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Prevalence and Associated Factors of Khat Chewing among Undergraduate Students in Wolaita Sodo University: A Cross Sectional Study

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Abstract
Background- Khat is currently recognized as one of the substances that are of concern in Ethiopian universities. However no studies have been conducted to investigate the habit in the study area. **Objectives:** To assess the prevalence of khat chewing and associated factor among undergraduate students of Wolaita Sodo university. **Methods**- A cross-sectional study was conducted among 527 students. Multistage sampling technique was used to select the study participants. Data entry and cleaning were done using EPIINFO Version 7 statistical software and analyzed using SPSS software package version 16.0. Descriptive statistics were done to describe the study population. Bivariate and multivariate analyses were employed to identify factors associated with khat chewing. Odds ratio with 95% confidence interval was computed to assess the level of association and statistical significance.**Result:** The prevalence of khat chewing among undergraduate regular students was 28.2% ,[95%CI(26.40%-30.16%)] Being male[AOR=2.12, 95% CI (1.27-3.51)], attained high school in urban area [AOR=1.63,95%CI(1.02-2.62)], year of study except second year [AOR=2.87,95%CI(1.59-5.17), AOR=2.09,95%CI(1.12-3.95), AOR=4.77,95%CI(1.39-16.30)] having family member who chew khat [AOR=2.28,95% CI=(1.41-3.72)], khat chewing practice common in their village[AOR=1.85,95% CI=(1.13-3.03)] were found to be significantly associated with khat chewing. **Conclusion**:-The prevalence of khat chewing is high among undergraduate students of Wolaita Sodo University. Therefore university authority needs to work in collaboration with the surrounding community and responsible public authorities in addition to provision of guidance for the students on the prevention and risk of khat chewing.
Keywords: Khat, University student, Ethiopia.

Introduction

Khat (Catha edulis) is a large green shrub that grows at high altitude in the region extending from eastern to Southern Africa, as well as on the Arabian Peninsula; mainly in Ethiopia, Somalia, Kenya, Malawi, Uganda, Tanzania, Congo, Zambia, Zimbabwe, Afghanistan, Yemen and Madagascar(1,2) . Khat leaves mainly contain naturally occurring alkaloid amphetamines (cathinone and cathine) and the leaves of khat are chewed by the people for its pleasurable stimulant action (3, 4). Khat chewing is believed to be rapidly increasing worldwide. Worldwide, it is estimated that 10 million people consume khat daily, predominantly living in the horn of Africa and the Arabian Peninsula, most notably including Ethiopia, Somalia, and Yemen (5). Moreover, khat chewing among college students ranges from 19% in Saudi Arabia to 54% in Yemen (6)

In Ethiopia, khat commonly used for social and religious purpose. Furthermore, it considered as a recreational substance (7). In addition, Khat is currently recognized as one of the substances that are of concern in Ethiopian universities. The prevalence of khat among undergraduate medical students of Addis Ababa University; 14% (8), in Diredawa among high school students, 18.4% (6) and in Harer among high school students was 24.2% (9). Despite its popularity, there is limited evidence of the adverse effects of habitual use of khat on mental, physical and social well-being.

Mentally and physically, it leads to problems like depression and anxiety, psychosis, impotence, cardiovascular events, liver failure and stomach ulcers among others (10). Moreover, Khat has implication at house hold level; khat divert household income that could have been used for nutritious food, home improvement, education or other family needs to purchase khat that causes financial problem and family breakdown (11) and Socially, Khat chewers spent long hours to chewing and then recovering from chewing; this causes absenteeism from Work, a barrier to obtaining employment and lack of integration of khat-consuming communities (12). Furthermore, it has implication on use of drugs and/or alcohol, smoking cigarette and sexual risk behaviors (13). In addition, khat chewing is frequently associated with absenteeism from class and poor academic performance of the students (14) and khat chewers had significantly higher mortality rate due to chronic illness; such as, heart disease and stroke compared with non-khat chewers (15).

Factors associated with khat chewing include demographic and social factors like peer influence and residence. In addition, studies show that gender and age are closely linked to lifestyle and the use of khat (5). Moreover, a

cross sectional study conducted in Debre Markos college student showed that chewing of khat were factor predisposing out-of-school youths to HIV/AIDS related risky sexual behavior (16). It has been learned from the previous studies that khat chewing behavior among university students show substantial variation with context. Similarly, the factors that contribute significantly to the khat chewing behavior are different between previous studies.

In spite of its serious consequences khat chewing is a common practice among university students. But studies on its magnitude and associated factor are scarce in the study area. Therefore, this study aims to determine the magnitude of khat chewing and associated factors among Wolaita Sodo University students. Hence this study provides information for public health policy, prevention and for planning.

Method and Materials

Study setting and period

The study was conducted at Wolaita Sodo University from February, 2015 to April, 2015. Wolaita Sodo University is one of the 32 public universities in Ethiopia and the university is located 384 km south of the capital city of Addis Ababa and 155 kilometer southeast of Southern Nations Nationalities and People Region state (SNNPR) capital city Hawassa. The university has around 10,956 regular undergraduate students at the time of the study. More than 90% of the students use the full boarding on campus services, accommodation, and meal provided by the university. Khat chewing in the university campus is prohibited.

Study design, participants and sample selection

An institution based cross-sectional study design was conducted. The study population included all randomly selected regular undergraduate students and exclude those who are absent or dropped out during the day at the time of data collection were exclude. Sample size was calculated by using single population proportion formula with the following assumptions: proportion of khat chewing is 31% (16), margin of error 5%, Confidence level of 95% , Design effect 1.5, N-population size of 10,956, Considering 10% non-response rate. The sample size(n) was calculated by Open Epi, Version 2 software (Sample size n = [DEFF*Np(1-p)]/ [$(d^2/Z^2_{1-\alpha/2}$*(N-1)+p*(1-p)] . The calculated sample size was 527.

Multistage sampling technique was used to select the study participants. From total of 39 departments in the university 15 departments were selected by simple random sampling technique, further stratification was done based on the year of study. The study participants were selected by lottery method from each year of study. To select study participants from each year of study, the list of student's name in their respect batch was used as a sampling frame and to determine the number of students from each year proportionate allocation to their size was used. Data was collected using pre-tested structured and self-administered questionnaire, which was prepared in English and then translated to local language (Amharic) which most students could understand. The questionnaire was developed after extensive review of literatures and similar study tools.

Data management and analysis

The completed questionnaire were coded and entered to EPI Info version 7 and then exported and analyzed in SPSS version 16. Furthermore, it was checked & cleaned for its completeness and errors in coding and entering before analysis. Bivariate and multivariate analyses were employed to identify factors associated with khat chewing. Odds ratio along with 95% confidence interval was computed to assess the level of association and statistical significance.

The independent variables that showed statistically significant association with khat chewing at $p< 0.05$ in the bivariate analysis was retained for further Multivariate analysis using logistic regression analysis to control confounding variables and to predict independent factors associated with khat chewing. Descriptive statistics was computed for the study variables and frequency distribution tables were used to describe most of the findings.

Operational definition

Current prevalence of chewing: The proportion of the study population, who were chewing khat within 30 days preceding the study,

Ever chewer: An individual is considered an ever chewer even if he/she had chewed at least once in his/her lifetime

Ethical consideration

The study was approved by Ethics review board of Wolaita Sodo University, school of public health, College of Health Science and Medicine. Verbal consent was taken from the students to confirm whether they are willing to participate or not. Those not willing to participate were given the right to do so. Confidentiality of the responses was ensured throughout the research process by gathering participants in different classes.

Result

Socio - Demographic Characteristics of Respondents

A total of 527 students completed the questionnaire, 514 students' completely filled questioners, giving a response rate of 97.5%. Thirteen filled questionnaires were discarded due to data incompleteness. The mean age of the students was 21.91±2.2 years and 72.2% (371) of the respondents were male. The majority of the respondents 25.5% (131) were Oromo ethnic group and 41.2% (212) were orthodox Christian by religion (**Table 1**).

3.2. Prevalence of khat chewing practice

The prevalence of khat chewing practice among Wolaita Sodo university students was 28.2% at 95% CI (26.24% - 30.16%), of which 31.8% (118) were male students. It was found that 19.3 %(28) of the respondents chewed khat at least once in their life time (ever chewer). Among all respondents 80.7% (117) were chewing khat in the past one month at the time of study (current khat chewer) among them 84.6% were male students. Nearly one third of khat chewer 31% (45) were from third year and 71.7% (104) of students attained high school in urban area. More than one third 39.3% (57) of khat chewers were chew khat greater than three days per week (>3 days/week). The amount of khat consumed at a time was estimated per cost in birr and 77.2%) (112) of chewer consumed khat that costs 16-25 birr per ceremony. This indicates that money spent by students for khat is high. Very few families can afford for this expense. When these students have no money to buy khat, they could be engaged in criminal activity (**Table 2**).

3.3 Reasons for khat chewing

Multiple responses were obtained as reasons for khat chewing among respondents who already started khat chewing. The reasons reported for khat chewing among khat chewer in this study were; 44.1%(64) to relieve tension, 37.2% (54) to work long hour without getting tired, 16.6 (24) to make friendship, 2.1%(3) for prayer and other reason like to kill time and to reduce physical fatigue and to get energy (**Figure 1).**

3.3. Factors Associated with khat chewing practice

3.3.1. Bivariate analysis

Bivariate analysis was conducted for socio demographic variables, monthly pocket money, year of study and type of high school attended. Bivariate analysis shows sex, attained high school, year of study, availability of khat in the village, member of family chew khat, amount of pocket money and parent education level were statistically significant association with khat chewing practice. Those variables which were with p –values less than 0.05 at bi-variate logistic regression were included in multiple logistic regressions (**Table 3**).

3.3.2. Multivariate analysis

The result of multiple logistic regression model showed that males were 2.12 times more likely to chew khat [AOR=2.12, 95% CI : (1.27 - 3.51)] compared to female, those attained high school in urban area were 1.6 times more likely to chew khat [AOR=1.63, 95% CI: (1.02-2.63)] compared to rural area. Respondents year of study except for second year [year two AOR=1.49, 95%CI: (0.82-2.72), year three AOR=2.87, 95% (1.59-5.17), year four AOR=2.09, 95% CI (1.10-3.95), year five AOR=4.77, 95% CI: (1.39-16.33)] more likely to chew khat compared to first year students. Respondents who had family member who chew khat were 2.14 times more likely to chew khat [AOR=2.14, 95% CI:(1.31-3.47)] compared to those who didn't have chewer family member and those with khat chewing practice common in their village 1.9 times more likely to chew khat [AOR=1.96, 95% CI:(1.20-3.19)] compared to those who didn't have khat chewing practice in their village (**Table 4**).

Discussion

This study showed that the prevalence of khat chewing among undergraduate students of Wolaita Sodo University was 28.2% at 95% CI (26.24% - 30.16%). This finding was almost in line with previous study finding in Jimma city, south western Ethiopia, Eastern Ethiopia high school, Asendabo town, south western Ethiopia youth and Axum university students (17, 18).

On the other hand this finding was higher than study finding in Dire Dawa High school student, Addis Ababa University under graduate medical student and Saudi Arabia College and secondary (High) school students of Jazan region (6, 19). This difference may be because of students' residence; in this study majority of students attained high school in urban area which is an important risk factor. The second reason might be due to sex distribution of students; in this study nearly three fourth of students were male which is also risk factor.

Gender has statistically significant and strong association with khat chewing; males were 2.12 times more likely to chewing khat than female [AOR=2.12, 95% CI (1.27- 3.51)].This finding was supported by similar study finding in southern Ethiopia, Axum university, college and secondary (high) school of Jazan region Saudi Arabia and Somali-Australian (6, 20).This may be due to cultural restriction of; meaning female are more culturally

restricted from exposure to khat chewing than male. Moreover, having someone in the family who chew khat has statistical significant and strong positive association with khat chewing practice; students with parental model (parent/family member used khat) were more than two times prone to khat chewing than their counter parts [AOR=2.14 ,95% CI(1.31-3.47)]. This finding was in agreement with a previous study finding in Axum University, Ethiopia and Jazan Saudi Arabia (20).This is because young people tend to imitate and exercise what they observed from their parents and family member. In addition youth used khat to socialize with their family member (11).

Place of residence when attending high school had also association with khat chewing. Those attained high school in urban area were 1.6 times more likely to chew khat [AOR=1.63, 95% CI (1.02 - 2.62)] compared to those attend high school in rural area. This finding was opposite with the study finding among students of higher education in Jazan region, Saudi Arabia this difference may be due to the more liberal lifestyle in urban area compared to cultural conservatism in rural area and may also be attributed to easiness of reporting chewing khat by urban adolescent than rural residence (20). In addition, availability of khat chewing practice in the village has statistical significant and associated with khat chewing practice; those with khat chewing practice common in their village 1.96 times more likely to chew khat[AOR=1.96,95% CI (1.20 - 3.19)] compared to counter parts. This is in agreement with studies conducted in Kenyan secondary school (21) and positively associated with students' abuse substance in Axum University (22).Respondents' year of study (except second year students) had statistical significant and positive association with khat chewing practice; [AOR=1.49,CI(0.82-2.72),AOR=2.87,CI(1.59-5.17),AOR=2.09,CI(1.10-3.95), AOR=4.77,CI(1.39-16.30)] compared to first year students. This finding was in agreement with a previous study finding in Axum University, Ethiopia and Jazan Saudi Arabia (20).The reason may be due to the fact that as year of study increases students become hopeless and get in to depression so that they may tend to chew khat to get relived from depression mood.

Limitation of the study

The study was school based; therefore preclude generalization to all youth in Ethiopia indicating a need for further study using a more representative sample of youth in Ethiopia.

Conclusion

In general, the prevalence of khat chewing among Wolaita Sodo University undergraduate students was high. Khat chewing is significantly associated with being male, attained high school in urban area, having family member who chew khat, students year of study, availability of khat chewing practice in the village. This finding indicates that to create awareness among university students about khat chewing consequences. In addition, family khat use should also be addressed in adolescent khat use prevention programs.

Recommendations

Khat chewing among university students demand special attention therefore; the university authority should inform their students about the health and socio - demographic problem associated with khat chewing. Moreover, the university should teach and council their students on ways of coping with the problem rather than starting chewing khat. In addition, parents or family members should be role models to their children by not chewing khat. Furthermore, the university authority needs to work in collaboration with the surrounding community and responsible public authority in addition to provision of guidance for the students on the prevention and risk of khat chewing.

Authors Contributions

Meron Moges: Conceived the study, Obtained ethical clearance and permission for study, Participated in the design of the study and performed the statistical analysis,

Honegne Nahosenayi: Guided the research, involved in the design of the study and performed the statistical analysis,

Getu Gamo: Involved in the design of the study and statistical analysis and drafting the article or revisiting it critically for important intellectual content: All authors read and approved the final manuscript.

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Table1. Socio-demographic characteristics of Wolaita Sodo University students (n=514), Southern, Ethiopia, February, 2015.

Variable	Number	Percent
Sex		
Female	143	27.8
Male	372	72.2
Age		
17-19years	29	5.6
20-24years	458	89.1
>25years	27	5.3
Level of education		
1st year	123	23.9
2nd year	139	27
3rd year	118	23
4th year	107	20.8
5th year	27	5.3
Attained high school		
Urban	325	63.2
Rural	189	36.8
Parent residence		
Urban	233	45.3
Rural	281	54.7
Ethnicity		
Wolaita	105	20.4
Sidama	74	14.4
Oromo	131	25.5
Amhara	110	21.4
Other	94	18.3
Amount of pocket money		
50 - 200birr	302	58.9
201 – 400birr	92	17.9
401 – 600birr	112	21.8
>600birr	7	1.4

Table 2. Prevalence of khat chewing among respondents in Wolaita Sodo University, Feb, 2015

Variable	Number	Percent
Sex		
Female	27	18.6
Male	118	81.4
Current chewer		
Female	18	15.4
Male	99	84.6
Ever chewer		
Female	9	32.1
Male	19	67.9
Age		
17-19years	1	0.7
20-24years	132	91
>25years	12	8.3
Level of education		
1st year	28	19.3
2nd year	34	23.4
3rd year	45	31
4th year	30	20.7
5th year	8	5.5
Religion		
Orthodox	53	36.6
Protestant	44	30.3
Muslim	39	26.9
Catholic	6	4.1
Other	3	2.1
Attained high school		
Urban	104	71.7
Rural	41	28.3
Amount of money to buy khat		
<15 birr	20	13.8
16 – 25 birr	112	77.2
>25 birr	13	9
Frequency of khat chewing		
Daily	18	12.4
>3 days per week	57	39.3
1 – 3 days per week	34	23.4
Occasionally	36	24.8

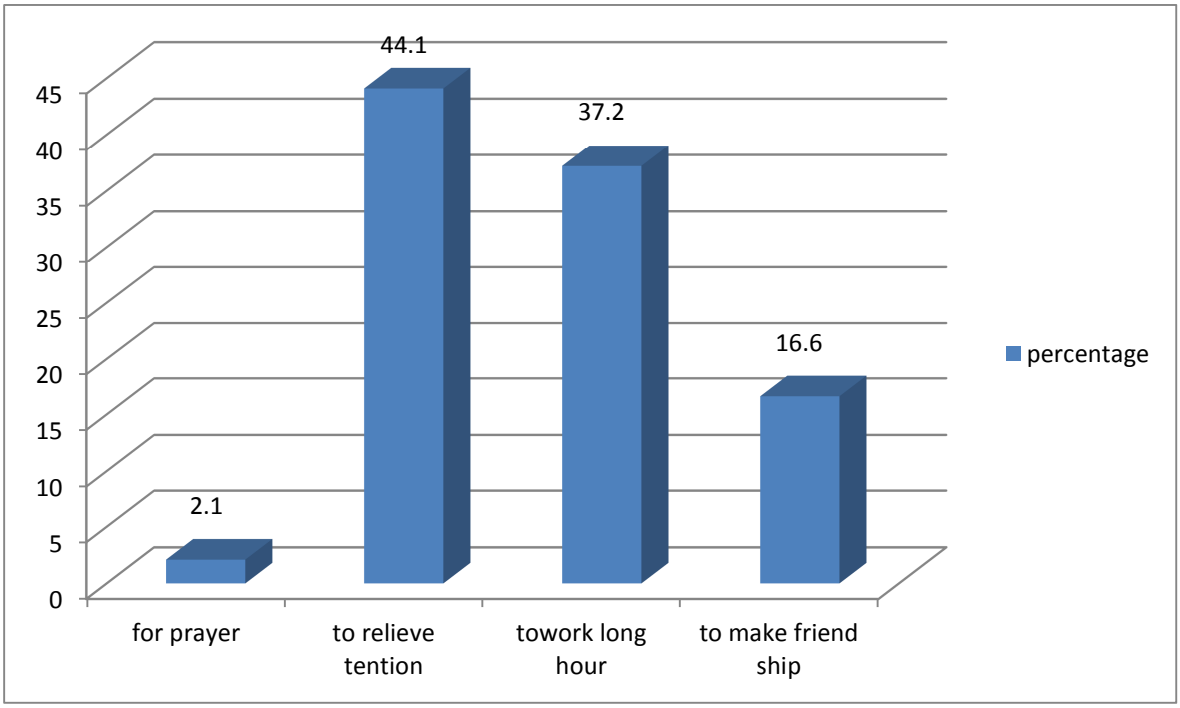

Figure 1. Figure showing reason for khat chewing practice among respondents in WSU, February 2015.

Table 3: Bivariate analysis of factors associated with khat chewing practice among undergraduate regular students at Wolaita Sodo University, Southern Ethiopia, February 2015 (n = 514).

Variable	Khat chewing		COR (95% CI)
	Yes	No	
Sex			
Male	118	253	2.04(1.25-3.21)*
Female	27	116	1
Age			
17-19years	1	28	0.05(0.23-1.11)
20-24years	132	326	0.51(0.01-0.38)
>25years	12	15	1
Level of education			
1st year	28	124	1
2nd year	34	104	1.45(0.82-2.55)
3rd year	45	71	2.81(1.64-4.88)*
4th year	30	64	2.08(1.14-3.77)*
5th year	8	6	5.91(1.89-18.37)*
High School			
Urban	104	221	1.69(1.12-2.58)*
Rural	41	148	1
Amount of pocket money			
50 - 200birr	59	243	1
201 – 400birr	26	66	1.62(0.95-2.77)
401 – 600birr	60	52	4.75(2.98-7.59)*
>600birr	0	7	0.00
Parent residence			
Urban	73	160	1.32(0.90-1.95)
Rural	72	209	1
Family chew khat			
Yes	66	84	2.84(1.89-4.26)*
No	79	285	1

Table 3 continued….

Live with attaining high school			
With parents	102	288	1
Alone	30	52	1.63(0.99-2.69)
Friend	12	29	1.17(0.58-2.38)
Other	1	0	4.56
Khat common in Village			
Yes	68	102	2.31(1.55-3.44)*
No	77	267	1
Educational level of father			
Illiterate	9	49	1
Literate	135	318	2.31(1.10-4.84)*
Educational level of mother			
Illiterate	41	142	1
Literate	104	227	1.59(1.05-2.41)*

*statistically significant at p<0.05

Table 4: Multivariate analysis of factors associated with khat chewing practice among undergraduate regular students at Wolaita Sodo University, Southern Ethiopia, February 2015 (n = 514).

Variable	**Khat chewing**		**COR (95% CI)**	**AOR (95% CI)**
	Yes	**No**		
Sex				
Female	27	116	1	1
Male	118	253	2.01(1.25-3.21)	2.12(1.27-3.51)*
Attained high school				
Urban	104	221	1.69(1.12-2.56)	1.63(1.02-2.62)*
Rural	41	148	1	1
Level of education				
1st year	17	110	1	1
2nd year	33	98	2.81(0.82-2.55)	1.49(0.82-2.72)
3rd year	49	69	4.59(1.61-4.89)	2.87(1.59-5.17)*
4th year	32	79	2.62(1.14-3.77)	2.09(1.10-3.95)*
5th year	14	13	6.97(1.89-18.34)	4.77(1.39-16.30)*
Family chew khat				
Yes	66	84	2.84(1.84-4.26)	2.14(1.31-3.47)*
No	79	285	1	1
Khat common in village				
Yes	68	102	2.31(1.55-3.44)	1.96(1.20-3.19)*
No	77	267	1	1

*statistically significant at p<0.05