for HIV infection [6]. By reducing users' inhibitions, they may increase HIV risk behaviors, including not using a condom,

having multiple sexual partners, needle sharing or use of contaminated needles for injection, prolonged and traumatic sexual intercourse [4,7-9].

Substance use and addiction are public health concerns for many reasons. In addition to increasing the risk of HIV transmission, substance use can affect people's overall health and make them more susceptible to HIV infection and, in those already infected with HIV, substance use can hasten disease progression, increased risk of delayed HIV/AIDS care and negatively affect adherence to treatment [6,10,11].

Though many African countries are on drug transit routes, the extent of drug-related problems in Africa is not clear. In Ethiopia, drugs like alcohol, khat and cannabis are commonly consumed in both urban and rural areas. A report has known that alcohol and khat were the two drugs commonly ever tried by high school students in both government and private schools in Ethiopia [7]. Evidence on substance use in selected urban areas of Ethiopia showed 82% of street children, commercial sex workers, and street vendors as having used addictive drugs or substances and khat, alcohol, cannabis and solvents were the commonly used substances [12].

Khat (*Catha edulis*), which Ethiopians do consider as an illicit drug, was shown associated with multiple adverse health and social consequences and sometimes linked to other drug use. Cerebral-stimulant action of khat chewing is being overcome by different activities, depending on the local situation, such as indulgence in alcohol and abuse of sedatives and hypnotic drugs. Khat chewing in some areas occurs with the use of other substances such as cigarette and cannabis. Alcohol intake following khat chewing, commonly known in Ethiopia as “chebsi”, is perceived to overcome the effect of khat chewing. Therefore, most khat chewers are believed to drink after chewing [13,14].

A large body of literature acknowledges that a number of factors such as behavioral, social, environmental, and structural factors contribute to substance use [6,13,15]. Even though the problem of substance use is reported to be on the increase in major urban areas of Ethiopia, the available data on the relation of substance use and HIV is almost non-existent [16]. However, such data are important in identifying HIV risk prevention strategies in multiple contexts targeted to populations at greatest risk for HIV infection, including substance users. Thus, this study aims to identify factors associated with substance use and whether substance use is predicting an increased risk of HIV infection focusing on khat and alcohol use among first-time clients of East Gojjam Ethiopian HCTs.

Subjects and Methods

Study setting, population and design: A case control study of factors associated with substance use and the relationship of substance use with HIV infection was conducted on people visiting HCT centers of East Gojjam Ethiopia between December 2015 and February 2016. Sexually active persons ages 15-49 who came for the first time to be tested for HIV infection in the selected health institutions that carry out HIV counselling and testing were the study population.

Sample size and sampling procedure: The sample size was calculated using the differences of substance abuse proportions between cases and controls with a 95% confidence level, 5% margin of error, a power of 80%, a per cent exposure to substances among cases of 56% and a difference of 12% in prevalence of substance abuse between cases and controls groups and the ratio of case to control of 1:3. Thus, by considering 20% non-response rate, due to the personal nature of some of the questions (i.e., details of sexual relationships), the required minimum sample size of 229 cases and 687 controls were estimated. Initially seven main health institutions specializing in HIV counseling and testing were identified. Due to the little difference between the minimum sample size estimated (n=916) and the number of eligible persons who were tested for HIV during the study period in the seven selected centers (n=989), all of them were invited to participate.

Data collection and measurement process: Interviewer-administered questionnaires and HIV testing were used to obtain the required data. Data for the 12 month period preceding the date of diagnosis were collected using interviewers-based pre tested structured questionnaire. Data collectors were HCT trained counselors who were fluent users of the local languages working in HCT clinics of respective institution. Participants were interviewed before they underwent pre-test counselling and tested for HIV infection. The outcome variable HIV serostatus at baseline was assessed with two HIV rapid tests [17] done in parallel with the FDA-approved Uni-gold™ Recombigen® HIV (Trinity Biotech plc, Bray, Co. Wicklow, Ireland) and Determine™ HIV-1/2 (Alere Medical Co. Ltd, Matsudo-shi, Chiba, Japan) test. If

both of the HIV rapid tests were non-reactive, no further testing was done. If one or both of the HIV rapid tests was reactive, a CD4 cell count was performed and confirmatory test was performed using an FDA-cleared Western blot test. Those HIV-tested positive individuals were designated as cases and controls otherwise. The main exposure variable was substance abuse and the outcome variable is HIV infection. Exposure to substance use is a patterned use of a substance in which the user consumes the substance at any time in amounts or in methods not medically prescribed and was coded as yes if participants reported ever used any of alcohol or khat) and no if they reported neither used alcohol nor khat within the last year. Substance use was categorized as none/no, light, or heavy in the HIV infection predictors analysis. However, in the analysis of substance use as an outcome, the light and heavy were collapsed into a single category as yes. Household socio economic status was rated based on a 1-5 scale with poorest households being rated as a 1 and the wealthiest households rated as 5. The two lowest categories were combined to form a measure of low, the middle level remains as one category, and the two highest categories were collapsed to form a measure of high wealth index.

Statistical analysis

The collected data were entered using EPI-info version 6 and analyzed using SPSS version 21 software. Descriptive statistics including proportions and frequencies were used to summarize the socio-demographic, substance use and sexual and relationship characteristics of the sample. Chi-squared test was used for proportion comparison. Bivariate and multivariate analysis was used for the relationship between self-reported substance use and HIV infection. P-Value of 0.05 was set as a cut-off point for the significance of the association between dependent and independent variables.

Ethical review

Ethical clearance was initially obtained from Debre Markos University. Each health institution was communicated for their cooperation. After explaining the objective and benefit of the study, informed consent was obtained from each respondent. Respondents were clearly informed that participation is voluntary; their responses are confidential and had the right to withdraw from the study any time without giving further explanation.

Results

Table 1 shows selected background characteristics of 953 (96.4%) of the total 989 persons visiting HCTs initially planned. The remaining excluded data from the analysis were of those declined participation. With regard to socio-demographic and economic characteristics, cases and controls were similar in terms of sex and residence. But cases were more likely to be never married (57.7% vs. 18.9%), illiterate (9.30% vs. 3.2%), live in low income households (26.1% vs. 11.7%), and not working (53.3% vs. 45.3%).

Variable	Cases (N=227) n (%)	Controls (N=726) n (%)	Total (N=953) n (%)
Sex			
Male	81 (35.7)	255 (35.1)	336 (35.3)
Female	146 (64.3)	471 (64.1)	617 (64.7)
Age group of subjects			

15-19	8 (3.50)	75 (10.3)	83 (8.70)
20-24	47 (20.7)	310 (42.7)	357 (37.5)
≥ 25	172 (75.8)	341 (47.0)	513 (53.8)
Residence			
Rural	35 (15.4)	136 (18.7)	171 (17.9)
Urban	192 (84.6)	590 (81.3)	728 (82.1)
Marital status			
Never married	131 (57.7)	227 (18.9)	323 (28.1)
Ever married	96 (42.3)	499 (81.1)	630 (71.9)
Educational level			
Illiterate	21 (9.30)	23 (3.20)	44 (4.60)
Literate	206 (80.7)	703 (96.8)	909 (95.4)
Wealth index			
Low	73 (32.2)	85 (11.7)	158 (16.6)
Middle	137 (60.3)	389 (53.6)	526 (55.2)
High	17 (7.05)	252 (34.7)	269 (28.2)
Working status			
Not working	121 (53.3)	329 (45.3)	450 (47.2)
Working	106 (46.7)	397 (44.7)	503 (52.8)

Table 1: Background characteristics of people visiting HCTs in East Gojjam Ethiopia, 2016.

Substance use was reported in 668 of 953 sample studied. This resulted in 70.1%; 95% CI (63.1, 78.6%) of the entire sample used substance within the last year. The distribution of substance abuse and sexual and relationship variables studied among cases and controls is detailed in Table 2. As Table 2 shows, cases were more likely to drink and chew frequently/heavily (39.2% vs. 17.1% and (16.3% vs. 3.3%), respectively, have more sexual partners (36.6% vs. 7.3%), have exchange of sex for money or gifts (59.9% vs. 33.6%) and experience violence within partnerships (41.4% vs. 28.4%). But both groups were similar in terms of age at starting sexual life and condom use during the most recent sexual intercourse.

Variable	Cases (N=227) n (%)	Controls (N=726) n (%)	Total (N=953) n (%)
Substance use within the last year			
None	28 (12.3)	257 (35.4)	285 (29.9)
Alcohol	82 (36.1)	180 (24.8)	262 (27.5)
Khat	11 (4.8)	41 (5.6)	52 (5.5)
Both	106 (46.7)	248 (34.2)	354 (37.1)
Alcohol drinking			
None	39 (17.2)	298 (41.0)	337 (35.4)

Light (occasional)	99 (43.6)	322 (44.4)	421 (44.2)
Heavy (frequently)	89 (39.2)	106 (17.1)	195 (22.4)
Khat chewing			
None	110 (48.5)	437 (60.2)	547 (57.4)
Light (occasional)	80 (35.2)	265 (36.5)	345 (36.2)
Heavy (frequently)	37 (16.3)	24 (3.3)	61 (8.9)
Age at first sex			
<15	184 (80.9)	558 (76.9)	742 (77.9)
≥ 15	43 (19.1)	168 (23.1)	211 (22.1)
Sexual partners in the past 12 months			
0	10 (4.4)	104 (14.3)	114 (12.0)
1	134 (59.0)	569 (78.4)	703 (73.8)
≥ 2	83 (36.6)	53 (7.3)	136 (14.3)
Condom use at last sex			
Yes	136 (59.9)	244 (33.6)	380 (39.9)
No	91 (40.1)	482 (66.4)	573 (60.1)
Given or received money, gifts, or favors in return for sex within the last year			
Yes	136 (59.9)	244 (33.6)	380 (39.9)
No	91 (40.1)	482 (66.4)	573 (60.1)
Violence within partnerships within the last year			
Yes	94 (41.4)	206 (28.4)	300 (31.4)
No	133 (58.6)	520 (71.6)	653 (68.6)

Table 2: Substance abuse and sexual and relationship histories of HCTs clients in East Gojjam Ethiopia, 2016.

With regard to the outcome variable, socio-demographic and economic characteristics, sexual behaviors and relationship characteristics categories of factors were tested. We present here only the risk of HIV infection among substance users because our main exposure of interest is limited to substance use. Table 3 shows unadjusted and adjusted results from the logistic regression analysis of the association between substance use and HIV infection in second and third columns, respectively. The multivariate analysis indicates that being HIV-positive was associated with increased odds of substance use and number and frequency of substance used. Alcohol use in the past 12 months was associated with HIV infection (AOR: 2.47, 95% CI (1.41, 4.34)). Being infected with HIV was far more common among those using both alcohol and khat (AOR: 3.04, 95% CI (1.37, 6.77)) as compared to those neither using alcohol nor khat. The result also showed that the odds of HIV infection was 2.74 times higher among those reporting drinking alcohol frequently (AOR: 2.74, 95% CI (1.40, 5.35)) as compared to those who did not.

Variables	Crude OR (95% CI) [†]	P-value	Adjusted OR (95% CI)	P-value
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Substance used				
None	1			
Alcohol	4.20 (2.03, 11.53)	0.04	2.47 (1.41, 4.34)	0.002
Khat	2.46 (1.06, 5.95)	0.001	1.85 (0.92, 3.70)	0.083
Both	3.92 (1.24, 12.17)	0.029	3.04 (1.37, 6.77)	0.006
Alcohol drinking				
None	1		1	
Light drinking	2.35 (1.49, 3.33)	0.01	1.66 (1.26, 2.19)	<0.001
Heavy drinking	6.42 (3.22, 15.53)	0.003	2.74 (1.40, 5.35)	0.003
Khat chewing				
None	1		1	
Light chewing	1.20 (0.76, 2.00)	0.4	1.12 (0.67, 1.88)	0.663
Heavy chewing	6.12 (1.90, 19.19)	0.002	1.95 (0.58, 4.65)	0.449

Table 3: The relationship between substance abuse and HIV infection among HCTs clients in East Gojjam Ethiopia, 2016; CI, confidence interval; OR, odds ratio; *Bivariate analysis; †Adjusted for variables in the table and additionally for the socio demographic and sexual and relationship variables.

The associations of selected background characteristics, sexual behaviors and relationship characteristics variables with substance use are presented in Table 4. In the bivariate analysis, being male, having lower household socioeconomic status, having no work, starting sexual intercourse earlier, having more sexual partner within the past 12 months, not using condom during the most recent sexual intercourse, engaging in exchange of sex for money or other gifts as well as experiencing any violence within relationships within the last year were significantly associated with substance use. Being male (AOR: 3.04; 95% CI (1.37, 6.77)), living in households with low income (AOR: 2.00; 95% CI (1.36, 2.93)), engaging in exchange of sex for money or other gifts (AOR: 3.22; 95% CI (1.57, 6.58)) and violence history within relationships (AOR: 3.52; 95% CI (1.30, 9.55)) were independently associated with substance use in multivariate analysis.

Discussion

This case-control study investigated the factors associated with both substance use and the relationship between substance use and HIV risk on first-time clients of HCTs in East Gojjam of Ethiopia. 70.1% of the entire sample reported using at least one type of substance within the last year. The study found that HIV infection among people visiting HCTs is independently associated with substance abuse. Using both alcohol and khat was associated with three-fold increased odds of HIV infection, after controlling for other risk factors. These data are consistent with observations from study done by Vanderweele and Vansteelandt [18].

Variables	Substance use		Crude OR (95% CI)	†Adjusted OR (95% CI)
	Yes	No		
Sex				
Male	270 (80.4%)	66 (19.6%)	2.25 (1.08, 4.46)	3.04 (1.37, 6.77)*
Female	398 (64.5%)	219 (35.5%)	1	1
Age				
15-19	50 (60.2%)	33 (39.8%)	1	
20-24	217 (60.8%)	140 (39.2%)	1.02 (0.54, 1.90)	0.78 (0.38, 1.61)
≥ 25	401 (78.2%)	112 (21.8%)	2.36 (1.40, 5.35)	1.44 (0.79, 2.61)
Residence				
Rural	142 (83.0%)	29 (17.0%)	1	1
Urban	526 (67.3%)	256 (32.7%)	1.26 (0.72, 2.16)	1.15 (0.50, 2.64)
Marital status				
Never married	271 (83.9%)	52 (16.1%)	3.06 (0.70, 5.55)	0.82 (0.46, 1.45)
Ever married	397 (74.9%)	233 (25.1%)	1	1
Wealth index				
Low	125 (79.1%)	33 (20.9%)	2.46 (1.41, 4.34)	2.00 (1.36, 2.93)*
Middle	380 (72.2%)	146 (27.8%)	1.69 (1.40, 5.35)	1.44 (0.79, 2.61)
High	163 (60.6%)	106 (39.4%)	1	

Work status				
Not working	352 (78.2%)	98 (21.8%)	2.06 (1.08, 4.46)	1.55 (0.94, 2.56)
Working	316 (63.5%)	182 (36.5%)	1	1
Age at first sex				
<15	562 (75.7%)	180 (24.3%)	3.09 (1.92, 3.70)	0.78 (0.38, 1.61)
≥ 15	106 (50.2%)	105 (49.8%)	1	1
Sexual partners in the past 12 months				
0	89 (78.1%)	25 (21.9%)	1	1
1	459 (65.3%)	244 (34.7%)	0.53 (0.43, 2.17)	0.52 (0.23, 1.19)
≥ 2	120 (88.2%)	16 (11.8%)	2.11 (1.57, 6.58)	1.13 (0.68, 1.86)
Condom use at last sex				
Yes	443 (63.4%)	256 (36.6%)	1	1
No	225 (88.6%)	29 (11.4%)	4.48 (2.83, 12.00)	1.21 (0.64, 2.25)
Exchange of sex for money or other gifts within the last year				
Yes	322 (87.0%)	48 (13.0%)	4.57 (1.941, 5.062)	3.22 (1.57, 6.58)*
No	346 (59.3%)	237 (40.7%)	1	1
Violence within partnerships within the last year				
Yes	226 (75.3%)	74 (24.7%)	1.46 (0.75, 4.08)	3.52 (1.30, 9.55)*
No	442 (67.7%)	211 (32.3%)	1	1

Table 4: Factors associated with substance use among clients of HCTs, East Gojjam Ethiopia, 2016; †Adjusted for all variables in the table; *Significant at p-value<0.05.

The question then arises as to what aspects of substance use might make it risky for HIV. However, it is worth look at certain aspects of alcohol and khat use that contribute to increased risk of HIV infection among users. The multivariate analysis of association between selected demographic, sexual and relationship variables and substance use among persons visiting HCTs indicated that substance users had higher odds of being male, living in households with low income, engaging in exchange of sex for money or other gifts and violence history within relationships.

As present study observes higher odds of substance use was associated with being male. This study is consistent with earlier case-control study conducted in Addis Ababa that addresses factors related to substance abuse among people visiting HCTs, with a higher prevalence for males [16]. Gender roles, which determine what it means to be a man or woman, may affect this tendency. Gender-based expectation influences individual vulnerability to health risks. Masculinity determines that men should be tough and take more risks including acceptability of alcohol use by men [19]. Taking risks is linked to this social perception, thus, men have higher rates of substance use, which, in turn can decrease inhibitions and increase sexual risk factors for HIV transmission. Therefore, gender differences should not be overlooked when developing and implementing prevention programs.

This study indicated the association between substance use and living in households with low income. Other studies have also shown the association between poverty and substance use [6,13]. The findings in these studies supported the hypothesis that poor people are at risk of alcohol and illicit drug use due to the psychological and social stressors caused by their poverty. The link between substance use and socioeconomic status is complex and multi-fold. As for unemployment, for instance, its relation with a prevalence of drug use was shown in a study by Mesfin et al. [13]. Their results showed that nearly 50% of the users were jobless. Social and economic disparities among substance users are therefore key elements in the context of HIV/AIDS [20]. An individual's socioeconomic status may affect his/her likelihood of becoming infected with HIV or affect the quality of life of those living with HIV, due to their limited option of treatment and social resources [1].

Substance use was independently associated with self-reporting engagement in exchange of sex for money or other gifts. The increased odds of engaging in such relationships among substance users may be either to access money to buy substances or directly in return for these items. However, it should be noted that both parties who engage in transactional relationships or sex might have an increased susceptibility to HIV infection because of such relationships often coexists with other sexual risk behaviours like an early sexual debut, age-disparate relationships, multiple concurrent sexual partnerships and inconsistent condom use [21-23]. Furthermore, alcohol as a

currency for sexual exchange in drinking venues addressed in [24-28], pointing out that some women who frequenting alcohol outlets do so with the expressed intention of finding men to pay for their drinks. Evidences from these studies suggest that frequenting alcohol outlets was associated with increased sexual risk among women. Other studies show evidence of men those who engage in transactional relationships may be substantially controlling, patriarchal and violent than other men [29,30] and these women might agree to riskier sex (e.g. unprotected sex) and be less able to refuse it, when drunk.

Higher risk of acts of violence experience observed among substance users in present study is consistent with previous study [31-33]. On the one hand, prolonged alcohol and other drug consumption may lead to marked socioeconomic problems such as economic drain and family instability. On the other hand, alcohol consumption and intoxication leading to irresponsible behaviour, reduced inhibitions, clouded judgment, and impaired ability to interpret social cues, thus increasing the likelihood of violence [34,35]. While substance use increases, in all contexts, risks to violence, the literature suggests that violence itself plays a role in bringing substance use [6]. Violence is associated with increased risk of rape within relationships which affects the ability to safer sex negotiation, thus increasing vulnerability to HIV [36-38].

This study might have had some limitations. The exposure data in this study was gathered using interviewer administered questionnaire interview via participants self-reports. Thus, such data can be affected by information bias of different kind such as: recall bias, social desirability bias and reporting bias of other kinds. Despite our efforts to cover wide range of risk factors, there still exist some variables unmeasured such as knowledge about HIV/AIDS transmission and prevention methods. In addition, the case-control sampling of self-selected (service-seekers) participants limits the generalizability of results. Despite this limitation, this study provides important information about substance use and its links with HIV/AIDS. In a context where a substance use changes in HIV/AIDS epidemic creates challenges for health care providers, policy makers and programmers, information must be generated on how to deal with the disease among substance users-preventing HIV infection via substance use. Hence, the findings may help in developing and implementing a comprehensive prevention programs that can alter the contextual factors associated with both substance use and HIV status focusing on risk behaviors, gender differences as well as differences in socioeconomic and cultural issues.

Conclusion

Substance use involves at least five of every seven participants studied and an important factor in HIV risk among people who visited HCTs in East Gojjam. The increase of substance abuse and the link to HIV indicates the need for comprehensive behavior risk reductions and other public health strategies targeted to substance users as populations at greatest risk for HIV infection. The findings imply the need of behavior change communication programmes that are sensitive to strong social and cultural values focusing on relational characteristics that found to be increased among substance users by present study, such as such as engagement in transactional sex and violence within partnerships. In addition, improving household socioeconomic position through income generation trainings is recommended in order to reduce the tendency of substance use. This will not only benefit the individuals immediate quality of life but will also permit them to place a higher priority on their medical well-being,

which includes addressing health issues such as HIV infection. The HCT services should be more accessible to the community. All clients seeking HIV services need to be screened for substance use and other complex health and social needs. It is important that health care providers discuss with their clients who visited HCTs the benefits of changing behaviors for quality life. This may include alcohol and other substances cessation and other health-related behaviors that increase their chances to contract HIV or interfere with the long term quality of life for those infected with HIV.

Conflict of Interest

The authors declare that they have no competing interests.

Authors' Contribution

All authors conceptualized the research question, monitored and managed fieldwork, analyzed and interpreted the findings and written the paper.

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