

# Prevalence and Factors Associated with Khat Chewing Among Students of Jigjiga Teachers Training College, Ethiopia: A Crosssectional Descriptive Study

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## ABSTRACT

### Background

Khat use is more prevalent among higher education students. Hence, this study aimed at assessing the prevalence and factors associated with khat chewing among students of Jigjiga Teachers Training College.

### Method

To achieve the objective, a cross-sectional survey design was conducted using a self-administered questionnaire. A total of 275 students were included in the study. The required sample was proportionally allocated and stratified based on the field and year of study, and they were selected by using a simple random sampling method. Data was entered to EPI DATA-3.1.0 and then exported to and analyzed using SPSS-23. The data analysis involved descriptive (mean, mode, frequency distribution) and inferential statistics (bivariate and multivariate logistic regression models).

### Result

The study found that the current prevalence of khat chewing is 26.4. Being male (AOR=4.05, 95% CI: (1.645-9.967), second year (AOR=4.117, 95% CI: (1.498-11.315), having monthly pocket money greater than or equal to 1000 birr (AOR=9.379, 95% CI: (2.880-30.540), being urban resident (AOR=3.302, 95% CI: (1.371-7.952), living off-campus (AOR=4.833, 95% CI: (1.920-12.163), having chewer family member (AOR=4.174, 95% CI: (1.725-10.102), having a chewer friend (AOR=7.352, 95% CI: (3.110-17.376) and belief that khat helps to study better (AOR=3.474, 95% CI: (1.448-8.331) were found to be significantly increasing the odds of current khat chewing.

### Conclusion

A significant proportion of students chew Khat. Being male, second year student, urban resident, having more pocket money, residing outside campus, having a khat chewing family member and friend, and the belief that khat helps to study were found to be associated with khat chewing.

### Keywords

Khat, Chewing, Substance, Students, Prevalence

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## Introduction

Khat, also known as *Catha edulis*, is a blossoming plant local to East Africa and the Arabian-Peninsula (1–3). It is also less commonly grown and consumed in Madagascar (4). People regularly chew the young leaves of the plant to be stimulated and gain a strong sense of euphoria (5). It has been mainly used since the 13<sup>th</sup> century as a recreational medication by the indigenous people of Ethiopia, Somalia, Yemen, and Kenya (6). Likewise, it is been abused in different parts of the world by immigrants from the Middle East and East Africa (7,8). Khat is an amphetamine-like psychoactive substance that stimulates the central

nervous system and it has two major compounds known as *cathinone* and *cathine* (9,10).

Predominantly, this plant is known as Khat but it has different names in different countries where it is cultivated mostly. In Ethiopia, it is mainly known as *Chat* and specifically it is called *Jimaa* in Harerghe zone. Similarly, people in Yemen, Somalia, Kenya, and Uganda call it *qat*, *qaad* (*jaad*), *mirra*, and *marung*, respectively (11–13). People who need khat chew fresh and soft leaves for its quick psychoactive effect. It is usually wrapped by soft plastics and leaves of *enset* (“Ethiopian banana”) to keep it soft and fresh. Hence, it requires quick transportation because of its short-term lifespan. Khat is essentially ingested

by chewing. The fresh leaves of the plant are often chewed with soft drinks and sugar for a sweet taste. Then, they gradually swallow the juice for the desired effect (14). Its consumption is illegal in many countries of Europe and North America but it is legal in many countries of the Gulf and Horn of Africa including Djibouti, Ethiopia, Kenya, Somalia, Eritrea, Uganda and Yemen (15,16).

These days, because of migration and globalization, khat abuse is more prevalent from local to global contexts. Therefore, five to ten million people in the world were estimated to be khat users (17). A study conducted in Saudi Arabia indicated that almost half of the professional drivers in the southwestern part of the country were current khat users (18). Another study conducted in Jazan region of Saudi Arabia indicated that 28.7 % of the population were current khat users (19). Similarly, the lifetime prevalence of khat use was more than 80% (20). From these users, more than half of the adults were frequent and heavy khat users. A household survey conducted in Eastern Kenya indicated that the current khat use prevalence was 36.8% among residents in Eastern part of the country (14). Besides, the prevalence of weekly khat abuse in Somalia was found to be 36.4 % (21).

When we come to Ethiopian context, millions of people chew khat on a regular basis. Formerly, khat was cultivated and chewed mostly by Muslim dominated communities in the eastern, southern, and South Western parts of the country (22). However, these days, it is cultivated and consumed in all parts of the country among different religious and ethnic groups with the variation where it is lowest in Tigray region (1.1 %) and highest in Harari region (53.2 %). The 2011 Ethiopian demographic Health survey further indicated that the overall prevalence of khat chewing in Ethiopia is 15.3% (23).

According to Ethiopian Demographic and Health Survey (EDHS) of 2016, the life time prevalence of khat chewing was 26.9 % among male and 12.1 % among female Ethiopian adults (24). The same survey indicated that of those who chewed khat, two males and females in three had chewed khat for six and more days in a month. An older study conducted in Ethiopia, Butajira found that about half of the respondents were current khat

users (25). Similarly, a study conducted in Nekemte town of East Wollega zone indicated that the current prevalence of khat chewing was 48.6 % (26). In Somali region, according to EDHS 2011, the prevalence of khat chewing among people aged between 15–49 years was 26%, this makes the region the fourth most khat chewing region in the country (23). Moreover, as noted in EDHS 2016, the prevalence of khat chewing among men was 44.8% in Somali region, which makes the third region after Harari region and Dire Dawa (24).

These days, khat is becoming popular among higher education students. Students chew khat for various reasons. Some of the alleged reasons are staying alert, gaining concentration, attention to study for a longer period, and sometimes for recreational and relaxation purposes (27). A systematic review indicated that 14.6 % of students in Saudi Arabia, Ethiopia, and Yemen were current khat users (1). Various studies conducted in different Ethiopian colleges and universities indicated that the current prevalence of khat chewing is increasing at an alarming rate. A cross-sectional study conducted among university students in Gondar, Jimma, and Hawassa indicated that the current prevalence of khat abuse was 32.5 %, 23.9, and 16.3 % respectively (27–29). In addition, a recent systematic review of 24 studies indicated that the pooled prevalence of khat chewing was reported to be 23.2 % among Ethiopian university students (2).

Despite a serious consequence of khat, khat chewing is highly prevalent in Ethiopian Somali region as EDHS reported. Thus, by doing this research, the researchers of this study wanted to update the recent data to stakeholders and policymakers and help them to use the information from this research in their efforts to recognize and take the necessary interventions related to khat among these groups of population. Even though studies conducted among the community and institutions are available in different regions in Ethiopia, but no studies were done on khat chewing prevalence and its associated factors in Somali region. In addition to that, there has been no any previous study conducted in the current study area related to this topic and nothing is known about the magnitude of khat chewing and its associated factors among

college students in Jigjiga city administration. Therefore, generally, the main aim of this study was to assess the prevalence and factors associated with Khat chewing and specifically to investigate whether there is a significance difference in chewing Khat across demographic variables among students of Jigjiga Teachers Training College, Somali region, East Ethiopia.

## Methods

### Study Design

An institution-based cross-sectional descriptive study was conducted in Jigjiga Teachers Training College. Because it is quantitative research, it is preferable to collect information from participants through standardized scales, which were administered at one time.

### Study Area

This study was conducted in the teachers training college campus. It has been 19 years now, since the college was established, 1999 G.C. It is the first public teacher training college established in Somali region working towards the implementation of the government strategy of expending quality of education regarding teachers' education in the region. In recent years, the intake capacity of the college is increasing from year to year. Therefore, currently it has a total of 2263 regular students with three sections, namely, languages, social, and natural sections. The college is in the capital city of the Somali regional state, Ethiopia. It has geographical boundaries with neighboring regions of Oromia, Afar, and Dire Dawa Council, as well as with neighboring countries such as Somalia, Kenya, and Djibouti. Jigjiga town is 635 km away from the capital city of Ethiopia, Addis Ababa. The town has 20 kebeles (small administrative units) with a total population of 277560, where males and females were 149,292, and 128268, based on the national census of 2007.

Study was carried out in April, 2018. The Source population was all students of Jigjiga Teachers Training College. The Study population was all regular students of Jigjiga Teachers Training College.

### Inclusion Criteria

All regular students of Jigjiga Teachers Training College who were registered for the 2018

academic year and attending their education during the data collection time were included in this study.

### Exclusion criteria

Those regular students who were not mentally fit or have chronic diseases during the data collection time were excluded from this study.

### Sampling

The sample size determination of the prevalence was calculated using the formula for a single population proportion by considering 26.3% of the proportion of khat chewing practice which was reported from a previous study done in Ethiopia (28).

Therefore,

$$n = [z^2 \times p \times (1 - p) / d^2]$$

$$= 1.96^2 \times 0.263 \times (1 - 0.263) / 0.05^2 = 3.841 \times 0.263(0.737) / 0.0025 = 0.744 / 0.0025 = 297.6 \approx 298$$

Where,

$Z_{\alpha/2}$  = standard normal deviation = 1.96 = 95% C.I

P = proportion of khat chewing in the previous study

d = margin of error = 5%

To determine sample size for risk factors using the formula for a double population proportion formula by using *Epi info version 7* and the following assumption was considered: confidence level=95%, Power (1-β) =80%, unexposed to exposed ratio=1:1, percentage of khat chewing among exposed and non-exposed and adjusted odd ratio (AOR) for the selected risk factors. Additionally, non-respondent rate of 5% and a finite population correction formula was considered. Therefore, after comparing all calculated sample sizes, the largest sample size was the final sample size, which was 275.

**Table 1: Sample size calculation of prevalence and risk factors from different literatures**

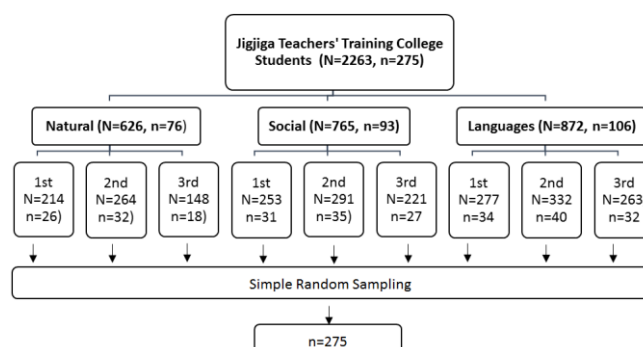
S.N	Variable		Proportion	Study area	Initial sample size	Non-response rate 5%	Total sample size	Finite correction formula	Reference
1.	Prevalence, withdrawal symptoms and Associated factors		26.3%	Jimma Town	298	15	313	275	(28)
2.	Prevalence and Determinants		24.2%	Harar City	282	14	296	262	(30)
3.	practice and perceived health effects		17%	Dera Woreda	217	11	228	207	(31)
4.	Factors	Being Muslim	49.7% of exposed AOR=4	Jimma Town	90	5	95	91	(28)
		Having chewing friend	1.9 % of exposed AOR=7.93	Harar city	202	10	212	194	(30)
		Being Muslim	66.9% of exposed AOR=4.34	Dera Woreda	118	6	124	118	(31)

Table 1 shows initial sample size, non-response rate, total sample size, and finite correction formula from previous studies conducted in different parts of the country. By considering these studies, a study with the highest sample size (28) was selected as a reference for sample size determination.

### Sampling Procedure

The required sample was allocated to the Jigjiga Teachers Training college by stratifying by field and years of study on the assumption that the field of study and the duration of stay in the college would affect khat chewing. And then the total sample size of the college was distributed proportionally to each field and year of study based on the total number of their students. Finally, individual students fulfilling the inclusion criterion were selected from each year of study and section using a simple random sampling method. In some cases, where the eligible

respondents were absent, the next student in the list was the substituent after checking twice.



**Figure 1: Schematic presentation of sampling procedure**

Figure 1, indicates that the study participants were selected from natural, social, and language streams. Furthermore, students were proportionally represented from each year level using a simple random sampling approach.



## Study Variables

Current khat chewing was a Dependent Variables while Independent Variables were Socio-demographic factors: Age, sex, field of study, year of study, marital status, monthly pocket money, original place of residence, and campus housing. Socio-cultural & behavioral factors: khat chewing family, khat chewing friends, smoking cigarettes, belief that khat helps to study better, and belief that khat could lead to negative health effects.

## Operational Terms Definitions

**Khat chewing:** an act of chewing the leaves of the plant khat in any quantity by a student in the college (27).

**Current khat chewer:** person who was chewing khat within 30 days preceding the study (24) .

**Non- current khat chewer:** Person who has not used khat within 30 days preceding the study (32).

## Data Collection Technique and Tools

A structured questionnaire which was pertinent to the study objectives was adopted and modified to suit the objectives of the study from WHO ASSIST questionnaire (33), EDHS 2016 questionnaire (24) and some other previous relevant literatures (27,30,33–35). The data was collected by using self-administered questionnaire. The questionnaire was developed first in English and then translated into local languages, namely, Somali and Amharic languages to make clearer and to avoid language barriers and then translated back into English to check the accuracy by an independent translator.

Data collection tools were first prepared in English, which is the medium of instruction in Ethiopian Higher Education institutions and translated into local languages, namely, Somali and Amharic languages, to reduce the language barrier. Before collection of the entire data, pre-test was done on 10% of the study respondents in Management and Public Service College using simple random sampling and the questionnaire was reevaluated and appropriate revisions were made before being used for actual data collection.

For the actual data collection, training was given to three undergraduate health science students who served as data collection facilitators. During the data collection process, supervision was conducted strictly and frequently. After the collection of data, the completeness of the required type of data was checked for accuracy and consistency before the entry of data to the EPI DATA and SPSS as well as during the entry time and using simple frequency. Skip pattern command was used as one way of quality assurance during data entry.

## Data Analysis

After the collection of data, the researcher checked the completeness of questionnaires and incomplete questionnaires were excluded; responses were coded, cleaned, and entered into EPI DATA version 3.1.0 and it was exported and analyzed using the Statistical Package for Social Sciences (SPSS) version 23. Then, descriptive statistics was generated first and the results were shown in tables, percentages, mean, and standard deviation. Additionally, using inferential statistics, bivariate logistic regression analysis was performed. A variable with  $p$  values below 0.2 in the bivariate analysis was considered as a candidate variable for multivariate logistic regression.  $P$ -values lower than 0.05, 95% confidence interval, and adjusted odds ratio were used to determine the level of significance of the association in the multivariate logistic regression model and goodness of fit was checked.

## Ethical Considerations

This study was conducted after gaining oral consent from the study participants. The data collectors clearly explained issues related to objectives of the study, privacy, and confidentiality of data.

## Results

### Socio-Demographic Characteristics of Respondents

**Table 2: Description of Socio-demographic characteristics of the students at TTC, Jigjiga, Ethiopia, 2018.**

Variable	Category	Frequency (n=261)	Percentage (%)
Age	18-25yrs	172	65.9
	26-30yrs	71	27.2

	>30yrs	18	6.9
Gender	Male	173	66.3
	Female	88	33.7
Marital status	Single	232	88.9
	Married	22	8.4
	Divorced	7	2.7
Field of study	Language	101	38.7
	Social	90	34.5
	Natural	70	26.8
Year of study	First year	87	33.3
	Second year	102	39.1
	Third year	72	27.6
Monthly pocket money	200-500birr	64	24.5
	600-900birr	109	41.8
	>=1000birr	88	33.7
Original place of residence	Urban	160	61.3
	Rural	101	38.7
Living condition	On-campus	181	69.3
	Off-campus	80	30.7

Table 2 indicated that a total of 275 students were invited and approached to participate in the study and all of them agreed. Two hundred sixty-one of the questionnaires were filled completely and returned back where fourteen of the questionnaires were incompletely filled and nonreturned back which made the response rate 95%. The mean age of the students was 23.73 (SD=  $\pm 3.76$ ) years and nearly the majority of the respondents 172 (65.9%) were in the age range of 18-25 years. Nearly two-thirds of the respondents 173(66.3%) were males and 88 (27.6%) were females. The majority of the study subjects were single in their marital status 232(88.9%). Regarding the field of study of the students, most students 101 (38.7% were from languages, followed by social science students 90 (34.5%) and then by natural science 70 (26.8%). From the total of students involved in the study, the second year, first year, and third year students accounted 102 (39.1%), 87 (33.3%), and 72 (27.6%) respectively. From that nearly half of the respondents, 109 (41.8%) reported that they got 600-900 birr of monthly pocket money. The average monthly income reported was 804.41(SD =  $\pm 319.27$ ) birr. Regarding the place of origin, the majority of the students 160(61.3%) were from urban areas and the remaining 101 (38.7%) were from rural areas. Majority of the study

participants, 181(69.3%) were living in the dormitory/on campus.

### Socio-Cultural and Behavioural Characteristics of Respondents

**Table 3: Description of Socio-cultural and behavioural characteristics of the students at TTC, Jigjiga, Ethiopia, 2018.**

Variable	Category	Frequency	Percentage (%)
Family member	Yes	121	46.4
	No	140	53.6
Friend	Yes	91	34.9
	No	170	65.1
Smoke cigarette	Yes	62	23.8
	No	199	76.2
Khat helps study better	Yes	94	36
	No	167	64
Khat could lead negative health	Yes	141	54
	No	120	46

effect

According to Table 3, out of 261 respondents, 121 (46.4%) reported that they had a family member chewing khat while 140 (53.6%) of them did not have a family member who chewed khat. Moreover, 91 (34.9%) of them had a friend who chewed khat where 170(65.1%) of them did not have a chewer friend. The majority of the respondents, 199 (76.2%) did not smoke a cigarette and did not believe that khat helps to study better 167(64%). More than half of the study participants 141 (54%) believed that khat could lead to negative health effects.

### Prevalence of Current Khat Chewing

**Table 4: Description of prevalence khat chewing in students at TTC, Jigjiga, Ethiopia, 2018.**

Variable	Category	Frequency	Percentage (%)
Current khat chewer	Yes	69	26.4
	No	192	73.6

Table 4 revealed that the study considered one form of khat chewing behaviour (current chewing). The overall current prevalence of khat chewing was 69 (26.4%) (CI: (21.5-31.8). Gender wise, the prevalence of male and female current khat chewers were 56(32.4%) and 13(14.8%), respectively.

### Patterns of Current Khat Chewing

**Table 5: Description of patterns of current khat chewing of the students at TTC, Jigjiga, Ethiopia, 2018**

Variable	Category	Frequency	Percentage (%)
Frequency of khat chewing	Daily	8	11.6%
	3-4days a week	7	10.1%
	Twice a week	34	49.3%
	Once a week	16	23.2%
	Once a month	4	5.8%
Time spent on khat chewing	<1hour	11	15.9%
	1-2hours	16	23.2%
	3-4hours	30	43.5%
	=>5hours	12	17.4%
Money spent on khat chewing per month	400-750birr	33	47.8%
	800-1150birr	25	36.2%
	>=1200birr	11	16%
Substances used during/after khat chewing	Alcohol	2	2.9%
	Hot drinks	16	23.2%
	Others like soft drinks, sugar and groundnuts, shisha	51	73.9%

Table 5 indicates that, from 69 of the current khat chewers, the majority of them, 34 (49.3%) were chewing twice a week followed by once a week 16 (23.2%). Besides, the result indicates that 71 % of the current chewers, 18.77 % out of the total sample, chew khat at least two times in a week. In addition, 30 (43.5%) of them spent 1-2 hours on khat chewing and 16 (23.2%) of them spent 3-4 hours on it. Among the current chewer, most of the participants 33 (47.8%) spent 400-750 birr per

month to purchase khat. The mean money spent by the current khat chewer per month was 830.60 birr (about 23 USD) with SD =  $\pm 281.63$ . Regarding the substance used during /after khat chewing, the majority of current chewers, 51(73.9%) used soft drinks followed by 16 (23.2%) of those who used hot drinks like coffee.

### Reasons for Khat Chewing

**Table 6: description of reasons for khat chewing of the students at TTC, Jigjiga, Ethiopia, 2018.**

Reasons for Using Khat	n	%
Relaxation	13	18.84
Academic purpose	21	30.43
Religious purpose	2	2.9
Energy	3	4.35
Wasting time	4	5.8
Cope up with stress	9	13.04

Socialization	10	14.49
Dependence	7	10.14
Total	69	100

According to table 6, among the current khat chewers, 21 (30.43%) of them chew khat for academic purposes. Then followed by the need for enjoyment and relaxation 13 (18.84%) and for Socialization reasons 10 (14.49%).

### Factors Associated with Current Khat Chewing Practice:

**Table 7: Bivariate analysis of socio-demographic factors associated with current khat chewing practice of students at TTC, Jigjiga, Ethiopia, 2018.**

Variable	Category	Current khat chewing		COR (95% CI)	P-value
		Yes (%)	No (%)		
Age	18-25yrs	44 (63.8%)	128(66.7%)	0.894 (0.301-2.650)	0.839
	26-30yrs	20 (29%)	51(26.6%)	1.020(0.322-3.232)	0.974
	>30yrs	5 (7.2%)	13(6.7%)	Reference	
Gender	Male	56(81.2%)	117(60.9%)	2.761(1.414-5.393)	0.003*
	Female	13(18.8%)	75(39.1%)	Reference	
Marital status	Single	62(89.9%)	170(88.5%)	0.912(0.172-4.821)	0.913
	Married	5(7.2%)	17(8.9%)	0.735(0.108-5.011)	0.754
	Divorced	2(2.9%)	5(2.6%)	Reference	
Field of study	Natural	18(26.1%)	52(27.1%)	0.819(0.413-1.625)	0.568
	Social	21(30.4%)	69(35.9%)	0.720(0.377-1.378)	0.321
	Language	30(43.5%)	71(37%)	Reference	
Year of study	First-year	13(18.8%)	74(38.5%)	Reference	
	Second-year	36(52.2%)	66(34.4%)	3.105(1.501-6.352)	0.002*
	Third-year	20(29%)	52(27.1%)	2.189(1.000-4.791)	0.050*
Monthly pocket money	200-500birr	9(13%)	55(28.6%)	Reference	
	600-900birr	19(27.5%)	90(46.9%)	1.290(0.545-3.052)	0.562
	>=1000	41(59.4%)	47(24.5%)	5.331(2.348-12.102)	<0.001*
Original place of residence	Urban	51(73.9%)	109(56.8%)	2.157(1.174-3.965)	0.013*
	Rural	18(26.1%)	83(43.2%)	Reference	
Living condition	On-campus	36(52.2%)	145(75.5%)	Reference	
	Off-campus	33(47.8%)	47(24.5%)	2.828(1.590-5.029)	<0.001*

\*statistically significant at  $p < 0.2$

Bivariate analysis was conducted for socio-demographic variables and Socio-cultural and behavioural characteristics. Those variables which were with  $p$  –values less than 0.2 in bivariate logistic regression were included in multiple logistic regression (Table 7 and 8).

Table 7 showed that gender, year of study, monthly pocket money, original place of residence, and living condition were significantly

associated with current khat chewing practice among Jigjiga Teacher Training College students.



**Table 8: Bivariate analysis of Socio-cultural and behavioural associated with current khat chewing practice of the students at TTC, Jigjiga, Ethiopia, 2018.**

Variable	Category	Current khat chewing		COR (95% CI)	P-value
		Yes (%)	No (%)		
Family member chewer	Yes	40(58%)	81(42.2%)	1.890(1.083-3.300)	0.025*
	No	29(42%)	111(57.8%)	Reference	
Close friend chewer	Yes	44(63.8%)	47(24.5%)	5.430(3.007-9.804)	<0.001*
	No	25(36.2%)	145(75.5%)	Reference	
Smoking cigarette	Yes	27(39.1%)	35(18.2%)	2.884(1.572-5.289)	0.001*
	No	42(60.9%)	157(81.8%)	Reference	
Khat helps study better	Yes	38(55.1%)	56(29.2%)	2.977(1.688-5.250)	<0.001*
	No	31(44.9%)	136(70.8%)	Reference	
Khat could lead negative health effect	Yes	33(47.8%)	108(56.3%)	Reference	
	No	36(52.2%)	84(43.7%)	1.403 (0.808-2.435)	0.229

\*statistically significant at p&lt;0.2

In addition to the above socio demographic determinants indicated in Table 7, Table 8 indicates that having a family member or a close friend who chews khat, cigarette smoking

practice, and erroneous belief that khat helps to study better were statistically and significantly associated with current khat chewing practice.

**Multivariate Analysis:****Table 9: Multivariate analysis of factors associated with current khat chewing practice of the students at TTC, Jigjiga, Ethiopia, 2018.**

Variable	Category	Current khat chewing		AOR (95% CI)	P-value
		Yes (%)	No (%)		
Gender	Male	56(81.2%)	117(60.9%)	4.049(1.645-9.967)	0.002*
	Female	13(18.8%)	75(39.1%)	Reference	
Year of study	First-year	13(18.8%)	74(38.5%)	Reference	
	Second-year	36(52.2%)	66(34.4%)	4.117(1.498-11.315)	0.006*
	Third-year	20(29%)	52(27.1%)	1.827(0.498-6.707)	0.364
Monthly pocket money	200-500birr	9(13%)	55(28.6%)	Reference	
	600-900birr	19(27.5%)	90(46.9%)	1.477(0.470-4.642)	0.505
	>=1000birr	41(59.4%)	47(24.5%)	9.379(2.880-30.540)	0.000*
Original place of residence	Urban	51(73.9%)	109(56.8%)	3.302(1.371-7.952)	0.008*
	Rural	18(26.1%)	83(43.2%)	Reference	
Living condition	On-campus	36(52.2%)	145(75.5%)	Reference	
	Off-campus	33(47.8%)	47(24.5%)	4.833(1.920-12.163)	0.001*
Family member chewer	Yes	40(58%)	81(42.2%)	4.174(1.725-10.102)	0.002*
	No	29(42%)	111(57.8%)	Reference	
Close friend chewer	Yes	44(63.8%)	47(24.5%)	7.352(3.110-17.376)	0.000*
	No	25(36.2%)	145(75.5%)	Reference	
Smoking cigarette	Yes	27(39.1%)	35(18.2%)	1.314(0.545-3.168)	0.543
	No	42(60.9%)	157(81.8%)	Reference	
Khat helps study	Yes	38(55.1%)	56(29.2%)	3.474(1.448-8.331)	0.005*

better	No	31(44.9%)	136(70.8%)	Reference
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\*statistically significant at  $p < 0.05$ , AOR & (95% CI)

To minimize the risk of confounders for dependent variables, multiple logistic regressions were used. The results of multiple logistic regression model showed (Table 9) that being male, being second year, receiving monthly pocket money  $\geq 1000$ birr, being an urban resident, off-campus life, having a family chewer member, having a friend chewer and belief that khat helps to study better were associated significantly with current khat chewing. Gender wise, males were 4.05 times more likely to chew khat (AOR=4.049, 95% CI: (1.645-9.967)) compared to females. Those who were in the second year of their education were 4.12 higher odds of current khat chewing (AOR=4.117, 95% CI: (1.498-11.315)) relative to those in the first year students. Current khat chewing was 9.38 more likely to occur among those who had monthly pocket money  $\geq 1000$ birr (AOR=9.379, 95% CI: (2.880-30.540)) respective to those who had monthly pocket money 200-500birr. Study participants who were from urban residence chewed khat 3.30 times more than those from rural (AOR=3.302, 95% CI: (1.371-7.952)). Those respondents living in off-campus were 4.83 times at risk to chew khat (AOR=4.833, 95%CI: (1.920-12.163)) than their counterparts.

Respondents who had a family member who chews khat showed a significant association with current khat chewing (AOR=4.174, 95% CI: (1.725-10.102)) in comparison with those who didn't have a family chewer member. Students were more likely to chew khat if they had close friends who were khat chewers compared to those who did not have friends who chewed khat at all (AOR=7.352, 95% CI: (3.110-17.376)) and those believed that khat helps to study better were found 3.47 times higher risk to chew khat (AOR=3.474, 95% CI: (1.448-8.331)) when contrasted to those who didn't believe that khat helps study better. To check the model adequacy, the *Hosmer* and *Lamshow* goodness of fit was checked and showed that the model fits to the data.

### Discussion

This study tried to investigate the prevalence and risk factors associated with khat chewing among

students of Jigjiga Teachers Training College. The current khat chewing prevalence among the students was 26.4% (CI: (21.5-31.8)) and 70% of the khat chewers consume khat at least two times in a week. Besides, the risk factors associated to khat abuse are being male, being a second year student, having more monthly pocket money, urban origin, residing off-campus, having a family member who chews khat, having a friend addicted to khat and students' belief that khat helps to study well were found statistically significance. Based on the above data findings, the following explanations were made.

The prevalence of current khat chewing in this study was 26.4 with a 95% confidence interval of (21.5-31.8). It converges to 26 % of the current prevalence among the general public in the Somali region (23). This prevalence also relates to studies that involved higher education students in Saudi Arabia (23.1%) and Yemen (21%) (32,36). Besides, this finding is similar to studies conducted among Haromaya high school students, Eastern Ethiopia (24.2%), Jimma university, South-Eastern Ethiopia (23.9%), and Wolaita Soddo University students, Southern Ethiopia was 28.2% (28,30,37).

The prevalence of khat abuse in Jigjiga Teachers college is higher compared to the national current practice of khat use among the general public in Ethiopia (15.3%). It is also greater than the pooled prevalence of current khat users among Saudi Arabia, Yemen, and Ethiopian university students (14.16%) (1). Additionally, this study came up with a higher prevalence rate in relation to studies conducted in Bahir Dar university, Northern Ethiopia (12.7%, 20.6%) and Hawassa university, Southern Ethiopia (13 %) (35,38,39).

However, the prevalence is lower than studies conducted among undergraduate students of a College in Gondar Town, North-western Ethiopia (32.5%) (27). Furthermore, it is lower than the current prevalence of khat abuse among students of Ambo university, Woliso Campus (48.1%) (40). Generally, the khat consumption rate varies from area to area.

The possible reasons for the different rates could be differences in the study settings and cultural variations. In some parts of the country, khat abuse is a taboo. However, in Eastern and South Western parts of the country, khat abuse has a deep-rooted cultural link and it is used as a means to enhance social relationships. In Jigjiga, khat consumption rate is very high because it is considered as a normal and socially acceptable practice. Besides, Khat is easily accessible to purchase due to the fact that it is a few kilometres away from Hararghe, one of the top khat producing areas in Ethiopia. These differences also might be because of students' place of residence since the majority of students of this were from urban area which is an important risk factor. The third reason might be due to the sex distribution of students; in this study, nearly more than two-thirds of students were male.

This study found that the participants spent a significant amount of time and money on khat chewing. Almost half of the current khat chewers (49.3%) chew khat twice a week and 43.5 % of them spend 3-4 hours per chewing session. These findings were comparable to those of other studies among higher education students at Jazan University, Saudi Arabia (41). This study also revealed that 36.2% of the participants chewed khat costing 800-1150 ETB (about 22-32 USD) per month. Even though the students spent less money on khat compared to Yemeni Health science students(42), they spent a lot of money and time on khat chewing. This use of resources may have an impact on the social and economic aspects of the students' lives and their health and academic performance. Furthermore, if students have no money to buy addictive substances, they may opt to be engaged in activities such as stealing.

In this study, the main reasons behind khat chewing were related to using khat for study or academic purposes (30.5%), followed by using it for recreational or relaxation (18.8%) and socialization purposes (14.5%). This result is similar to the previous reports from different studies (23,27,28,35). All these reasons are important indicators for interventions aimed at decreasing the prevalence of khat chewing among college students.

This study indicated that being male, second year, and urban resident; having monthly pocket money greater than or equal to 1000 birr; living off-campus; having family and friends who chew khat; and a belief that khat helps to study better were significantly associated to current khat chewing. Several studies conducted in various parts of the country indicated that that male students are more likely to chew khat compared to their female counterparts (35,37,43–45). This can be attributed to cultural restrictions that females are more prohibited from exposure to various forms of substance abuse than males in their childhood and their later lives.

Additionally, several studies confirmed that having friends and family members who chew khat increases the probability of students to be engaged in khat chewing because of modelling and peer pressure (28–30,46). This study also noted that having 1000 ETB or more monthly pocket money was significantly associated with khat chewing when contrasted to having monthly pocket money 200-500birr. Same to this, a study done in Adama University showed that those students who had more pocket money were found to be chewers compared to those with lower monthly income (23,47). This indicates that having much money may encourage students to purchase and chew khat since they feel independent and to have friends easily and increase social interaction.

Regarding the year of study, the study demonstrated that second year students were more likely to chew khat compared to their first-year counterparts. The result partially resembles a study done in Ambo University, Wolliso campus, which revealed that being first and second year student was associated with khat chewing compared to third and fourth year students (40). In contrary, a study carried out in Woliata Soddo University revealed that third and fourth year students (except second year students) had a statistically significant and positive association with khat chewing practice when compared to first year students (37).

Concerning the original place of residence, students from urban areas chewed more compared to students who came from rural areas. In contrast to this study, a national demographic survey indicated that rural residents are at more risk of

chewing compared to urban residents (23). However, in agreement with our findings, a community-based survey found that urban residents were more likely to chew khat compared to rural residents (48). This may be due to the more liberal life styles in urban areas compared to cultural conservatism in rural areas and may also be attributed to the easiness of reporting chewing khat by urban adolescents than rural residents since in rural areas, khat chewing is not a common habit, students from the rural area are under the control of their family.

In this study, living off-campus (outside) campus had also an association with khat chewing when compared to living in on-campus (dormitory). Similarly, other studies conducted in Bahir Dar and Hawasa universities stated the same where living off-campus in rented houses were having higher odds of chewing khat compared to living in the university dormitory (29). According to studies, students who live away from parents had a higher rate of exposure to khat abuse because they receive lesser social supports from the family and friends (36,38).

Finally, students who believed that khat helps to concentrate during study time were found to be more likely to chew compared to those who didn't have such belief. This study is consistent with another study conducted in Bahir Dar University which revealed the same result that students who perceived khat use improves academic performance were more likely to use khat. The main reason given for chewing khat by students is to concentrate and study well (35).

### Conclusion

From the study findings, it is concluded that current khat chewing among students of teacher training college was prevalent as 26.4% (CI: (21.5-31.8)). This study determined the existence of risk factors such as being male, being the second year of study, having more monthly pocket money, being an origin of urban, residing off-campus, having family member chewer, having a friend Khat chewer and students believe that khat helps study well. Thereby, these variables were identified as the major factors forcing these students to khat chewing behavior.

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