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Prevalence, Pattern and Associated Factors of Khat Chewing Among Debre Berhan University Students, Ethiopia, 2014

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Abstract

Background: Substance usage among youths is becoming a great problem worldwide, particularly in college and university students. Khat is one of the most frequently used substances among these groups of population. Khat chewing has serious health, social and economic consequences. However, in our setting the magnitude, pattern and factors contributing to the use of Khat is not well addressed. Therefore, this study was conducted to assess the prevalence, pattern and associated factors of Khat chewing among Debre Berhan University students in Ethiopia.

Methods: This cross-sectional study was design to quantify the mastication of khat and identify socio demographic, behavioral and social factors among undergraduate students. Data was collected through structured, self-administered and pre-tested questionnaire. Stratified random sampling was used to recruit 406 students. Bivariable and multivariable logistic regression analyses were fitted via SPSS statistical software package to identify associated factors of khat chewing.

Results: The life time and current prevalence of khat chewing were estimated to be 20.1% and 12.2%, respectively. Out of ever chewers, 68 (84%) were in the age group of 18-24 years and 62 (76.5%) were male. The most common reasons to chew khat were for examination preparation (41.9%) followed by socialization (38.3%). Significant association was observed between khat chewing and family members chewing khat (AOR = 6.26; 95% CI: 2.67, 14.72), friends chewing khat (AOR = 6.89; 95% CI: 3.71, 14.80) and use of alcohol (AOR = 2.50; 95% CI: 1.36, 4.60).

Conclusion: The prevalence of khat chewing in this study was significantly higher when compared to some previous studies done in Addis Ababa University. The pattern of khat chewing among university students was not restricted by social regulation mechanisms, and even, it seems a social norm. Therefore, teachers in high schools, colleges and instructors in university should follow their students' substance use behavior including khat and need to counsel those students who are at risk of substance use. Moreover, families ought to be a role model for their children by avoiding risk behaviors.

Keywords: Alcohol; *Catha edulis*; Friends; Logistic models; Mastication; Pattern; Prevalence; Social norms and socialization

Introduction

Khat is a natural stimulant from the *Catha edulis* plant that is cultivated in the Republic of Yemen and most of the countries of East Africa. Its young buds and tender leaves are chewed to attain a state of euphoria and stimulation [1,2].

Many different compounds are found in khat including alkaloids, terpenoids, flavonoids, sterols, glycosides, tannins, amino acids, vitamins and minerals. Cathinone is the active ingredient of khat responsible for its psycho stimulant effect which is structurally and chemically similar to amphetamine [3]. Several million people are chewing khat worldwide, with an estimation of 10 million people chewing khat daily [4]. The pattern of khat chewing among university students is not restricted by social regulation, and even, it is a social norm that most students chew with their friends. Most chewing sessions took place at weekends usually in social gatherings after 8 pm with an average duration of about 6 hours that makes students to waste long time in khat session, unable to sleep, absent from school and impaired activity in the morning following the khat session. This in turn makes students to have poor academic performance [5].

A common effect of khat use is insomnia, a condition that the users some times to overcome with sedatives and alcohol. Khat use may endanger health in that the resulting anorexia leads to malnutrition and thereby to increase susceptibility to infectious diseases [6]. Khat chewing in large amounts can induce psychotic reactions [7,8]. There is also significant association between mental distress and frequency of khat use [9,10]. The recent sharp increase in khat chewing may not only affect the health of individuals but also have serious socioeconomic consequences [11]. In Ethiopia, khat chewing has deep rooted history as early as fourteenth century [12].

Recently, khat chewing becomes a common practice among high school, college and university students. A significant number of students chew khat to be alert especially during examination period [13].

A cross-sectional study conducted among colleges and secondary schools of Jazan Region of Saudi Arabia, the result showed that the overall prevalence rate of khat chewing was 21.4% (Male=37.7% and Female=3.8%) [14].

In Ethiopia, different studies were conducted on the prevalence of khat chewing and reported the percentage of ever use of khat as 9.2% and 35.6% in governmental high school, private high school of Addis Ababa, and 31% among Butajira governmental high school [15]. In addition, prevalence study conducted among 622 medical students at the school of medicine of Addis Ababa University reported 7% [13]. Another study from Jimma University medical students in 2009 showed that current prevalence of chewing khat was 33.1%. Sex, age and income have shown significant association with the habit of khat chewing. This study also showed that khat chewing, smoking and alcohol intake have a significant negative influence on academic achievements of university students [16]. All in all, different prevalence were reported form different parts of Ethiopia; for instance; 27.7% from Hosanna Health Science College students in 2010 [17]; 64.9% from South-Western Ethiopia [18]; 40% from Adama University [10]; 28% from Axum University [19] and 22.3% from North-Western Ethiopia [20]. Moreover, study conducted among 754 College students in Bahir Dar town showed that the overall prevalence of khat was 19.6% [21].

In spite of the wide spreading and increasing practice of khat chewing, there are limited studies conducted among university students. Moreover, now a day's the number of universities and prevalence of substance use among students is increasing. Most importantly, there is little study which included the pattern of khat chewing throughout the country. Therefore, the aim of this study was to assess the magnitude, pattern and associated factors of khat chewing among students in Debre Berhan University, Ethiopia. Estimating the prevalence, pattern and associated factors of khat chewing among students is important for stakeholders to design rules and regulation.

Methodology

Study design and setting

Institution based cross sectional study was conducted at Debre Berhan University students. Debre Berhan University is located 130 km away from Addis Ababa, the capital city of Ethiopia. It is one of the newly established Universities in the country which begun its official work in 2007 by receiving 725 students. During data collection period there were a total of 9983 regular under graduate students, of which 6596 (66.1%) were male and 3387 (33.9%) were female attending their classes in the university. The study was conducted from April 17 to May 17, 2014.

Study population

University students, which account a large segment of population, are the most at risk of using substances. These students are attending their higher education after they are travelled from different parts of Ethiopia. Currently, students are enrolled in undergraduate, postgraduate and doctoral program. However, this study was conducted among undergraduate students, who are enrolled under regular program.

Sampling size and sampling technique

The sample was calculated using a single population proportion formula as follows:

$n=(Z_{\alpha/2})^2 * p(1-p)/d^2$,

where n=minimum sample size required for the study; Z=standard normal distribution (Z=1.96) with confidence interval of 95% and =0.05; p=the anticipated population proportion hence, p=40% (0.4) which is the prevalence of khat chewing found from Adama university students was used [10]; d=tolerable margin of error=5%. The formula yields a sample of 369 students. After adding 10% for non-respondents, a total sample of 406 study subjects was recruited by using stratified random sampling. The source population was stratified by their year of study; that is, first year (stratum 1), second year (stratum 2), third year (stratum 3), fourth and fifth year together (stratum 4). A calculated sample was proportionally allocated to population size and taken independently from each stratum by systematic random sampling. After calculating the interval "k" from each year of study the first sampling unit was selected by random start from the first interval in the frame of each stratum with simple random sampling and continued to take samples at every "k" intervals of each stratum according to their ID numbers. Accordingly, 141 students from first year, 124 students from second year, 91 students from third year and 50 students from forth year were allocated.

Data Collection Tool and Procedure

Pretested and structured self-administered English version questionnaire with closed-ended questions were used, to collect information on use of various Psychoactive Substances after important modifications was made. Pretesting of the questionnaire was undertaken on 10% of the respondents in order to check the clarity and appropriateness of the questions. The questionnaire designed to assess sociodemographic characteristics, academic factors (faculty and year of study), environmental factors (peer pressure and family model) and substance use (alcohol, cigarette, cannabis and sedatives). Three diploma clinical nurses were recruited to data collection and one health officer supervisor was engaged to facilitate and guide data collector. One day training was given for them concerning how to use the questionnaire and the ethical principles of confidentiality and data management prior to the data collection process. Data quality control issues were ensured by conducting the pretest prior to the actual study period on 30 students at Debre Berhan Health Science College. It was also ensured by giving training for the facilitators as well as strict and regular supervision at the period of data collection.

Data Quality Assurance

Ethical clearance was obtained from the Institutional Review Board (IRB) of college of medicine and health sciences, University of Gondar and Emanuel Mental Specialized Hospital and it was submitted to Debre Berhan University and permission was found. Information was collected after obtaining informed consent from each participant. The right was given to the study participants to refuse or discontinue participation at any time they wanted and the chance to ask any thing about the study. For the purpose of anonymity participant's name was not used at the time of data collection and all other personal information was kept entirely anonymous and confidentiality was assured throughout the study period.

Operational Definitions

- Life time prevalence: Proportion of students who had ever chewed khat in their life time.
- Current prevalence: Proportion of students who are chewing khat within 30 days prior to the study.
- Pattern: A description of frequency, duration and circumstance of khat use with respect to some other categorical variables.

Data Processing and Analysis

First data was checked for completeness and consistency by supervision. Then it was coded, cleaned and entered in the computer using Epi-Info 3.5.1 software and analyzed by using SPSS version 16. Descriptive statistic was used to explain the frequency, proportion, tabulation and pattern of khat chewing behavior. In order to determine the crude odds ratio, simple logistic regression analysis was fitted. Then, factors which was significant at p value less than 0.25 in simple logistic regression was entered into multiple logistic regression analysis to identify independent predictors of khat chewing. During multiple analysis, statistical association was declared when p-value is less than 0.05. The strength of association was presented by Adjusted Odds Ratio (AOR) with its 95% confidence interval.

Results

Sociodemographic characteristics of the students

Out of 406 students participated in this study, 403 completed the questionnaires making the response rate of 99.3%. Among study subjects, 274 (68%) were male, 349 (86.6%) were in the age group of 18–24 and the mean age of the respondents was 21.8 years (SD ± 2.6).

Three hundred forty seven (86%) of the subjects were Orthodox Christians and 272 (68%) were Amhara in ethnicity. Most of the students 386 (96%) were single. With regard to the area of original residence, 208 (51.6%) were from rural back ground. Almost all of the students (95.3%) use university services (food and bed services). Among the participants 116 (28.8%) were from business and economics followed by 99 (24.6%) from health and medicine faculties (Table 1).

Variables	Count	Percent
Age		
18-24	349	86.6
≥ 25	54	13.4
Sex		
Male	274	68
Marital status		
Married	15	3.5
Single	386	96
Widowed	2	0.5
Original residence		
Urban	195	48.4
Current accommodation		
Café	384	95.3
Monthly earnings		
0-50	104	25.8
51-200	99	24.6
201-400	125	31
>400	75	18.6
Year of study		
Year one	139	34.5
Year two	124	30.8
Year three	90	22.3
Year four and five	50	12.4
Faculty		
Health	99	24.6
Engineering	77	19.1
Business & economics	116	28.8
Law	30	7.4
Social science	35	8.7
Computer science	26	6.5
Natural & computational science	20	4.9
Total	403	100

Table 1: Socio-demographic characteristics of study participants, Debre Berhan university, Ethiopia, 2014 (n=403).

Distribution of khat chewing

From a total of 81 khat chewers, 45 (55.6%) reported that they felt increased concentration followed by 33 (40.7%) felt happiness after khat chewing. Out of total respondents, 76 (18.9%) of their friends and 36 (8.9%) of their family members were khat chewers. Among the total respondents, 104 (25.8%) were using alcohol. Of whom 39 (9.7%) and 21 (5.2%) students were life-time and current khat chewers, respectively (Tables 2 and 3).

Variables	Ever Khat chewers		Current Khat chewers	
	Yes, n (%)	No, n (%)	Yes, n (%)	No, n (%)
Age group				
18-24	68(16.9%)	281(69.7%)	43(10.7%)	306(75.9%)
≥ 25	13(3.2%)	41(10.2%)	6(1.5%)	48(11.9%)
Sex				
Male	62(15.4%)	212(52.6%)	36(8.9%)	238(59.1%)
Female	19(4.7%)	110(27.3%)	13(3.2%)	116(28.8%)
Marital status				

Married	-	15(3.7%)	-	15(3.7%)
Single	80(19.9%)	306(75.9%)	48(11.9%)	338(83.9%)
Widowed	1(.3%)	1(.3%)	1(0.3%)	1(.3%)
Original residence				
Urban	39(9.7%)	156(38.7%)	23(5.7%)	172(42.7%)
Rural	42(10.4%)	166(41.2%)	26(6.5%)	182(45.2%)
Current accommodation				
Café	73(18.1%)	311(77.2%)	43(10.7%)	341(84.6%)
Non-café	8(2%)	11(2.7%)	6(1.5%)	13(3.2%)
Monthly income				
0-50	12(3%)	92(22.8%)	8(2%)	96(23.8%)
51-200	27(6.7%)	72(17.9%)	17(4.2%)	82(20.4%)
201-400	23(5.7%)	102(25.3%)	13(3.2%)	112(27.8%)
>400	19(4.7%)	56(13.9%)	11(2.7%)	64(15.9%)

Table 2: Khat chewing behavior of Debre Berhan University students, Ethiopia, May 2014.

Variables	Ever Khat chewers		Current Khat chewers	
	Yes, n (%)	No, n (%)	Yes, n (%)	No, n (%)
Year of study				
Year one	23(5.7%)	116(28.8 %)	11(2.7%)	128(31.8 %)
Year two	22(5.5% 0	102(25.3 %)	15(3.7%)	109(27.1 %)
Year three	23(5.7%)	67(16.6%)	16(4%)	74(18.4%)
Year four and five	13(3.2%)	37(9.2%)	7(1.7%)	43(10.7%)
Faculty/college				
Health	23(5.7%)	76(18.9%)	13(3.2%)	86(21.3%)
Engineering	18(4.5%)	59(14.6%)	10(2.5%)	67(16.6%)
Business and economics	17(4.2%)	99(24.6%)	10(2.5%)	106(26.3 %)
Law	6(1.5%)	24(6%)	3(0.7%)	27(6.7%)
Social science	10(2.5%)	25(6.2%)	9(2.2	26(6.5%)
Computer science	5(1.2%)	21(5.2%)	3(0.7%)	23(5.7%)
Natural and computational science	2(.5%)	18(4.5%)	1(0.3%)	19(4.7%)
Friends chew Khat	44(10.9 %)	32(7.9%)	32(7.9%)	44(10.9%)
Family chew Khat	24(6%)	12(3%)	17(4.2%)	19(4.7%)
Use of alcohol	39(9.7%)	65(16.1%)	21(5.2%)	83(20.6%)
Cigarette smoking	4(1%)	-	4(1%)	-
Use of cannabis/sedatives	2(0.5%)	-	1(0.3%)	1(0.3%)
Feelings after Khat chewing				
Happiness	33(40.7 %)	48(59.3%)	21(25.9 %)	60(74.1%)
Depression	6(7.4%)	75(92.6%)	4(4.9%)	77(95.1%)
Increased concentration	45(55.6 %)	36(44.4%)	28(34.6 %)	53(65.4%)
Others	6(7.4%)	75(92.6%)	3(3.7%)	78(96.3%)

Table 3: Khat chewing behavior of Debre Berhan University students, Ethiopia, May 2014.

Pattern of khat chewing

Regarding the pattern of khat chewing, the minimum age for starting khat chewing was 13 years old. At the same time, the mean age at which the respondents started khat chewing was 18.4 (SD ± 2.3 years). It is clear from the table that the majority of students 33 (40.7%) chew khat in their friends' houses followed by in public places 18 (22.2%). Thirty four (42%) students who ever chewed khat said that it is easy to find khat and most of the chewers 64 (79%) bought khat directly from khat sellers. From 81 study participants who reported ever chewed khat, 34 (42%) believed that khat chewing is important for examination preparation followed by 31 (38.3%) for socialization. From 81 ever chewers 63 (77.8%) chewed with their friends.

Concerning the regularity of chewing Khat, 31 (38.3%) students said that they masticate khat in social occasions only, while 25 (30.9%) chew at weekends. When students were asked about timing of Khat chewing, 46 (56.8%) of them reported that they chew Khat in the afternoon. The mean time and money spent to chew khat per session was 4:20 hrs (SD ± 1.5) and 22.3 ETB (SD ± 10.3) (Tables 4 and 5).

Characteristics	Male n (%)	Female n (%)	Total n (%)
Place of khat chewing			
My house	8(9.9%)	2(2.5%)	10 (12.4%)
Public places	14(17.3%)	4(4.9%)	18 (22.2%)
Occasions	7(8.6%)	2(2.5%)	9 (11.1%)
My friend's house	23(28.4%)	10(12.4%)	33 (40.7%)
In university	5(6.2%)	1(1.2%)	6 (7.4%)
Others*	8(9.9%)	1(1.2%)	9 (11.1%)
Is it easy to find khat?			
Yes	25(30.9%)	9(11.1%)	34(42%)
Yes to some extent	26(32.1%)	7(8.6%)	33(40.7%)
No	11(13.6%)	3(3.7%)	14(17.3%)
Where do you get khat from?			
From sellers	52(64.2%)	11(13.6%)	63(77.8%)
Elder persons give me khat	1(1.2%)	1(1.2%)	2(2.5%)

I give money to somebody to buy	7(8.6%)	5(6.2%)	12(14.8%)
I take some from others	1(1.2%)	2(2.5%)	3(3.7%)
Characteristics	Male n (%)	Female n (%)	Total n (%)
First age to start chewing			
13-17 yrs	20(24.7%)	4(4.9%)	24(29.6%)
18-24 yrs	41(50.6%)	15(18.5%)	56(69.1%)
>24 yrs	1(1.2%)		1(1.2%)
Khat chewing time			
At evening	4(4.9%)		4(4.9%)
At noon	5(6.2%)	1(1.2%)	6(7.4%)
Afternoon	33(40.7%)	13(16.1%)	46(56.8%)
At night	24(29.6%)	6(7.4%)	30(37%)

Table 4: Pattern of khat chewing among students in Debre Berhan University, Ethiopia, 2014 (n=81).

Characteristics	**Male n (%)**	**Female n (%)**	**Total n (%)**
Frequency of khat chewing			
Daily	5 (6.2%)	2 (2.5%0	7 (8.6%)
Most of the week days	16 (19.8%)	2 (2.5%)	18 (22.2%)
Weekends	18 (22.2%)	7 (8.6%)	25 (30.9%)
In occasions	23 (28.4%)	8 (9.9%)	31 (38.3%)
Time spent per session			
1-4 hrs	34 (42%)	12 (14.8%)	46 (56.8%)
≥ 5 hrs	28 (33.3%)	7 (8.6%)	35 (42%)
Money spent per session			
<10 ETB	5 (6.2%)	2 (2.5%)	7 (8.6%)
11-20 ETB	30 (37%)	13 (16.1%)	43 (53.1%)
21-40 ETB	24 (29.6%)	4 (4.9%)	28 (34.6%)
>40 ETB	3 (3.7%)		3 (3.7%)
With whom do you chew khat			
Family	5 (6.2%)	2 (2.5%)	7 (8.6%)
Relatives	2 (2.5%)	1 (1.2%)	3 (3.7%)
Friends	48 (59.3%)	15 (18.5%)	63 (77.8%)
Alone	19 (23.5%)	3 (3.7%)	22 (27.2%)
Reason/s to chew khat			
Free of parental supervision	6 (7.4%)	2 (2.5%)	8 (9.9%)
Peer pressure	10 (12.4%)	5 (6.2%)	15 (18.5%)
For socialization	23 (28.4%)	8 (9.9%)	31 (38.3%)
For examination preparation	25 (30.9%)	9 (11.1%)	34 (42%)
For pleasure and recreation	12 (14.8%)	1 (1.2%)	13 (16.1%)
To kill time	4 (4.9%)	2 (2.5%)	6 (7.4%)
To increase academic	2 (2.5%)	0	2 (2.5%)
Performance			
To relieve stress & anxiety	20 (24.7%)	7 (8.6%)	27(33.3%)

Table 5: Pattern of khat chewing among students in Debre Berhan University, Ethiopia, 2014 (n=81).

Bivariate and multivariate analysis

Bivariate analysis revealed that gender of students, religion, current accommodation, income, years of study, school/faculty, having friend who chew khat, having family members who chew khat, alcohol use and cigarette smoking were associated with khat chewing (<0.25). In multivariate logistic regression analysis alcohol users were 2.5 times [AOR=2.5; 95% CI: (1.363, 4.599)] more likely to chew khat than their counterparts. Likewise, students whose friends chew khat were 6.89 times [AOR=6.89; 95%CI: (3.711, 12.801)] more likely to use khat compared to students whose friends do not chew khat. Students whose family members chew khat were 6.3 times [AOR=6.26; 95% CI: (2.665, 14.72)] more likely to chew khat than students whose family members do not chew khat (Table 6).

Variables	**Ever khat chewing**		**COR (95% CI)**	**AOR (95% CI)**
	Yes; n (%)	**No; n (%)**		
Sex				
Male	62 (15.38%)	212 (52.6%)	1.69 (0.96, 2.97)	1.26 (0.64, 2.49)
Female	19 (4.71%)	110 (27.31%)	1	1
Religion				
Orthodox	61 (15.13%)	286 (70.96%)	0.2 (0.09, 0.43)	0.85 (0.51, 1.42)
Muslim	16 (3.97%)	15 (9.94%)	1	
Accommodation				

Non-café	8 (1.98%)	11 (2.73%)	3.09 (1.2, 7.98)	1.53 (0.39, 5.88)
Café	73 (18.11%)	311(77.18%)	1	1
Friends chewing khat				
Yes	44 (10.92%)	32 (7.94%)	10.78 (6.1, 19.05)	6.89 (3.71, 12.8)*
No	37 (9.18%)	290 (71.96%)	1	1
Family members chewing khat				
Yes	24 (5.95%)	12(2.98%)	10.88 (5.15, 22.99)	6.26 (2.67, 14.72)*
No	57(14.14%)	310(76.93%)	1	1
Use of Alcohol				
Yes	39(9.68%)	65(16.13%)	3.67 (2.20, 6.14)	2.50 (1.36, 4.60)*
No	42(10.42%)	257(63.77%)	1	1
N.B. * shows p-value less than 0.05				

Table 6: Bivariable and multivariable logistic regression analysis of khat chewing among students in Debre Berhan University, Ethiopia, 2014.

Discussion

In this study, 20.1% of students self-reported that they had chewed khat once in their life time. This result was almost in line with previous study findings in Saudi Arabia secondary school students as reported by Ageely HM (21.4%) [14], Eastern Ethiopia as reported by Reda A et al. (24.2%) [22], Ethiopian students as reported by Zein Z (22.3%) [20], college students in Bahir Dar town (19.6%) [21] and a community based study done in Dera Woreda by Keleke A et al. (19.9%) [23]. But, the result of this study is much higher than the results reported among medical students of Addis Ababa University as described by Wakgari (7%) and in Addis Ababa governmental high schools as stated by Kassaye M et al. (9.2%) [13,15]. This might be due to time difference, study setting and difference in age group.

Conversely, our finding is lower than findings stated by Alsanosy RM et al, in higher education institution of Jazan region (24.8%) [5], study from Saudi Arabia secondary high schools mentioned by Mahfouz MS et al. (24.2%) [24], South Western Uganda reported by Ihunwo and Amadi (32%) [25], from Addis Ababa private and Butajira governmental schools (35.6% and 31%), respectively as mentioned by Kassaye M et al. [15], staff of Jimma University (46%) [26], Jimma city community (37.8%) [9], Jimma university students (33.1%) [16], Hosanna Health science students (27.7%) [17], southwestern Ethiopia (64.9%) [18], Arbaminch town (27%) [27], Adama University (40%) [10], Axum University students (28.8%) [19], and in four colleges of North western Ethiopia (26.7%) [28]. The possible reason might be due to their current accommodation that almost all of the students in this study area are using bed and food services in the university. Due to the presence of rules and regulations in the university that prohibit students from using khat and other substances might be protective. In most of the studies done in the above study areas; the students were attending their classes being non-café that might be a good opportunity for them to practice khat chewing freely. When we compare the previous study areas, in this study area regarding the source of khat; most of the former study areas or around them, khat plant cultivation might be common, but in this study area in most cases the source is from other areas brought by the sellers.

History of khat chewing by friends of the participants have statistically significant with khat chewing by the participants; students who had peer that chew khat were almost seven times more likely to use khat than their counterparts (AOR=6.893; 95% CI: 3.711, 12.801). This finding is similar with previous study findings by Mahfouz et al. [24], Reda A et al. from Eastern Ethiopia [22], Axum University [19] and Bahir Dar town colleges, Ethiopia [21]. This is a well-established fact that youth directly encourage their friends to imitate to their behavior; therefore students who chew khat, boosts their inexperienced peers to commit the same behavior.

History of family members chewing khat has statistically significant association with khat chewing practice; students with history of family members using khat were more than six times prone to chew khat than their complements (AOR=6.264; 95% CI: 2.665, 14.72). This finding was compatible with previous study findings from Jazan Region [24], Eastern Ethiopia [22], Axum University [19], North Western Ethiopia [28], Bahir Dar town colleges and Dera Woreda, Ethiopia [23]. This is because young people tend to imitate and exercise what they observe from their siblings and parents. Similarly, in this study young children illustrated mastication of khat during their development in their home from their elders and families.

Moreover, even if it was difficult to determine the temporal relationship, the study revealed that use of alcohol has statistically associated with khat chewing practice; students who drink alcohol were 2.5 times more likely to chew khat than those who do not drink (AOR=2.504; 95% CI=1.363, 4.599). This association was also reported by study done in Arbaminch town and Addis Ababa University medical students, Ethiopia [13,27].

When we see the pattern of khat chewing among the study participants who chewed khat in this study, the majority 33 (40.3%) of khat chewers were chewing khat at their friends' houses followed by in public places 18 (22.2%). The result is different from the findings reported by Alsanosy and his peers in Jazan region [5] that most (43.8%) of the participants chewed khat in their houses. This might be due to that the participants in the previous study area were using dormitory services in their home that gave them a good opportunity

for chewing at their home freely. Similarly, in our study setting most (85%) students reported that they can find khat easily, which is almost consistent with the study done in Jazan higher education [5]. This shows that khat is available for students who want to chew. Most of the chewers (78%) bought khat from khat sellers which show that students have an access and are free to buy as well as to chew without any degradation. This result is almost the same as the study finding reported by Alsanosy [5]. Regarding the time of khat chewing, most of the students (57%) were chewing khat in the afternoon which was different from the result found in Jazan higher education research that most of them chewed at night [5]. This could be due to that most of the students in the previous study area chewed at their home. We can understand that most of the working time (learning class sessions) is lost by chewing khat in the afternoon; as a consequence poor academic performance may occur [11]. During khat chewing the range of time spent among the participants was 1-10 hrs and most of them (57%) spent <5 hrs per session. This result is less than the study done in Jazan which was between 6 and 9 hours [5]. The main reason for khat chewing among the respondents was for examination preparation 34 (41.9%) followed by socialization which shows that students need to use khat to be alert during examination time. Knowing patterns of khat chewing among students is important for planning institution based intervention programs.

Study Limitations and Strengths

Strengths

Having high response rate and its being the first study that included pattern of khat chewing in Ethiopia could be considered as the strengths of this study.

Limitations

This study did not assess the cause and effect relationship between khat chewing and alcohol use as it is one of associated factor. It is also impossible to generalize the result to the whole young people, because the study involved only university students. Absence of qualitative data also considered as limitation of this study.

Conclusions and Recommendations

We can conclude that significant number of students are chewing khat in Debre Berhan University. The predominant factors associated with khat chewing were having family and friends using khat, and students who use alcohol. The pattern of khat chewing among students was not restricted by social regulation mechanisms, however, seems social norm. Therefore, communities in the University, especially instructors should strictly follow their students behavior whether they attend their classes regularly or not with a great attention on students who repeatedly absent from their classes in the afternoon. Parents should be role models to their children via avoiding risk behavior including khat chewing. Moreover, peer to peer health education is important to teach students about the ill health effects of chewing khat, time waster nature of khat, effects of khat on academic performance and the bad consequences of risk behaviors.

Author Contributions

EA conceived, designed and analyzed the data. BTD Wrote the first draft of the manuscript. GA, GH and WA made critical revision and approved final version: All authors reviewed and approved the final version of the manuscript.

Competing Interests

We, the authors, declare that we have no competing interests.

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