

Prevalence, Factors and Consequences of Khat Chewing among High School Students of Gondar Town, Northwestern Ethiopia

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Summary

Khat (*Catha edulis* Forsk) is a plant grows in most parts of Ethiopia, contains a psychoactive substance called cathinone (amphetamine analogous). It is widely abused in some east African countries and the Arabian Peninsula. Habitual use of khat is certainly addictive and potentially harmful on physical, psychological and economical well being of the community. To assess the prevalence, factor and impacts of khat chewing among high school students of Gondar town, Northwestern Ethiopia.

A cross-sectional study was conducted on 397 students of two high schools found in Gondar, Northwest Ethiopia. A stratified sampling method was used for determination of students in each school. Students in each grade i.e. grade 9-12, were selected by systematic sampling technique. Self-administered questionnaire was used for data collection from April to May 2008. The result was analyzed by using EPI info version 3.4.3 statistical software package.

The study revealed 12.6% current prevalence of khat chewing, and that of lifetime prevalence was 22.7%. The lifetime prevalence was found to be significantly higher among males (30.2%), Muslims (42.9%), age group greater than 23 years (42.9%), Tigries (38.7%), and widowed (80%) than their respective counterparts. The lifetime khat chewing was associated with sex (OR=3.4963, $X^2=18.7832$, $P=0.0000$), age ($X^2=13.6309$, $P=0.0010$), religion ($X^2=13.1870$, $P=0.0104$), ethnicity ($X^2=8.5447$, $P=0.0360$) source of money ($X^2=10.1689$, $P=0.0172$), and family job ($X^2=14.3173$, $P=0.0137$). Sixty (67.7%) of the lifetime chewers started chewing after they entered to high schools. Sixty-three (70%) of the lifetime chewers want to stop chewing. Economic and social problems including financial crisis, behavioral change, and loss of working time were mentioned by 115 (29 %) of the students. 265(66.8%) of the respondents strongly disagree with women's khat chewing.

The prevalence of khat chewing is increasing among high school students. Most of the students knew the effects of khat chewing on health and its socio-economic problems. Parents, colleagues, teachers and other concerned bodies should give emphasis on the side of avoiding exposing factors and have pave the ways make quit khat chewing and this will have strong positive impact on the coming new and productive generation of this world.

Keywords: khat chewing; High school students; Gondar; Ethiopia.

Introduction

Khat has been used since antiquity as a recreational and religious drug by natives of East Africa, Arabian Peninsula, and through out the Middle East [1]. The leaves, twigs, and shoots of the khat shrub are most commonly chewed and kept in the cheek [2].

Khat leaves are commonly chewed and liquid part taken, rarely it is taken as a tea, smokes or sprinkled on food. Khat is chewed while it was fresh; it is usually wrapped in banana leaves immediately after picking, to preserve its potency [3, 4]. khat (*Catha edulis*) leaves, are chewed and ingested, they produce loquacity of thought, euphoria, removal of fatigue and suppression of hunger [2,5]. Fresh leaves of *Catha edulis* Forsk (Khat) contain the alkaloid stimulants and (α - aminonorpropiophinone) and Cathine (NPE) in addition to more than 40 alkaloids, glycosides, tannins and terpenoids [4, 6].

Khat has been used traditionally for medicinal and recreational purpose i.e. cough, bronchial asthma, hay fever, appetite suppressant and for weight loss, fatigue, diabetes, malaria, aphrodisiac, increase level of alertness, ability to concentrate, confidence, friendliness, contentment and flow of ideas [3, 7].

Small survey in Kenya showed that khat was the third most common drug used after alcohol and tobacco. A study in Uganda found 31.5% lifetime khat use and 20.4% current users. A large survey in Butajira, Ethiopia reported that 55.7% of the adults included in the survey had used khat at some times in their life, and that 50% were current users [4].

Among the staff of Jimma University the life time prevalence of khat chewing was found to be 46% and the current prevalence was 30.8 % [8]. The lifetime prevalence of khat chewing was 26.7% and that of current prevalence was 17.5% among college students in North West Ethiopia [9]. A study on students of technology and pharmacy in Addis Ababa University (AAU) shows that the lifetime prevalence of khat chewing was 31.9% and the current prevalence rate was 14.4% [4]. Some studies revealed that lifetime and current prevalence rate of khat chewing is 7.9% and 3.9% respectively among the high school students of Debar town [10].

Drug abuse is becoming a growing threat to the level of individuals in particular to the whole community in general [10]. Khat leaves are substance of abuse and that khat chewing has the potential to complicate psychiatric conditions and forensic events [11]. According to the World Health Organization (WHO), khat is classified as an abusive drug that can produce mild to moderate psychic dependency [2]. The French government considers khat as a narcotic drug [12]. In Germany, cathine is controlled substance and ownership and sale of the plant is illegal. In 1971, Commission on Narcotic Dugs recommended the USA Narcotic Laboratory to under take research on the chemistry of khat and its component. In their 22nd report in 1985 cathine was assessed as have central stimulating action similar to amphetamine but about 7 to 10 times less potent [1, 3].

Concerning khat chewing among high school students' of Gondar town is not studied before in details and the current prevalence as well as the reasons for using khat are not determined well. Thus, this study aimed to assess the extent, factors and impacts of khat chewing among high school students of Gondar town, Northwestern Ethiopia.

Study Areas and Study Setting

The study was conducted in Gondar town, which is the capital city of North Gondar Zone. Gondar is located at 748 km North East direction from Addis Ababa, Capital city of Ethiopia and 182 km away from Bihar Dar, which is the capital city of Amhara National Region. The town has surface area of 81.19 km². The projected total population of Gondar town for 2000

E.C based on 1996 census was 250,000 with average growth rates of 4.11% per year. The average House hold family size is 5.2. The town has 12 Urban Kebeles and 10 Rural Kebeles (14). The study setting is consists of all high schools of the town. In this town 8 high schools are presented and of which 4 are governmental and 4 are private high schools including preparatory schools [13].

Methodology

Study Design

A study was conducted by using cross-sectional survey method by employing structured self-administered questionnaire.

Sample size and sampling technique

The reference population was all high school students in Gondar Town grade 9 to 12. And Students of the two high schools, which were conveniently selected for their composition of all levels of students that is grade 9 to 12 was selected as study population. The total number of students in two-selected school was 7791 ($N < 10,000$). The following formula for estimation of a single population proportion was used to estimate the minimum number of students for the study. The proportion of khat chewers among students was assumed to be 50% in order to maximize the sample size. Thus, the sample size was calculated by using the prevalence rate of 50%, 95% level of significance, marginal error of 5% and none response rate 10%, and calculated as 403 students. Samples were taken from two campuses by proportion.

The average number of students in one class varies with school and levels of grades. There for the type of sampling used was stratified sampling technique. First, the proportional sample size was calculated for both schools from the entire sample size. Since there are four grade levels (strata) in each (both) schools the respective sample size was divided in to four and finally the section (s) was selected by systematic sampling technique in both schools.

Data Collection Instruments and Procedure

A structured self-administered questionnaire was used for data collection. The questionnaire covers a range of socio-demographic characteristics and data on khat chewing. Before collection of the entire data pretest was done on about 15 students and the questionnaire was reevaluated. More over, the developed questionnaire in English was translated in to Amharic in order to make more clear (to avoid language barrier) even before pre-test was done. For the actual data collection training was given for 3 of our classmates. Then the questionnaire was duplicated and data was collected from April 10 to May15, 2008.

Data Processing and Analysis

The collected data was cleared, coded, entered and analyzed by using Epi-Info version 3.4.3 statistical software package. The required percentages, the p-values, odds ratio and other statistical values were obtained during analysis. In the data analysis the dependent variables include attitudes to khat chewing, effect of khat chewing, prevalence of khat chewing and factors affecting the practice of chewing and independent variables were age, grade level, marital status, religion, ethnicity and parent job.

Ethical Consideration

In order to begin data collection official letter of co-operation was written from the school of pharmacy to the heads of each school. Informed consent from each study subject was obtained after giving clear explanation about the purpose of the study. Confidentiality of the information was assured and maximum effort was made to maintain the privacy of the respondent during the data collection and the secrecy was kept.

Results**Socio-demographic Characteristics**

Four hundred and three participants were included in the study and the overall response rate was 397(98.5%) with 2:1 male to female ratio. 270(68.0%) were students in the age group 17-19 years having mean age 17.1 ± 1.85 years. Majority of the respondents are Orthodox Christian, Amhara ethnic and single in their marital status 86.9%, 90.4% and 91.7% respectively (See Table1).

Table1: Socio-demographic characteristics of khat users among the high school students of Gondar town, Ethiopia, 2008.

Variables	Population (n=397)		Khat chewers		Non chewers	
	No	%	No	%	No	%
Sex						
Male	242	61.0	73	30.2	169	69.8
Female	155	39.0	17	11.0	138	89.0
Age						
14-16	73	18.4	10	13.7	63	86.3
17-19	270	68.0	58	21.5	212	78.5
20-22	47	11.8	19	40.4	28	59.6
≥ 23	7	1.8	3	42.9	4	57.1
Religion						
Orthodox	345	86.9	70	20.3	275	79.7
Muslim	35	8.8	15	42.9	20	57.1
Catholic	2	0.5	0	0	2	100.0
Protestant	12	3.0	3	25.0	9	75.0
Other*	3	0.8	2	66.7	1	33.3
Ethnicity						
Amhara	360	90.7	77	21.2	283	78.8
Oromo	6	1.5	1	16.7	5	83.3
Tigrie	31	7.8	12	38.7	19	61.3
Marital status						
Unmarried	364	91.7	79	21.7	285	78.3
Married	27	6.8	6	22.2	21	77.8
Divorced	1	0.3	1	100.0	0	0
Widowed	5	1.3	4	80.0	1	20.0
Source of money						
Family	359	90.4	76	21.2	283	78.8
Friends	4	1.0	3	75.0	1	25.0

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Relatives	7	1.8	1	14.3	6	85.7
Others**	27	6.8	10	37.0	17	63.0
Family job						
Government employee	145	36.5	35	24.1	10	58.8
Merchant	102	25.7	29	28.4	82	90.1
Driver	17	4.3	7	41.2		
Farmer	91	22.9	9	9.9		
Laborer	42	10.5	10	23.8	32	76.2
Grade						
9 th	108	27.2	20	18.5	88	81.5
10 th	98	24.7	26	26.5	72	73.5
11 th	96	24.2	18	18.8	78	81.3
12 th	95	23.9	26	27.4	69	72.6
Field						
Natural	94	47.5	27	28.7	67	71.3
Social	104	52.5	22	21.2	82	78.8

*No religion, **Independents

Khat Use Practice

Prevalence Rates of khat Chewing

The lifetime prevalence of khat chewing was 22.7% while the current prevalence of chewing was 12.6%. The frequency of lifetime chewing among males was higher when compared to females (OD=3.4963, $X^2=18.7832$, $P=0.0000$). 50 students (55.5%) of the ever chewers were current users and of which 29(58.0%) were from Fasillades higher school students. The current prevalence of khat chewing was more among males (78%) than females (22%) and it has no statistical association with sex (OD=0.6289, $P=0.2089$). 25 (27.8%) of chewers' family were aware of their habit of chewing. The prevalence of khat chewing was associated with age, source of money, and family job, $P=0.0010$, 0.0172, and 0.0137 respectively (See Table 2). Eighty (88.9%) of the chewers' peer or friends had history of khat chewing and also ten (11.1%) of the chewers' family.

Table2: Current khat users in correlation with sex and school among students of Gondar high schools, Ethiopia, 2008.

	Population		current user		non- user		X^2	P-value
	No	%	No	%	No	%		
Sex								
Male	242	61.0	39	78.0	203	58.5	0.3223	0.2088
Female	155	39.0	11	22.0	144	41.5		
Total	397	100.0	50	100.0	347	100.0		
School								
Azezo	157	39.5	21	42.0	14	35.0	0.2110	0.2547
Fassilades	240	60.5	29	58.0	26	65.0		
Total	397	100.0	50	100.0	40	100.0		

Reasons for Starting and age of starting khat Chewing

The main reasons given for chewing were to keep alert while reading (38.9%), followed by relaxation (33.3%), and peers pressure (13.3%) (See Table 3).

Table 3: Reasons given by high school students in North West Ethiopia for starting khat chewing

Reason	No	%
To study	35	38.9
For relaxation/to avoid unpleasant feeling	30	33.3
Peer pressure	12	13.3
To kill extra time	7	7.8
Religion	4	4.4
For socialization	2	2.2
Total	90	100

30(33.3%) of the chewers started chewing before they enter to high school. Sixty (67.7%) of the chewers started chewing after they enter high school. The mean year for staying on chewing was 2.26 (SD= 5.84) the longer year for staying was 10 year and the shortest 1 year.

Khat Source and Pattern of khat Chewing

37(41.1%) of the chewers were buying khat from khat house followed by 23 (25.6%) from independent khat sellers shop. 24(26.7%) of the chewers were chewing more than once per week. The amount of khat consumed at a time was estimated per cost in Birr, and 53(58.9%) of the chewers consumed Khat that costs less than 15 Birr and followed by costs 15-30 Birr per ceremony (See Table 4).

Table 4: Pattern of khat use among high school students (n 90) of Gondar town

Pattern	No	%
Place to buy		
Independent khat seller	24	26.7
Khat house	37	41.1
Shop/café/restaurant	15	16.7
Friends	5	5.6
Multiple source	9	10
Frequency of use		
Daily	12	13.3
Once a week	15	16.7
Monthly	5	5.6
More than once a month	4	4.4
Rarely	30	33.3
Money spent		
Less than 15 birr	53	58.9
15-30 birr	24	26.7

30-45 birr	6	6.7
Above 45 birr	7	7.8
Setting		
Alone	23	25.6
With others	34	37.8
At home	13	14.4
In the school	3	3.3
In khat house	10	11.1
Other*	7	7.8
Substance used with khat		
Cigarette	8	8.9
Alcohol	13	14.4
Coffee	40	44.4
Alcohol & Cigarette	5	5.6
Other**	24	26.7

*With Boy/Girl Friends

**Soft drinks like Pepsi, Coca-Cola; 'Shisha', coconut

Reason to Stop or not to Stop Khat Chewing

Sixty three (70.0%) of the chewers want to stop chewing; out of these the reasons to stop chewing were that khat cause health problems (20.6%), to control personal bad habit (19.0%), not to waste money (17.5%), it brought social problems (12.7%), and other reasons (6.4%). Twelve (19.0%) gave all those reasons and the rest of them mentioned more than one reason (4.8%), while 27(30.0%) of the chewers didn't want to stop khat chewing; out of the reasons not to stop were that, six (22.0%) of chewers were not want to lose pleasure gained by khat chewing and six (22.2%) have no any other choice to do so. (See Table 5)

Table 5: Reasons given by high school students of Gondar town to stop and not to stop khat chewing, North West Ethiopia, 2008.

Reasons	No	%
To stop		
1.khat causes health problem	13	20.3
2.Buying khat is west of money	12	18.8
3.To control personal bad habit	12	18.8
4.Khat brings social problem	8	12.5
5.Other	4	6.2
Not to stop		
1.Part of socializing activity	2	7.4
2.No effect on health and economy	4	14.8
3.Family and friends use khat	1	3.7
4.Not to loose pleasure	6	22.2
5.No alternative activity	6	22.2
6.Being addicted	4	14.8

Problems associated with Khat Chewing

One hundred-four (26.2%) knew that Khat chewing is a risk factors for sleeping difficulties, loss of appetite, addiction, weight loss, anxiety, hallucination, and lethargy. Addiction and loss of appetite were mentioned as the main health problems of Khat chewing, 56(14.1%) and 35 (8.8%) respectively. One hundred and fifteen (29%) of students knew that Khat chewing has socio-economic problems like financial crisis, behavioral change, social problems and loss of working time. Here, financial crisis and behavioral change are the main problems mentioned by students, 86(21.7%) and 53 (13.44%) respectively (See Table 6).

Table 6: Impacts of khat chewing mentioned by students of high school, Gondar town, 2008.

Impacts	No	%
1.Health impacts		
Sleeping difficulties	34	8.6
Loss of appetite	35	8.8
Urge to use khat	56	14.1
Weight loss	13	3.3
Anxiety	16	4.0
Hallucination	8	2.0
Lethargy	4	1.0
Others*	15	3.8
2.Socio-economic impacts		
Financial crisis	86	21.7
Behavioral change	37	9.3
Social problems	53	13.4
Loss of working time	36	9.1
Others*	13	3.3

*combination of more than one alternative

Attitudes of Students towards Khat Chewing

The students strongly disagree that khat chewing has no problem 210 (252.9%), it is alright to chew khat for students, men, women, 238 (59.9%), 224(56.4%) and 265(66.8%) of students, respectively. And also with that of khat chewing is ok for elder but not for young people 201(50.6%) and all right if it is done in moderation 169(42.6%).

Two hundred and thirty (57.9%) of respondents strongly disagree with khat chewing activity. Three hundred and seven (77.3%) and two hundred and twenty eight (69.5%) of students didn't prefer both alcohol and cigarettes than khat chewing to their families, respectively. 110(27.7%) of students agree that peoples who chew khat often do not give attention to their families properly, one hundred and fifty nine (39.3%) of students strongly agree with the idea that schools should have regulation on khat chewing (See Table 7).

Table7: Attitude of Gondar town high school students towards khat chewing, 2008.

Attitude	Strongly Agree		Agree		Disagree		Strongly Disagree	
	N	%	N	%	N	%	N	%
Khat chewing has no problem	31	7.8	16	4.0	140	35.3	210	52.9
Khat chewing is all right for students	20	5.0	25	6.3	114	28.7	238	59.9
Khat chewing is all right for men	18	4.5	20	5.0	135	34.1	224	56.9
Khat chewing is all right for women	16	4.0	9	2.3	107	27.0	265	66.8
Approve of khat chewing	14	3.5	35	8.8	118	29.7	230	57.9
Chewers do not look after their family	90	22.7	110	27.7	98	24.7	99	24.9
Chewing is preferable for elderly	15	3.8	51	12.8	130	32.7	201	50.6
Alcohol drinking is better than chewing	31	7.8	59	14.9	103	25.9	204	51.4
Smoking is better than chewing	35	8.8	86	21.7	94	23.7	182	45.8
Moderate Khat use is ok	27	6.8	69	17.4	132	33.2	169	42.6
Khat use has to be regulated	156	39.3	93	23.4	58	14.6	90	22.7

Discussion

In this study the current prevalence of khat chewing was found to be 12.6%, which is lower than the prevalence reported in GCMS (17.5%). This is because higher institutes or colleges are where khat-chewing practices are widely to escape from stress, and to keep alert while studying, especially at freshman. Similar studies reported for Butajira (50%) and Jimma town (30.6%). The relatively lower distances between these places and khat growing areas and also Muslims in Butajira where they account for 90% of the population, where as here Muslims students account for only 8.8% in Gondar high school and moreover the present study was student based unlike that of those studies. In the current study khat chewing was found to be more prevalent among males than females (OR=3.5064, P=0.0000) and this is consistent with other studies [8, 9]. This may be because females are more culturally restricted from exposure to khat chewing practices than males.

The lifetime as well as current prevalence of khat chewing was not significantly associated with school (OR=0.9650, $X^2=0.0005$, P=0.4445; OD=1.3404, $X^2=0.2110$,) and field of study (OR=1.4989, $X^2=1.1398$, P=0.1120; OR=0.5089, $X^2=0.7476$, P=0.1335) (only for grade 11&12), respectively. This might be due the reason that the two schools are found in the same level of growth and also consist of students of almost the socio-demographic background (90.4%-Amharas, 91.7%-unmarried).

The current prevalence and the lifetime prevalence of khat chewing obtained in this study were also higher when compared to the results of Debark town high school students, (3.9% and 7.9% respectively) in Debark [8]. studies done at Addis Ababa University shown that 47.6% of the students of technology and pharmacy started khat chewing in their high school life. This indicates that high schools are becoming places where such habits are being started. In this study the peak age of khat chewing was found to be between 14-25 years. This finding is different from the results of Jimma, Butajira and Mogadishu which reported that the peak age of khat chewing was 18-44, 21-44 and 20-40 respectively [8].

In this study, no significant association was found between khat chewing and membership of specific marital status, and educational level. This might be due to the students were almost

all found in the same levels of thinking, age group or marital status (unmarried, 91.7%), and income levels.

The reasons given by the study population for khat chewing were to keep alert while reading (38.9%), relaxation (33.3%), and peers pressure (13.3%). This result is similar to the previous reports and it indicates that khat has similar effect on users to that of amphetamine and other psycho stimulants. This is an important indication to direct interventions towards decreasing the prevalence of these habits by showing other alternatives [8, 9].

In this study lifetime chewers started chewing after they entered high school (67.7%) this is higher than that of reported in the students of Gondar College of Medical Sciences (45.6%). This shows that no reduction in the prevalence of khat chewing and from this finding it can be said that the health risks and socio-economic impacts of khat chewing are not well disseminated in the high schools and youth groups [8, 9].

On average, chewers were found to spend around 15 birr per ceremony. This indicates that the money spent by students is high. Very few families can afford for this expense. When the students have no money to buy khat, they could be engaged in criminal activities. It can also affect the economy and the security of the family [9].

In this study 44.4% of chewers drink coffee while chewing khat. This shows maximum number of chewers use coffee, but others reported that they use different substance while they chew in order to maximize the excitement they get khat from chewing. 14.4% of students also use alcohol after they chew khat. As mentioned by other studies this may lead to engagement in sexual activity among young people. Hence it may be associated with increased incidence of HIV [14].

Many students believe that khat chewing brings health and socio-economic problems, 26.2% and 29.0%, respectively. This indicates that increasing the knowledge of those students may help to decrease the prevalence.

A majority of students (57.9%) reported that they have strong positive attitude towards stopping khat chewing activity. These students will be good examples for those chewers by showing that, stopping is possible and be encouraged [9]. Lack of teaching about the harmful effects of khat chewing in school curricula and looseness of regulations on use of illicit drugs are mentioned by other studies [6]. 249(62.72%) of the students have positive attitude towards regulation of schools on khat use. This is the way by which schools can take an intervention to calm the growing habit of khat chewing.

Conclusions

The prevalence of khat chewing is increasing among high school students. Most of the students knew the effects of khat chewing on health and its socio-economic problems. Parents, colleagues, teachers and other concerned bodies should give emphasis on the side of avoiding exposing factors and have pave the ways make quit khat chewing and this will have strong positive impact on the coming new and productive generation of this world.

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