

## ORIGINAL ARTICLE

**EFFECT OF SUBSTANCE USE ON ACADEMIC ACHIEVEMENT OF HEALTH OFFICER AND MEDICAL STUDENTS OF JIMMA UNIVERSITY, SOUTHWEST ETHIOPIA**Kalayu Meressa<sup>1</sup>, MD, Andualem Mossie<sup>2</sup>, PhD, Yeshigeta Gelaw<sup>3</sup>, MD

## ABSTRACT

**BACKGROUND:** *Khat (Catha edulis Forsk) chewing habit is becoming a national concern. The habit is spreading at an alarming rate among the young generation especially in high schools and higher institutions in Ethiopia. Students in universities and colleges commonly use khat, cigarette, coffee and other substances to get mental alertness. The objective of this study was to determine the prevalence and socio-demographic description of substance use and its effect on academic achievement of students in Jimma University.*

**METHODS:** *A cross sectional study was conducted among 248 sampled Medical and health officer students from September 16 to 20, 2008 using stratified random sampling method. Data were collected using self-administered structured questionnaire and analyzed using SPSS for Windows version 16. Statistical association was done when appropriate and level of significance was taken at 5%.*

**RESULT:** *Out of 248 sampled subjects, 239 responded giving a response rate of 96.4%. Of these 207 (86.6%) were males, 115 (48.1%) Oromos, 129 (54.0%) Orthodox Christian, 214 (89.5) in the age group between 20-24 years, and 152 (63.6%) medical students. The mean age of the study subjects was 23 ( $\pm 1.6$ ) years. The current prevalence of khat chewing was 33.1%. More males (37.2%) than females, Muslims (71.8%) than other religions, Oromos (40.9%) than other ethnic group, age group 25 - 30 (86.7%) more than other age groups and final year medical students (61.5%) than other class years were found to be khat chewers. The current prevalence of cigarette smoking, alcohol intake and coffee drinking were found to be 21.3%, 36.4%, and 87.9%, respectively. About 68% of the chewers were smoking cigarette during khat chewing. Eighty eight percent of chewers drink coffee. Forty percent of them used to take alcohol after khat chewing and 8.9% of the chewers took other substances like hashish, diazepam and shisha during chewing. Khat chewing had a significant association with high income ( $p < 0.001$ ), with smoking habit ( $p < 0.001$ ) and with coffee drinking habit ( $p < 0.05$ ). There was statistically significant difference ( $p < 0.05$ ) between the mean CGPA of chewers ( $2.77 \pm 0.43$ ) and non-chewers ( $2.89 \pm 0.40$ ); smokers ( $2.70 \pm 0.45$ ) and non-smokers ( $2.9 \pm 0.4$ ); alcohol users ( $2.77 \pm 0.44$ ) and non-users ( $2.9 \pm 0.4$ ). But no remarkable difference is seen between the mean CGPA coffee users and non users ( $p = 0.439$ , 95% CI [0.23- 0.01]).*

**CONCLUSION:** *The current prevalence of different substance use was found to be high. Sex, age, religion and income have shown significant association with the habit of khat chewing, cigarette smoking, coffee usage and alcohol intake. This study also showed that khat chewing, smoking and alcohol intake have a significant negative influence on academic achievements of university students.*

**KEY WORDS:** *Prevalence, Khat, Cigarette, alcohol, coffee, academic achievement, Jimma.*

## INTRODUCTION

Substance use and associated problems are of current global concern. It has become an epidemic in some parts of the African region with adolescents being the main victims of health problems due to substance addiction

(1). The common substances abused in most African countries including Ethiopia are alcohol, tobacco, cannabis or marihuana and khat (2, 3). Reports showed that these substances are widely used among students of Ethiopia both in colleges and high schools (4).

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Khat (*Catha edulis* Forsk, Celastraceae family) is an evergreen flowering tree or shrub, widely cultivated in East Africa both for domestic usage and for commercial purposes (5). *Catha edulis* Now-a- days, it is referred to khat in literatures consistently (6). In the USA, khat is classified as a schedule IV substance and cathinone classified as a schedule I substance by the Drug enforcement agency (4, 5).

Khat contains a substance that stimulates the CNS. The key constituent of khat responsible for its euphoric effect is called cathine or norseudoephedrine (7, 8). Another compound with a powerful CNS stimulant termed as cathinone (a-aminopropiophenone) (10). Besides the khatmines, several others compounds have been isolated from khat. These nutrients include ascorbic acid,  $\beta$ -carotene, calcium and iron, which constitute 161 mg, 1.8 mg, 290 mg and 18.5 mg per 100g of fresh consumable leave of khat respectively (9, 10).

Studies suggested that cathinone has positive inotropic and chronotropic effect on heart, a pressor effect on arteries, increases blood pressure, respiratory rate and metabolic rate transiently (3, 6). Reduced birth weight and inhibition of lactation have been reported in khat chewing mothers, possibly resulting from increased dopamine production (7, 13). Regular khat chewing is a predisposing risk factor for gastritis and peptic ulcer disease, mental illness, cardiac arrhythmia, tooth decay and constipation (15). Contrary to the popular belief that khat chewing helps students to concentrate while studying, a study conduct in Jimma University revealed that chewers have lower academic achievements than non-chewers (11, 12).

Smoking accounts about 10% of deaths world wide, mainly through cancer especially lung cancer, of which about 90% of cases are smoking related, ischemic heart disease and chronic bronchitis (13). Smoking in pregnancy reduces birth weight and retards child hood development. It also increases abortion and prenatal mortality (14). Tobacco products are used primarily to stimulate the nervous system and to get mental alertness and to improve memory (16).

Alcoholism is an international problem and had touched every corner of the world, both developed and developing countries (14, 16). Physical effects seen in sexual activity with excessive use of alcohol is degeneration and dysfunction of sexual glands though a smaller amount can lower inhibition and make the person more relaxed and more apt or eager to engage

in social and sexual activity (17). There is direct relationship between heavy alcohol drinking and hypertension (15).

Long-term alcohol use cause liver disease, progression to cirrhosis and liver failure. It also results in neurological degeneration resulting in dementia and peripheral neuropathies (19). Excessive consumption in pregnancy causes impaired fetal development, associated with small size, abnormal facial development and other physical abnormalities and mental retardation (16, 20). Thus, these and other abused substance in addition to the above described health problems they cause potential socio-economic problems to support their habit of drugs and these abused substances make addicted individuals to commit criminal activities (18, 21, 22). Studies done among university students reported that significant number of students consume khat, coffee and other substances to increase concentration, alertness and to keep awake for study during exam periods. However, this period of stimulation lasts for approximately 3 hours; a depressive phase, including insomnia, malaise, and a lack of concentration occur as latter effects (2, 8). Thus, the main aim of the present study is, to determine the magnitude and effect of substance use on academic performance of students.

## SUBJECTS AND METHODS

A cross sectional study was conducted in Jimma University, Jimma from August 10-September 14, 2008 among sampled medical and health officer students using self-administered questionnaire.

The required sample size was estimated using formula for single population proportion with 95% confidence coefficient and considering the habit of khat chewing of 30%.

The sampled students were recruited using multistage sampling techniques based on their disciplines (health officer and medicine), list in each class year, and proportion of students in each class year. Samples were proportionally allocate first the two disciplines and then years of training. Subjects were then selected by systematic random sampling from each class year. The sampling sample size was allocated to each school and class year as follows:

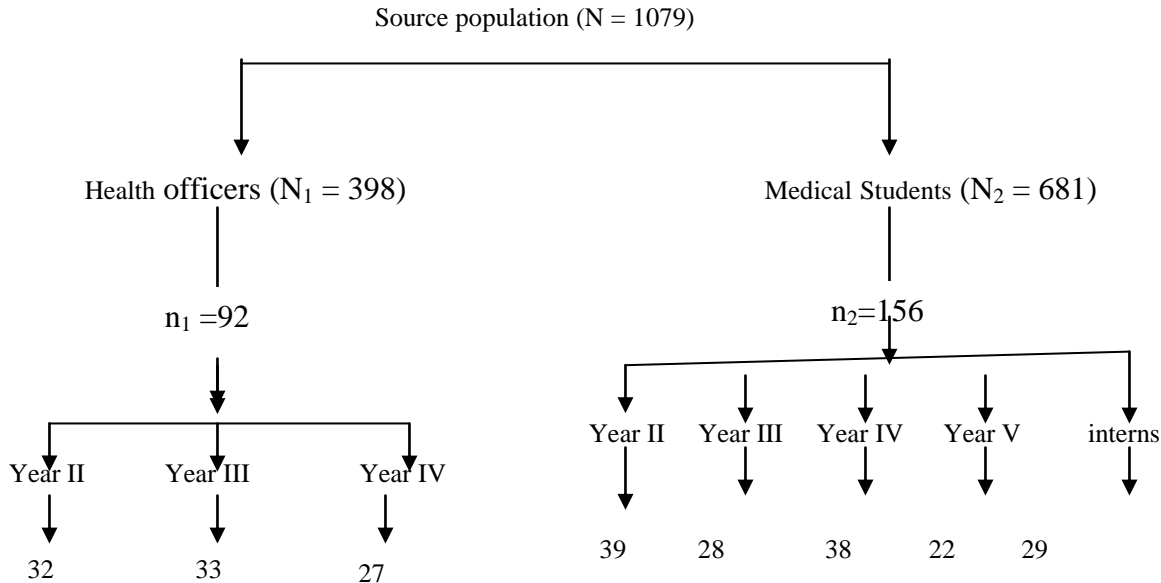


Figure 1. A tree showing sample allocation.

A structured questionnaire modified from WHO format was utilized to collect data from the sampled study population. The questionnaire included variables like khat chewing habit with use of other substances, health risks, peer pressure, attitude towards substance use, cumulative Grade point average (CGPA) and socio-demographic characteristics.

Data was collected using self administered structured questionnaire, where students were asked to respond genuinely to study variables including their CGPA. The questionnaire was pre-tested on ten randomly selected medical students who were excluded from the study.

After checking the collected data for completeness, it was analyzed using SPSS for Windows version 16.0. Statistical significance testing was done and level of significance was taken at 5%. Independent student t-test and two-way ANOVA were employed to compare variables when appropriate.

The study was approved by the Medical Science Faculty of Jimma University. Informed consent was taken from the study subjects during the data collection and participation was totally voluntary. Confidentiality regarding their habit and CGPA was kept unanimously. The following definitions were used for the study.

**Substance:** any of the drugs used by subjects such as khat, tobacco, coffee or alcohol

**Substance abuse:** Persistent or sporadic extensive use of drugs in consistent or unrelated to acceptable medical practice.

**Life time prevalence of chewing/ smoking/ alcohol use:** the proportion of the study population who had ever chewed khat/smoked/drank in their lifetime.

**Current prevalence of chewing/ smoking/ alcohol use:** the proportion of the study population who are chewing khat/smoking / drinking in the last 30 days preceding the study time.

**Previous use:** history of khat/ cigarette /alcohol use in lifetime but not in the past 30 days.

**Habitual use:** refers to use of khat on a daily or more frequently, otherwise referred as occasional use

**Heavy smoking:** smoking more than 10 cigarette per day

**Substance abuse:** Persistent or sporadic extensive use of drugs in consistent or unrelated to acceptable medical practice.

## RESULT

Out of 248 sampled subjects, 239 responded giving a response rate of 96.4% but nine questionnaires were incomplete and so only 230 analyzed. The mean age was 23( $\pm 1.6$ ) years. Two hundred seven (86.6%) of the respondents were males, 115 (48.1%) Oromo, 129 (54.0%) Orthodox Christian, 214(89.2 %) in the age group of 20-24 years and 151(63.2%) of the students came from rural area (Table 1).

**Table 1.** Prevalence and Socio-demographic characteristics of khat chewing in medical and health officer students of JU, Southwestern Ethiopia, 2008

Variables		Population (n = 239)	Khat chewers (n = 79)	Non chewers (n = 160)	$X^2$	P-value
		No (%)	No (%)	No (%)		
Sex	Male	207 (86.6)	77 (37.2)	130 (62.8)	12.0	0.001
	Female	32 (13.4)	2 (6.2)	30 (93.8)		
	15 -19**	10 (4.2)	2 (20.0)	8 (80)		
	20-24	214 (89.5)	64 (30.0)	150 (70.0)		
	25-30	15 (6.3)	13 (86.7)	2 (1.3)		
Religion	Orthodox	129 (54.0)	30 (23.3)	99 (76.7)	34.51	<0.001
	Muslim	39 (16.3)	28 (71.8)	11 (27.2)		
	Protestant	47 (19.7)	11 (23.4)	36 (75.6)		
	Others ¥	24 (10)	10 (41.7)	14 (58.3)		
Ethnicity	Oromo	115 (48.1)	47 (40.9)	68 (59.1)	3.94	0.1395
	Amhara	71 (29.7)	20 (28.2)	51 (71.8)		
	Tigrie	25 (10.4)	7 (28.0)	18 (72.0)		
	Gurage **	14 (5.9)	2 (14.3)	12 (85.7)		
	Other **	14 (5.9)	3 (21.4)	11 (78.6)		
Field of study	Medical	152 (63.6)	57 (37.5)	95 (62.5)	3.2	0.0736
	Health officer	87 (36.4)	22 (25.3)	65 (74.7)		
Income/mn	< 100	100 (41.8)	25 (25.0)	75 (75)	29.77	<0.0001
	100-500	109 (45.6)	31 (28.4)	78 (71.6)		
	>500	30 (12.6)	23 (76.7)	7 (23.3)		
Place of upbringing	Rural	151(63.2)	40 (44.3)	48 (55.7)	8.81	0.003
	Urban	88 (36.8)	39 (26.5)	112 (73.5)		

\*\* These rows are not included in chi-square calculation as the cells contain expected values less than 5.

¥ Others include Catholic, Jehovah, Adventist

The current prevalence of khat chewing was 33.1%. More khat use was seen among males (37.2%), Muslims (71.8%), Oromos (40.9%), students in the age group 25 - 30 (86.7%), medical students (58%) and final year medical students (61.5%). Thirty eight (48.1%) of the Chewers smoke cigarette, 70 (88.6%) drank coffee and 7(8.9%) take other substances like hashish, diazepam and shisha during chewing. Twenty (25.3%) reported to drink alcohol after khat chewing. Twenty three (76.7%)

of the respondents who were getting >500Birr per month were khat chewers (Table 1).

Among khat chewers 40 (50.6%) of them were daily chewers and 22 (27.8%) of them have been chewing for 2-4 years before the study. Twenty three (29.1%) of the chewers consume khat that costs 15-20 Birr, 26 (32.9 %), spent more than four hours per session (Table 2). Forty seven (59.5%) were from khat chewing families.

**Table 2.** Pattern of khat chewing in medical and health officer students of JU, Southwestern Ethiopia, 2008.

Chewing pattern(n=79)	Frequency	
	N <sub>0</sub>	%
Chewing frequency		
Daily	40	50.6
2-3 times a week	20	25.3
Once a week	11	14.0
Occasionally	8	10.1
Duration of chewing		
< 1 month	8	10.1
1-12 month	10	12.7
1-2 year	9	11.4
2-4 year	30	38.0
≥ 4 year	22	27.8
Price of Khat chewed/session (Birr)		
5-10	21	26.5
10-15	17	21.5
15-20	23	29.1
> 20	18	22.8
Time spent /session (hours)		
< 1	10	12.7
1-2	18	22.8
2-3	25	31.6
≥ 4	26	32.9
Additional substances used during and after Khat		
Smoking	38	48.1
Coffee	70	88.6
Alcohol	20	25.3
*Other	7	8.9%

\*Other: "hashish", "shisha" and diazepam

Relief from academic stress 41(51.8%), for relaxation 27 (34.1%) and socialization 17 (21.5%) were among the reasons for khat chewing. Thirty six (46%) of the chewers believed that they can stop chewing in the future and out of these 23 (59.0%) said they will stop after

graduation. All of the respondents said that khat chewing has health risk. Sleep disturbance 177 (74.0%), psychosis 167 (70%) and PUD 100 (41.8%) were few among others health problems reported by respondents, considered to be the result of khat Chewing.

**Table 4.** Association among khat chewing, cigarette smoking alcohol and coffee usage in medical and health officer students of JU, Southwestern Ethiopia, 2008

Variables	Khat			$X^2$	P-value
	chewers	Non chewers	Total		
Smoking					
Yes	38	13	51	48	< 0.001
No	41	147	188		
Coffee usage					
Yes	76	134	210	10	< 0.05
No	3	26	29		
Alcohol intake					
Yes	31	5	36		
No	48	107	155	34.39	< 0.001

The prevalence of cigarette smoking was 21.3%. Cigarette smoking was common among males (23.6%), age group 25-30 years 9(60%), Muslims 16(41%), Oromo 27(23.5%), and those from urban 27(30.7%) were smokers. Among the smokers 11(21.6%) smoked greater than nine cigarettes, 22(43.1%) smoked 4-9 cigarettes and 14(27.5%) smoked 1-3 cigarettes per day. Of the total smokers, 20(33.9%) used to smoke for the last 2-4 years and 31(52.5%) of the smokers said that they will stop smoking in the future. Cigarette smoking has a positive association with age, sex, religion, income and place of up bringing ( $p < 0.05$ ). But no significant association of cigarette smoking was observed with ethnicity and field of study ( $p > 0.05$ ) (Table 3). Almost all participants cited that cigarette smoking is a risk for lung cancer (96.7%), hypertension (71.9 %) and coronary artery disease (68.2%). As shown in figure 2, 58.6% of

medical interns and 50.0% of fifth year medical students were found to be khat chewers than the other class years.

The prevalence of alcohol intake was 36.4%. Alcohol intake was greater in males 81(39.1%), age group 25-30 years 10 (61.5%), Orthodox 55(42.6%), Tigrie 15(60.0%), those who earned  $>500$  Birr/month 16(53.4%) and those from urban 37(42.0%). Age, sex and ethnicity were significantly associated with alcohol drinking ( $p < 0.05$ ).

Most of the students 181(87.4%) drink at least one cup of coffee per day. Hundred (47.6%), 78 (37.1%), 23 (11.0%) and 9 (4.3%) of them drink 1, 2, 3 and 4 cups per day, respectively. There statistically associated variable with coffee drinking, while khat chewing was significantly associated with smoking, coffee drinking and alcohol intake ( $p < 0.05$ ) (Table 4).

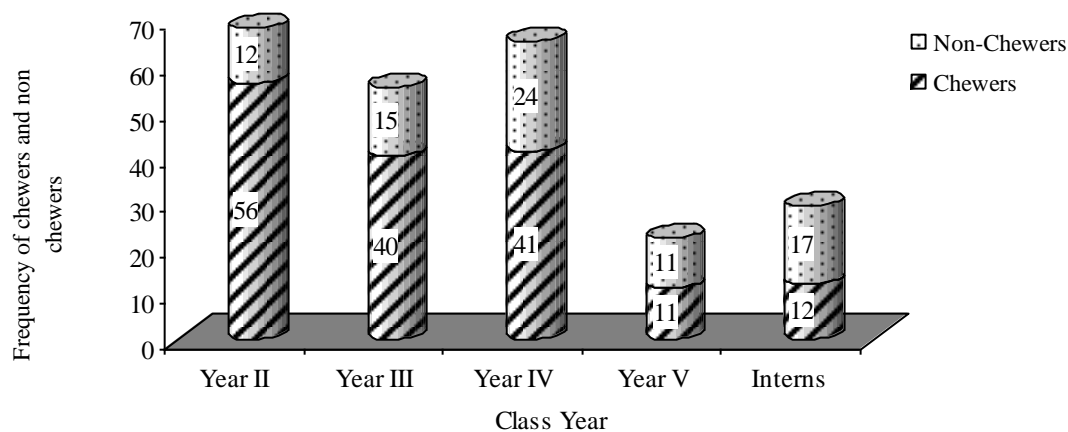
**Table 3.** Prevalence and Socio-demographic characteristics of cigarette smoking in medical and health officer students of JU, Southwestern Ethiopia, 2008

variables		Population (239)	Smokers (51)	Non smokers (188)	X <sup>2</sup>	P-value
		No (%)	No (%)	No (%)		
Sex	Male	207 (86.6)	49 (23.6)	158 (76.3)	4.03	0.0447
	Female	32 (13.4)	2 (6.2)	30 (93.8)		
Age	15-19 **	4 (1.6)	0	4 (100.0)	7.21	0.0072
	20-24	224 (92.1)	42 (19.1)	178 (80.9)		
	25-30	15 (6.3)	9 (60)	6 (40)		
Religion	Orthodox	129 (54.0)	23 (17.8)	106 (82.2)	13.47	0.00012
	Muslim	39 (16.3)	16 (41.0)	23 (59.0)		
	Protestant	47 (19.7)	5 (10.7)	42 (89.3)		
	Others	24 (10)	7 (29.2)	17 (70.8)		
Ethnicity	Oromo	115 (48.1)	27 (23.5)	88 (76.5)	1.02	0.6005
	Amhara	71 (29.7)	12 (16.9)	59 (83.1)		
	Tigrie	25 (10.4)	5 (20.0)	20 (80.0)		
	Gurage **	14 (5.9)	3 (21.4)	11 (78.6)		
	Other **	14 (5.9)	4 (28.6)	10 (71.4)		
Field of study	Medical	152 (63.6)	38 (25.0)	114 (75.0)	2.76	0.0966
	HO	87 (36.4)	13 (15.0)	74 (85.0)		
Income	< 100	100 (41.8)	17 (17.0)	83 (83.0)	10.05	0.0066
	100-500	109 (45.6)	21 (19.3)	88 (80.7)		
	>500	30 (12.6)	13 (43.4)	17 (56.6)		
Place of upbringing	Rural	151 (63.2)	24 (15.9)	127 (84.1)	6.39	0.0115
	Urban	88 (36.8)	27 (30.7)	61 (69.3)		

\*\* These rows are not included in chi-square calculation as the cells contain expected values less than 5.

Out of the total respondents 94(39.3%) mentioned that use of substance helped them for better academic achievement. Coffee 48 (58.5%), khat 39 (48.0%),

cigarette 5 (6.0%) and alcohol 2 (2.4%) were mentioned to help their academic achievement.



**Fig. 2:** Distribution of chat chewing in relation to class year among medical and health officer students of Jimma University, Southwest Ethiopia, 2008.

**Table 5.** Association among Khat chewing, cigarette smoking, coffee usage with academic performance (CGPA) in medical and health officer students of JU, Jimma, Southwestern Ethiopia, Sept.2008

Substance use		Mean CGPA $\pm$ SD	t-test for equality of means				
			t	p-value	95% confidence interval of the difference		
					Mean difference	Lower	Upper
Khat chewing	Yes	2.77 $\pm$ 0.43	2.32	0.021	0.13	0.246	0.020
	No	2.89 $\pm$ 0.4					
Cigarette smoking	Yes	2.70 $\pm$ 0.45	2.94	0.004	0.20	0.320	0.06
	No	2.90 $\pm$ 0.40					
Alcohol intake	Yes	2.77 $\pm$ 0.44	2.41	0.016	0.13	0.245	0.025
	No	2.90 $\pm$ 0.40					
Coffee usage	Yes	2.85 $\pm$ 0.41	0.78	0.439	0.06	0.229	0.009
	No	2.91 $\pm$ 0.47					

Significant difference has been seen in the mean CGPA of khat chewers versus non chewers ( $p = 0.021$ , 95%CI 0.246 and 0.02); smokers versus nonsmokers ( $p = 0.004$ , 95%CI 0.32 and 0.06) and the mean CGPA of those who drink alcohol versus non users ( $p = 0.016$ , 95%CI 0.245 and 0.025). But no remarkable difference was seen between the mean CGPA coffee users and non users ( $p = 0.439$ , 95%CI 0.229 and 0.009) (Table 5).

## DISCUSSION

The prevalence of khat chewing among medical and health officer students was 33.1% which is almost comparable to the one that was reported for Jimma University students 24.79% (24).

Similar studies among pharmacy and technology students of Addis Ababa University in 2004(13) and college students of Northwest Ethiopia in 2002 (20) found prevalence of khat chewing 14.4% and 17.5%,

respectively which are lower than the current finding. These could be explained by the availability of khat, social acceptance to the habit and study time difference which may contribute to the higher prevalence among JU medical and health officer students than those in North West Ethiopia and Addis Ababa University.

This study showed that the habit of khat chewing was higher in males than females, which is in line with research findings reported for Jimma University students in 2004(24). This could be because females are culturally more restricted than males.

In this study khat chewing has shown significant association with religion and Muslim students were found to be khat chewers as compared with students of other religion. The possible explanation could be because the habit of khat chewing is socially accepted among Muslim communities. Thus, Muslim students may adopt the habit from their society. This finding is

supported by similar studies done in Jimma University (24), Jimma town (12) and Butajira (1).

In the present study, ethnicity and khat chewing have shown significant association. More Students of Oromo ethnic group were found to be chewers than other ethnic backgrounds. The possible reason could be that khat is cultivated abundantly in Oromia region and the society in this area might use it for different purposes and students may have learned the habit from their community.

In this study a significant association was found between smoking and sex, income, religion and place of up bringing. This is because due to cultural influence on females and the high income.

Habits of khat chewing and smoking have a strong association with monthly income. Most of the students whose monthly income >500 birr were found to be chewers and smokers compared to those with lower income. This indicates that having money encourages students to develop new habits like khat chewing, cigarette smoking.

The prevalence of alcohol in take in this study was 36.4% which is comparable with that of pharmacy and technology students of Addis Ababa University (13). More than half of respondents who had sexual contact following use of substance

There was statistically significant difference between the mean CGPA of chewers and non-chewers; smokers and non-smokers ; alcohol users and non-users This finding is in agreement with other studies (25). This shows that substance use has a negative influence on academic performance of students. The possible explanation is that the associated valuable time and energy wastage for khat ceremony and possibly 'Mirkana Chebsi' despite the fact that khat chewing increases mental alertness/concentration and keeps students awake (2, 3).

In conclusion, the current prevalence of different substance use was found to be high. Sex, age, religion and income have shown significant association with the habit of khat chewing, cigarette smoking, coffee usage and alcohol intake. This study also showed that khat chewing, smoking and alcohol intake have a significant negative influence on academic achievements of university students.

Therefore, Jimma University should teach and counsel students on advantages and disadvantages of substance use. Health institution and policy makers should control the production and distribution of khat, coffee and tobacco plants. Rules and regulations should be set by universities/colleges in order to prevent development of such habits to produce motivated and hard working students with high academic performance.

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