Original Article

Prevalence, Reasons, and Perceived Effects of Khat Chewing Among Students of a College in Gondar Town, Northwestern Ethiopia: A Cross-sectional Study

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Abstract

Background: The estimate of the number of people chewing Khat globally ranges from 5 to 10 million people. Its use may result in a variety of effects due to the different compounds in it with effects on the gastro-intestinal system and nervous system being the principal ones. **Aim:** To assess the prevalence, factors, and effects of Khat chewing among students of a college in Gondar town, northwestern Ethiopia. **Subjects and Methods:** An institution-based cross-sectional study was conducted from 15th to 20th of April 2009 on a total sample of 424 students who were selected using stratified random sampling technique. Data were collected by three of the principal investigators using a structured pretested data collection instrument and analyzed by Epi Info version 3.5.2. **Results:** The lifetime and current prevalence of Khat chewing among the respondents were 42% (168/400) and 32.5% (130/400), respectively. Sex ($P < 0.01$), religion ($P < 0.001$), and income ($P < 0.01$) showed statistically significant variation in Khat chewing. The commonest frequency of Khat chewing was once a day 33.1% (43/130) while alcohol (40.8% [53/130]) and cigarette (40.0% [52/130]) were the mostly used substances with Khat. More than half of the chewers (53.85% [70/130]) reported spending 1–4 h for one Khat chewing ceremony. Financially majority of the chewers reported spending up to 10 Ethiopian Birr (ETB) (1.13 United States Dollar) on Khat (54.6% [71/130]) and other substances (64.6% [84/130]). Nearly two-thirds (62.3% [81/130]) of the chewers mentioned seeking concentration during study as their main reason for chewing. Among chewers, 83.1% (108/130) reported they faced problem associated to sleep disturbance, 82.3% (107/130) loss of appetite, and 80.8% (105/130) constipation. **Conclusion:** The prevalence of Khat chewing was fairly high among the students and the majority among them used other substances together with Khat. Spending of a significant amount of money and facing health problems were reported to be consequences of the habit. The college should take steps to make students aware of the ills of Khat chewing and associated habits.

Keywords: College, Effects, Gondar, Khat, Prevalence, Reasons

Introduction

The term Khat defines the leaves (young) and shoots of a flowering evergreen plant which is a species of the *Celastraceae* family, known as *Catha edulis*. It is native to eastern Africa and southern Arabia known by various names in different countries such as *qat* in Yemen, *eschat* in Ethiopia, and *miraa* in Kenya.[1,2] Compounds such as alkaloids, terpenoids,

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flavonoids, sterols, glycosides, tannins, amino acids, vitamins, and minerals among others are found in Khat. The principal alkaloids found in the plant are phenylalkylamines and the cathedulins.[2]

Khat may result in a variety of effects due to the different compounds in it with the gastrointestinal system and nervous system effects being the principal ones. Cathinone, an alkaloid in Khat, is considered responsible for effects such as excitement, loss of appetite, and euphoria associated with chewing the leaves of the plant.[2,3] Among the common effects of Khat chewing are constipation, urine retention, cardiovascular effects, increased alertness, dependence, tolerance, and psychiatric symptoms which affect the autonomic, as well as the central nervous system.[2,4,5]

The estimate of the number of people chewing Khat globally ranges from 5 to 10 million people most of which are in the Horn of Africa and Arabian Peninsula, specifically Ethiopia, Somalia, and Yemen.[6] Khat chewing is met with different sociocultural, as well as legal perspectives and practices in different countries. It is a prevalent and legal practice in countries of the Horn of Africa including Ethiopia, Somalia, Somaliland, Kenya, Eritrea, Djibouti and Uganda, and across the Arabian Sea in Yemen. In these nations Khat chewing is part of the routine life of significant proportions of the populations.[7]

On the other hand, Khat is classified by the World Health Organization as a possible drug of abuse but with lesser addictive potential than alcohol or tobacco.[8] Yet in the United States of America (USA), the use of Khat is considered to be illegal as cathinone and cathine are classified as a schedule I and IV drugs under controlled substances act.[9]

Globally different studies have been conducted reporting Khat chewing prevalence levels of more than 20% and different impacts, perceptions, and pattern of the practice.[10-14] In Ethiopia also different studies have shown the prevalence of Khat chewing in various parts of the nation. By the studies among the community prevalence of different levels were reported ranging from <20% up to more than 60% current Khat chewing habit.[15-17] Similar studies which focused on high schools and colleges/universities in different parts of the country have also reported varying levels of prevalence of Khat chewing and factors associated with it. Prevalence levels of Khat chewing in the range of <20% to up to 30% have been reported.[18-20]

The aim of this study was to contribute to describing Khat chewing through comprehensively assessing the prevalence among college students, reasons for its use and its perceived effects on health, as well as socioeconomic status of chewers. To this end, the study focused on assessing the prevalence, reasons, and perceived effects of Khat chewing among students of a college in Gondar town, northwestern Ethiopia.

Subjects and Methods

This study was conducted at Gondar Teachers Training College, a state run college in Gondar town which is 738 km far from the capital Addis Ababa to the northwest. The town is inhabited by a population projected to be around 306, 246 in July 2014 and continues to grow.[21] The students in the college live in dormitories in the college and in rented rooms in the vicinity of the college away from their families. An institution-based cross-sectional study was conducted on the prevalence, reasons, and perceived effects of Khat chewing practice among students in the college using self-administered questionnaires. The survey data were collected from 15th to 20th of April 2009 from sampled students of the college.

The source population for this study included all the students in the college, and the study population from which the sample population was drawn included regular and extension program students. In this study, Khat chewing was operationally defined as an act of chewing the leaves of the plant Khat in any amount by a student in the college, as a current practice or in the past.

Variables such as sex, age, religion, ethnicity, monthly income, educational level, origin of students, and shift of study and marital status were taken as independent variables while Khat chewing status and consequences (health, social, and economic) associated to it were considered outcome variables.

Sample size determination of the students to be included in the study was done using single proportion formula taking prevalence (*p*) of Khat chewing as 50% with a 95% confidence interval (CI) and a 5% margin of error.[22] Hence, the sample size calculated became 385 and with a 10% contingency the final sample size was 424. The sampling technique followed was a stratified random sampling by proportionally allocating the sample size using academic year as a stratification variable and by randomly selecting students from each stratum.

Data were collected by three of the principal investigators using structured pretested self-administered questionnaires. The data collected were analyzed descriptively by Epi Info version 3.5.2 statistical analysis software (Centers for Disease Control and Prevention, Atlanta, Georgia, USA). An exchange rate of 8.881 Ethiopian Birr (ETB) for 1 United States Dollar (USD) was employed to convert monthly income of the students by taking the average of the exchange rates from 25th to 30th April 2009.[23] Chi-square test was done to assess different sociodemographic groups for differences in relation to Khat chewing practice. In doing the tests, 95% CI and a *P* value of 0.05 were used for determining the statistical significance of differences between the groups.

The study was approved by the School of Pharmacy, University of Gondar and the administrators of the college gave permission to conduct the study there. All the participants of the study were provided with explanations as to the purpose

of the study, and that the information collected was going to be kept strictly confidential; and those who gave their verbal consent to participate in the study were included.

Results

Sociodemographic profile of respondents

Of the 424 surveys, 400 were returned in a complete manner for use in the study which made the response rate 94.3%. Among the total 400 students 59.8% (239/400) were male and nearly two-thirds, 60.8% (243/400) were in the age group of 16–20 years old. Almost all of the respondents were of Amhara ethnicity, 98.2% (393/400); Orthodox Christians, 92.5% (370/400); and single in their marital status, 91% (364/400) [Table 1].

In regard to their stay at the college, more than half, 51.8% (207/400) of the respondents were in their 1st year of college education and around 58% (229/400) were regular students. Almost half, 48.5% (194/400) of the respondents reported they had a monthly income of 200–300 ETB (22.52–33.78 USD) [Table 1].

Table 1: Sociodemographic characteristics of respondents

Variable	Frequency (%)
Sex	
Male	239 (59.8)
Female	161 (40.2)
Age (years)	
16-20	243 (60.8)
21-25	123 (30.8)
26-30	23 (5.7)
>30	11 (2.7)
Religion	
Orthodox Christianity	370 (92.5)
Islam	30 (7.5)
Ethnicity	
Amhara	393 (98.2)
Tigre	5 (1.3)
Oromo	2 (0.5)
Marital status	
Single	364 (91.0)
Married	36 (9.0)
Place of origin	
Urban	220 (55.0)
Rural	180 (45.0)
Educational level	
Year I	207 (51.8)
Year II	80 (20.0)
Year III	113 (28.2)
Field of study	
Natural sciences	84 (21.0)
Social sciences	84 (21.0)
Language	144 (36.0)
Math	50 (12.5)
Physical education	38 (9.5)
Shift of study	
Regular	229 (57.2)
Extension	171 (42.8)
Monthly income	
<200 ETB (22.52 USD)	151 (37.8)
200-300 ETB (22.52-33.78 USD)	194 (48.5)
300 and more ETB (33.78 USD)	55 (13.7)

Khat chewing prevalence and its relation to sociodemographic characteristics

The lifetime prevalence of Khat chewing among the respondents was 42.0% (168/400) with the current prevalence being 32.5% (130/400). The habit was higher among male respondents, 38.9% (93/239); when compared to the female respondents, 23.0% (37/161), in a statistically significant manner ($P < 0.01$). Statistically significant variation was also found by religion ($P < 0.001$) and income levels of the respondents ($P < 0.01$) [Table 2].

Pattern of Khat chewing

Of the total 130 respondents who chewed Khat 59.2% (77/130), who accounted for the majority, started the practice in college. As to the frequency of Khat chewing, the most common was once a day, reported by 33.1% (43/130) of the Khat chewers [Table 3].

The substances used together with or associated to Khat included alcohol, 40.8% (53/130) and cigarette 40% (52/130) as the most common ones reported by the respondents. A considerable proportion of respondents also reported they used Hashish, 13.1% (17/130) in relation to their Khat chewing practices [Table 3].

As to the time spent on a typical Khat chewing activity session, most of the chewers, 53.8% (70/130) reported they spent a duration of 1–4 h followed by those who reported they spent 5–8 h [Table 3].

Reasons for Khat chewing

Nearly two-thirds, 62.3% (81/130) of the Khat chewers reported that their need for concentration during study made them engage in the practice as the most common reason. This was followed by the need for entertainment and relaxation as reported by more than a third, 36.9% (48/130) of the chewers [Table 4].

Reported health and socioeconomic impacts of Khat chewing

Among the Khat chewers 83.08% (108/130) reported they faced problem associated to sleep disturbance, followed by those who reported loss of appetite (82.3% [107/130]) and constipation (80.8% [105/130]). The chewers attributed the occurrence of these incidents to their habit [Figure 1].

The chewers reported they spent different amounts of money on Khat, as well as other items, associated with

Table 2: Chi-square test of differences in the practice of Khat chewing with sociodemographic characteristics of respondents

Variable	Respondents (%)	Khat chewers (%)	Nonchewers (%)	χ^2	*P*
Sex					
Male	239 (59.8)	93 (38.9)	146 (61.1)	11.1	<0.01[a]
Female	161 (40.2)	37 (23.0)	124 (77.0)		
Age					
16-20	243 (60.8)	73 (30.0)	170 (70.0)	3.58	0.31
21-25	123 (30.8)	47 (38.2)	76 (61.8)		
26-30	23 (5.7)	8 (34.8)	15 (65.2)		
>30	11 (2.7)	2 (18.2)	9 (81.8)		
Religion					
Orthodox Christianity	370 (92.5)	111 (30.0)	259 (70.0)	14.1	<0.001[a]
Islam	30 (7.5)	19 (63.3)	11 (36.7)		
Ethnicity					
Amhara	393 (98.2)	126 (32.1)	267 (67.9)	4.32	0.12
Tigre	5 (1.3)	2 (40.0)	3 (60.0)		
Oromo	2 (0.5)	2 (100.0)	0 (0.0)		
Marital status					
Married	36 (9.0)	16 (44.4)	20 (55.6)	2.57	0.11
Not married	364 (91.0)	114 (31.3)	250 (68.7)		
Place of origin					
Urban	220 (55.0)	80 (36.4)	140 (63.6)	3.33	0.07
Rural	180 (45.0)	50 (27.8)	130 (72.2)		
Educational level					
Year I	207 (51.8)	66 (31.9)	141 (68.1)	0.70	0.71
Year II	80 (20.0)	24 (30.0)	56 (70.0)		
Year III	113 (28.2)	40 (35.4)	73 (64.6)		
Field of study					
Natural sciences	84 (21.0)	23 (27.4)	61 (72.6)	4.08	0.40
Social sciences	84 (21.0)	31 (36.9)	53 (63.1)		
Language	144 (36.0)	42 (29.2)	102 (70.8)		
Math	50 (12.5)	20 (40.0)	30 (60.0)		
Physical education	38 (9.5)	14 (36.8)	24 (63.2)		
Shift of study					
Regular	231 (57.8)	84 (36.4)	147 (63.6)	3.72	0.05
Extension	169 (42.2)	46 (27.2)	123 (72.8)		
Monthly income					
<200 ETB (22.52 USD)	151 (37.8)	45 (29.8)	106 (70.2)	9.86	<0.01[a]
200-300 ETB (22.52-33.78 USD)	194 (48.5)	57 (29.4)	137 (70.6)		
300+ETB (33.78 USD)	55 (13.5)	28 (50.9)	27 (49.1)		

[a]*P*<0.05. ETB: Ethiopian Birr, USD: United States Dollar

its consumption such as a cigarette, soft drinks, and others. More than half, 54.6% (71/130) of the chewers reported spending up to 10 ETB (1.13 USD) per one ceremony on Khat. On the other hand nearly two-thirds, 64.6% (84/130) of the chewers mentioned they spent up to 10 ETB (1.13 USD) for other substances taken with or after Khat chewing [Figure 2].

Among the total chewers in the study, more than three-quarters, 78.5% (102/130) reported that their families were not aware of their habit while the remaining described that it was known by family members. Among chewers whose families were informed of the habit the overwhelming majority, 82.1% (23/27) expressed that their families had negatively reacted to the former's habit [Table 5].

Of all the Khat chewers in the study two-thirds, 66.0% (78/130), expressed that their habit had a negative impact on their interactions with their families in one or another way [Table 5].

Discussion

This study focused on assessing the prevalence, associated reasons and perceived impacts of Khat chewing among college students. The lifetime prevalence of Khat chewing among the students was 42%, higher compared to one-third among students of Bahir Dar University and 31.9% among technology and pharmacy students at Addis Ababa University.[24,25] The current prevalence of Khat chewing; on the other hand, was found to be 32.5% which was comparable to 31.2% among students of Bahir Dar university.[24] The Khat chewing

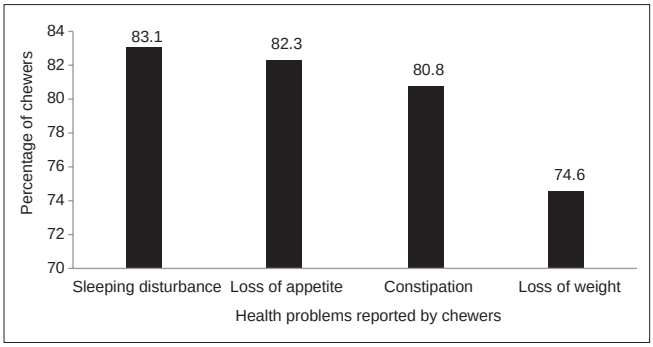

Figure 1: Percentage distribution of Khat chewers by reported ill-health experienced

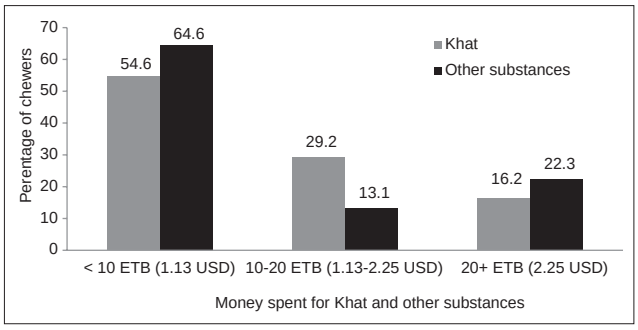

Figure 2: Percentage distribution of Khat chewers by the level of expenditure associated to the practice

Table 3: Distribution of educational level at which Khat chewing started, frequency, duration, and associated substances used among Khat chewers

Khat chewing pattern	Frequency (%)
Chewing frequency	
Twice a day	23 (17.7)
Once a day	43 (33.1)
Twice a week	21 (16.1)
Once a week	27 (20.8)
Once a month	16 (12.3)
Substances used in association with chewing*	
Alcohol	53 (40.8)
Cigarette	52 (40.0)
Soft drinks	28 (21.5)
Hashish	17 (13.1)
Marijuana	3 (2.3)
Time spent on chewing	
1-4 h	70 (53.9)
5-8 h	48 (36.9)
More than 8 h	12 (9.2)
Educational level at which Khat chewing was started	
Elementary	7 (5.4)
High school	47 (36.1)
College	76 (58.5)

*The percentages add up to more than 100% because of multiple responses

Table 4: Percentage distribution of reasons for Khat chewing reported by respondents

Reasons for chewing Khat	Frequency* (%)
Concentration during study	81 (62.3)
Entertainment and relaxation	48 (36.9)
Social relation/activities	24 (18.5)
Addiction	19 (14.6)
Others (to spend time, it's culture)	12 (9.2)

*The percentages add up to more than 100% because of multiple responses

Table 5: Percentage distribution of reported social impacts of Khat use

Variable	Frequency (%)
Family member's knowledge of Khat chewing	
Yes	28 (21.5)
No	102 (78.5)
Total	130 (100.0)
Reaction of family members toward Khat chewing	
Positive	1 (3.6)
Negative	23 (82.1)
Indifference	4 (14.3)
Total	28 (100.0)
Perceived influence of Khat on interaction with family members	
Positive	14 (10.8)
Negative	78 (66.0)
No influence	38 (29.2)
Total	130 (100.0)

prevalence reported among male students was very much higher compared to female students in this study. This can be attributed to the culture which discourages the habit among females more ardently than in males. Similar patterns have been reported by other studies also.[24,25]

The peak age of Khat chewing in this study was found to be between 21 and 25 years, which was similar to others findings including among college students in Bahir Dar town and also among students of high school and college in Jazan, Kingdom of Saudi Arabia.[12,19,20]

In the present study, Khat chewing practice showed statistically significant differences with religion which was supported by findings in other studies.[15,20] In addition, the status of Khat chewing was shown to differ in a statistically significant manner in relation to monthly income of the students which could be associated to the ability to buy Khat and involve in the habit.

The majority of the respondents stated that their reason for Khat chewing was for concentration during study. Similar reasons have been reported by studies on students of high schools in eastern Ethiopia, colleges in northwestern Ethiopia and Bahir Dar University.[18,20,24,25] Furthermore, the majority of the chewers in the present study described they started Khat chewing in college. Looking at these findings on the reason and pattern of Khat chewing, it can be argued that some students might consider the habit as important to help them succeed

in college. However, by a study done in Saudi Arabia Khat chewers were found to have had poorer academic performance compared to nonchewers.[12] Another study done on students of Jimma University in 2002 also reported that nonchewers had statistically significant higher cumulative grade point average compared to Khat chewers.[26]

In this study, large proportions of the students reported that they used alcohol (40.8%) and cigarette (40.0%) with and/or after Khat chewing. Alcohol is commonly employed as a means to help decrease or eliminate the exciting/stimulating effects of Khat chewing. Simultaneous use of cigarette and other psychoactive substances with Khat has also been reported by other studies.[20,24,25] This shows that Khat chewing has a far reaching implication in regard to leading to the use of other addictive substances which could result in a multiple addiction with dangerous consequences.

Various proportions of the chewers recounted they experienced problems such as loss of sleep, loss of appetite, constipation, and loss of weight as the main health problems. Negative consequences of Khat chewing, as well as its perceived effects, on health have been reported by different reports.[3,24,27]

Most of the chewers reported that they spent up to 10 ETB (1.13 USD) per session for Khat (54.62%) and for related substances (64.61%). When considered in combination with the frequency of Khat chewing among the students involved in the habit, which showed that the majority of the chewers consume it more than once a week, financial impact of the habit is evident. Considerable spending for Khat has also been shown by a study on students of eastern Ethiopian high schools.[18]

More than half of the chewers mentioned they to spent 1–4 h per session on the habit. This is a source of concern as spending this much time for many days in a week, has a negative impact in the time management of students in pursuing their studies as too much time would be wasted on the habit.

In the present study, 21.5% of the chewers reported that their families knew of their habits and among them a very high proportion of the chewers recalled negative reactions. Furthermore, in another social relation aspect of the practice, nearly two-thirds of the chewers recounted the practice had negative effects on their relation with their families. This evidences the social ills of the habit as it was affecting the interaction between chewers and families. This can be of negative consequences as the habit might follow the students far in to their life after college.

Strength and limitations of the study

The strength of the study lies in its coverage of wider aspects of Khat chewing through assessing prevalence, associated reasons, and impacts which makes it comprehensive. In regard to its limitations, the study was done in one institution only which may limit its generalizability to similar institutions. In addition, information on health effects of Khat chewing could have been associated also to other factors other than Khat chewing.

Future research prospect

Conducting studies of a follow-up nature could help to assess the pattern, health, and socioeconomic consequences of Khat chewing better.

Conclusion

In this study, the prevalence of Khat chewing was fairly high with statistically significant associations with sex, religion, and monthly income. Most of the chewers started the habit in college and the majority among them uses other substances together with Khat. They have also reported to spending a significant amount of money and time on Khat chewing and faced health problems they attributed to their habit. In the effort to control the increasing use of Khat among students the college should work toward creating awareness on the negative consequences of the practice on health, studies, and financial situation to students. In addition, showing other methods of studying and academic activities which help students to become more successful without turning to the Khat chewing and associated habits is crucial.

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Conflicts of interest

There are no conflicts of interest.

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