



# Prevalence and Correlates of Khat (*Catha Edulis*) Chewing Among Dilla High School Students at Dilla Town, South Ethiopia, 2020: A Cross Sectional Study

Yetayal Berhanu Wolde\*, Alem Eskeziya Ayenalem

Department of Psychiatry, college of health science and school of medicine, Dilla University, Dilla, Ethiopia

## ABSTRACT

**Introduction:** *Catha edulis* (khat) plant is an evergreen tree. In Ethiopia khat (*Catha edulis*) is commonly used for social and religious purpose. It is widely abused in East Africa in general and in Ethiopia in particular for various purposes. Khat chewing has negative influence on the physical, psychological, physiological and economic well-being of the community. However, only few studies are available on prevalence of Khat chewing and its determinants in Dilla, Town; South Ethiopia. So the aim of this study is to minimize this gap by assessing Prevalence of Khat (*Catha edulis*) Chewing and Its determinants Among Dilla High School Students at Dilla Town, South West Ethiopia from April 1-30 2020.

**Methods:** Quantitative school based cross-sectional study design was employed. The data were collected by using a self-administered questionnaire on a total of 332 students of grade 9th-12th using stratified sampling procedure. Descriptive statistics was done to summarize the dependent and independent variables. Data analysis was done by using SPSS version -20. Multiple logistic regressions were used to test the association between determinants & chat chewing, and P-value of  $<0.05$  was considered as statistically significant.

**Result:** In this study, it was found that 102(30.72%) at 95% CI (28.02, 34.01) of studied participants chewed khat in their life time. Among those 98(29.52%) at 95% CI (24.08, 38.01) of them have chewed in the past 3 months and out of those, 92(27.71%) of them have chewed in the last 30 days. The current prevalence rate of khat chewing from the total respondents was 27.71%.at 95% CI (11.02, 28.01) being follower of Muslim religion (Std.β =3.31, 95% C.I.:2.4, 5.82), having friend who chews khat (Std.β =3.91, 95% C.I.:1.53, 4.45) and having family who chews khat (Std.β =1.91, 95% C.I.: 1.53, 2.29) were factors independently associated with chewing of khat of respondents.

**Conclusion and Recommendation:** one third of the respondents chewed khat in their life and current time. Health education should be provided to students about the adverse effects of khat by invited psychiatric professionals of Dilla University Referral Hospital. Minister of Education in collaboration with Ministry of Health has to work to incorporate life skill training in high school students' curricula.

**Keywords:** Dilla; Cathinone; Khat; South Ethiopia; Prevalence; correlates; High school

## INTRODUCTION

Khat is a natural stimulant from the *cathaedulis* plant found in the flowering ever green tree, or large shrub of Celastraceae family, which grows mainly in Ethiopia, Kenya and Yemen and at high altitude areas in South Africa and Madagascar. The plant is known by different names in different countries. . like Khat, Qat , mirro, Quad or Joad in Ethiopia, Yemen, Kenya & Somali [1,2] respectively. But in most of the literature it is known as Khat. The active ingredient of khat responsible for its psycho stimulant effect

is an alkaloid chemical known as cathinone, which is structurally and chemically similar to amphetamine, and cathine, a milder form of cathinone. Cathinone is a highly potent stimulant, which produces central nervous system stimulation analogous to the effect of amphetamine. Fresh leaves contain both ingredients; those left unrefrigerated beyond 48 hours would contain only cathine, which explains users' preference for fresh leaves. Khat loses its potency after 48 hours. The results of various in vivo and in vitro experiments indicate that the substance could be considered as a "natural amphetamine" [1].

\*Correspondence to: Yetayal Berhanu Wolde, Department of Psychiatry, college of health science and school of medicine, Dilla University, Dilla, Ethiopia, E-mail: yetalb@yahoo.com

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All over the world it is estimated that more 10 million people chew khat leaf daily. Many of the users originate from countries between Sudan and Madagascar and on the South western part of the Arabian Peninsula especially Yemen [3]. In khat growing countries, the chewing of khat leaves for social and psychological reasons has been practiced for many centuries and its use has been gradually expanded to many countries worldwide. Chat chewers report that chewing khat gives increased energy levels, alertness and confidence, a sense of happiness, better thinking capacity and creativity, facilitation of communication ability, enhanced imaginative ability and the capacity to associate ideas [3,4].

Although khat has an extreme social nature (individual feelings of sociability in social gatherings), it influence physical and psychological functions. Its psychic influence depends on its active ingredients that have stimulating and euphoric effect. And the medical and psychosocial effects of khat chewing depend on its capacity to lead to dependency (addiction) and to specific physical and behavioral effects, including socioeconomic consequences for individuals and the community [5,6].

Many studies in Africa and outside reveal that the current prevalence and life time prevalence of khat chewing in high school, college and university students vary from place to place. These could be explained as among high school and college students in in Jazan, Saudi Arabia was (21.4% and 49.4%) (life time and current), (15.2% and 44.40%) (life time and current) respectively [7], among high school students in South Western Ethiopia was 64.9% (current) of which 55% were female students and 71.6% were male students (8), among 479 medical and paramedical students Boarding College in North West Ethiopia was 22.3% [3], among students of the college of medical sciences in north western Ethiopia was 23% [8], Among high school students in Gonder town, North West Ethiopia was 37.7% (lifetime chewers) & 31.4% (current chewers) and among high school students in North West Ethiopia was 26.7% (life time) [9]. The above mentioned investigators findings depicted that there were many factors associated with khat chewing among students. Of which, most studies [10-11] showed that being male, having peers who chewed khat, having family members who chewed khat, residence place, religion and seniority in the case of college/university students were statistically significant. Khat chewing nowadays has become an epidemic over East Africa especially in Ethiopia, Somali and southern Arab from the old to young, male and female, urban and rural settings [12]. Moreover, many adolescents have low knowledge towards adverse effects of khat chewing as indicated in literature [12,13].

Although the studies carried out in different parts of the countries revealed that the prevalence of khat use in adolescence are high having adverse effect on the health of individuals and social life of users. And its impact on students (young segments of the population) also increases nowadays. Khat chewing is a leading to subsequent substance abuse disorder which intern result in withdrawal from their academic training and affect their economic and social life. Although khat chewing is a wide spread problem among high school students of Ethiopia with negative consequences on their health, academic achievement, their hope to be productivity and socio economic development of the country, few studies were done on its magnitude and determinants among high school students of southern Ethiopia generally and in Dilla specifically despite there is abundant cultivation and day today observation of chewing in urban. Therefore this study was designed to determine the magnitude and determinants of Khat

chewing among Dilla high school students in south Ethiopia from April 1<sup>st</sup>-30<sup>th</sup> 2016. The finding of this study will be disseminated to Dilla high school director office and will provide information to policy makers to take intervention action and also to health professionals to give health education for students on the adverse effects and preventive aspects of the Khat. The finding of this study also will be used to lead for intervention by communicate with the responsible body, like Dilla police when khat chewing house are present around school and student family to teach the student that are exposed to khat chewing

## METHODS AND MATERIALS

### Study Design and Setting

The study was conducted from April 1<sup>st</sup> - April 30<sup>th</sup> 2016 at Dilla High schools of Dilla Town which is located to southern at a distance of 359km from A.A, which is the capital city of Ethiopia and 90km from Hawassa to southern, which is the regional city of SNNPR. It is located on the road between the city of Hawassa and Moyale; Oromiya region. There are five high school in Dilla town those are Dilla' Dama, Donbosco Hanbule and Woinshet Secondary School. Among those the study was conducted in Dilla high school students selected randomly by lottery method. The administrative servant is 19 males and 14 females with total of 33 administrative servants. The total students in the school were 3414 with males (2277) and females (1137). The total number of grade 9 students were 1427 with male 807 and with female 620 and the total number of grade 10 students were 1987 with male 1470 and female 517.

### Study Variable Measurements

Two categories of variables were used in this study. The dependent variable was khat chewing status of the students. Ever chewed was defined as a student who had ever tried chewed khat in the past, even once. Current chewer was defined as a student who had chewed khat on one or more days in the preceding month (30 days) of the survey. The former is said to be life time prevalence, whereas the latter one is current prevalence rate. Independent variables were; age, sex, grade, residential area, having family/peer/relative chewers, religion and others.

### Sampling Procedure

Representative sample of 332 randomly selected students from grade 9 and grade 10 students after stratified sampling was done were included in this study. The sample size was determined using single population proportion formula by taking 28.4% of study participants chew khat as a previous study done in jimma high school students in 2014 revealed, at 95% confidence level and considering and a 5% margin of error and non-response rate. Students who were sick were excluded from the study.

### Data collection procedure

The English version of self-administered structured questionnaire was developed by the investigators adapting from literatures. Then it was translated to Amharic language which is the official working language of the study area (Ethiopia). The consistency of the translation from English to Amharic was checked by English teachers in Dilla high schools. Before start of data collection, 5 peoples were recruited from Dilla Referral Hospital for data collection. Of

whom 2 were psychiatry nurses and 2 were administrative staffs and the one was supervisor. To keep the quality of data, data collectors and supervisor were given training for one day regarding necessary explanations about the research and how to answer for any questions that arise from the respondents. Pre-test was done on 25 students who were not included in the study

### Statistical Analyses

Data were cleaned, coded and entered into Epi data version 3.1. Then these data were exported to SPSS version 20. for analysis. Descriptive statistics such as frequency, percentage, mean, standard deviation were calculated for some variables. Data presentation was done using frequency distribution tables. Generalized linear model (GLM) called logistic regression was used to identify factors affecting khat chewing behavior of students. Coefficients of binary logistic regression were estimated by Wald statistics. Odds ratio [expo ( $\beta$ )] of logistic regression coefficients indicate the chance of increasing (OR>1) or decreasing (OR<1) of khat chewing when treated with different explanatory variables. The cutoff point for bivariable logistic regression was declared at  $p < 0.25$  to include variables in multivariate logistic regression. Statistical significance is confirmed at  $p$  value less than 0.05.

### Ethical Approval

The study was conducted after getting official permission from department of psychiatry and communicated with the manager of school of health science and dean of the college of health science and medicine of Dilla University Which was obtained from research and ethical review committee of Dilla University. The date collection was performed after I get verbal consent from each respondent. Similarly the confidentiality of the respondent was maintained and any information that they were given me was used for study purpose only.

## RESULTS

### Socio demographic characteristics of studied participants

A total of 332 questionnaires were distributed, of which all of them were filled consistently and completely with response rate of 100%. 147 (44.28%) of the samples were males and the remaining 185 (45.72%) were females. Around 249 (75%) of the respondents were Gadio followed by Oromo 30 respondents. Out of the total respondents 178 (53.9%) were protestants followers, followed by 67 (22.4%) Orthodox and the rest 53 (16.1%) were Muslim. Out of the total respondents 90.36% were single, 7.53% were having girl friend and the remaining 2.1% were married. From the total 332 respondents, 271 (81.6%) lives with their family followed by with brothers or sisters 48(14.46%) and (1.81%, 1.5%) were with relatives and alone respectively (Table 1).

### Practice of khat chewing of respondents

Among 332 of respondents 102 (30.72%) of them chewed khat in their life time. Among those 98 (29.52%) of them have chewed in the past 3 months and out of those, 92 (27.71%) of them have chewed in the last 30 days. The current prevalence rate of khat chewing from the total respondents was 27.71%. Among the respondents who chew khat, 35 (34.3%) of them take the khat for academic achievements. Among all the khat chewers, 22 (21.5%) were chew khat for personal pleasure and 10 (9.8%) chew khat to

**Table 1:** Socio demographic characteristics of the respondents of Dilla school students, Dilla town, South, Ethiopia, June 2020.

Variable		Frequency	Percentage	
Sex	Male	147	44.28	
	Female	185	45.72	
Age in years	14-18	266	80	
	19-23	66	20	
Ethnicity	Gadio	249	75	
	Amhara	23	6.5	
	Tiigray	10	3	
	Siltie	13	3.5	
	Oromo	30	9	
Religion	Others	10	3	
	Orthodox	67	22.4	
	Muslim	53	16.1	
	Protestant	178	53.9	
	Catholic	24	7.2	
Grade	Others	10	3.1	
	9	139	41.8	
	10	193	48.2	
	Marital status	Single	300	90.36
		Having girl friend	25	7.53
Married		7	2.11	
Living whom	with Alone	5	1.5	
	Parents	271	81.63	
	Brother/sister	48	14.46	
	With relatives	6	1.81	
	With others	2	0.6	

socialize with their friends. And 12 (11.76%) chew to get relief from stress, and 19 (18.63%) chew khat to pass time or recreational purpose. And 4 (3.92%) chew khat without any known reason (Table 2).

### Bivariate and Multivariate Analysis

Multivariate analysis was employed to assess the net effect of socio-demographic, explanatory variables on khat chewing. The result of binary logistic regression model revealed that respondent's sex, place of residence and having chewer friends significantly associated with khat chewing. Sex was found to be one of the associated factors for khat chewing among Dilla preparatory and high school students. Male students were 2 times more likely to chew khat than female students [Adjusted OR = 2.15, 95% CI = (1.02, 4.56)]. Student's residential place was found significant with khat chewing. Those students who come from urban area were almost 2 times more likely to chew khat than students from rural areas [Adjusted OR = 1.89, 95% CI = (0.95, 3.79)]. Having chewer friend was one of the factors which associated with khat chewing. Those students who have chewer friends were chewed khat about 3 times more likely than their counterpart [Adjusted OR = 3.14, 95% CI = (1.53, 6.41)]. Besides, students who have chewer family were chewed khat 2.68 times more than those students who did not have family who chew khat [Adjusted OR = 2.68, 95% CI = (1.13, 6.37)]. Contrary, grade level of students was statistically significant in the binary (crude) analysis but not when adjusted for

other variables in the model. In this study religion, category of age, having khat chewer relatives and living either with family or alone have no association with khat chewing (Table 3).

**Table 2:** Shows the frequency khat chewing and from where they got, in Dilla secondary school students, Dilla town, South, Ethiopia, June 2020.

Variable	Frequency	Percentage
Life time khat chewers	102	30.72
Current khat chewers	92	27.71
Life time khat chewers	Male	72 70.5
	Female	30 29.5
	Total	102 100
Current khat chewers	Male	74 80.43
	Female	18 19.57
	Total	92 100
How often do you chew	Every day	0 0
	Once per day	35 38.04
	>1 per day	21 22.83
	Once per week	20 21.7
	>1 per week	14 15.22
	Current use in last 30 days	92 27.71
	In past 3 months	98 29.5
From where do you get khat	I bought	43 42.2
	Owen farm	26 25.4
	Others	33 32.4
Who did introduce you to chew khat	Friends	51 50
	Religious group	8 7.84
	Accidental	18 17.65
	Family	12 11.76
	Traditional healers	3 2.94
Others	10 9.80	

## DISCUSSIONS

A cross-sectional study was conducted to assess prevalence of khat chewing and cigarette smoking among students of Dilla high school in South, Ethiopia in 2016. From the study, prevalence of khat and cigarette smoking was explored. This prevalence study of khat chewing revealed that 27.71% of the school students chew khat currently. This figure is lower than the other studies conducted on secondary school students (64.9% in Agaro secondary school and 31.4% in Gondar high school students) [14]. This could be explained by the fact that the consumption of khat previously with higher prevalence mainly in south western and north western part of Ethiopia is currently spreading to southern part of the country. This study also revealed that there are lower rates of life time and current khat chewing prevalence compared to a study in butajira southwest Ethiopia in 1999, where lifetime and current prevalence rates were found to be 55.7% and 50% respectively [11]. In addition this study also revealed that, the life time prevalence of khat chewing was 30.72% which is greater to the study conducted in Jazan region, Saudi Arabia [15]. From the findings of this study, majority of the students who chew khat in their life time were males 70.5%, which is consistent with the studies conducted in Gondar [16], Jimma [17], Adamitulu [18], and Butajira [11]. This may be because of females are more socially restricted than males. Reports of this study showed that, out of the current khat chewers 27.7% and 11.4% current cigarette smokers. This is lower than findings reported in Gondar high school, North West Ethiopia, 13.1% for cigarette and for alcohol 26.9% [14]. This difference may be due to the cigarette it the time difference at which the research was conducted. Which is different from reports taken from National Survey on Drug Use and Health at which students start when joined higher education [10]. A Finding from college students of North West Ethiopia was different, 52% at university level for khat [19]. The reason for this difference could be because of high cultivation of khat plant in the study area recently. This is in line with other studies conducted in Butajira [20] and Jimma [17]. This may be explained by: habitually Muslims take khat more than Protestant and Orthodox Christian followers. The subjective reasons given

**Table 3:** Bivariate and multivariate regression model estimates of risk factors for khat chewing among Dilla high school students in south Ethiopia, 2020.

Explanatory characteristics	Chat chewing		COR (95% CI)	AORR(95% CI)
	YES [No. (%)]	NO [No. (%)]		
Sex				
Male	33(9.9%)	145 (43%)	2.96 (1.44, 6.08)	
Female	11(3.3%)	143 (43%)	1	- 1
Age Category				
12 - 18	38 (11.45%)	255 (78.38%)	1.22 (0.48, 3.11)	
19 - 28	6 (5.25%)	33 (9.9%)	1	
Grade Level				
9 <sup>th</sup>	13 (3.92%)	103 (31.02%)	1.98 (0.86, 4.58)	
10 <sup>th</sup>	12 (3.61%)	60 (18.07%)	1.25 (0.53, 2.97)	
Family Chew Khat				
Yes	10 (3.01%)	25 (7.53%)	3.09 (1.37, 6.99)	1 2.68 (1.13, 6.37)
No	34 (10.24%)	263 (79.22%)	1	1
Peer Chew Khat				
Yes	31 (9.34%)	118 (35.54%)	3.44 (1.73, 6.84)	1 3.14 (1.53, 6.41)
No	13 (3.91%)	170 (51.20%)	1	1

for khat chewing in this study were also in agreement with the studies conducted in Gondar high school students, which were “to increase work performance”, “to relief stress”, “peer pressure”, “to fulfill religious ritual which was reported by the respondents”, and for “relaxation” [11]. One of the determinant factors that affect the chewing practice of students was having friends chewing khat having family using khat and place of residence. These predictors were statistically significant and determine khat chewing practice among Dilla high students. Basically, this finding agrees with other studies done by different investigators [15,8-10]. This is because: in the first place, youths directly persuade their friends to conform to their behavior; therefore khat chewers encourage their inexperienced peers to chew khat [21]; in the second place, since families were significant others (model/figures) of their sons, students with parental model (parents used khat) were more prone to khat chewing than their counter parts; thirdly, higher proportion of the students in this study were come from rural area that has no previous history of khat chewing as they lived with their family [22-26]. In addition to rural areas khat chewing is not a common habit, students from the rural area are under the control of their family.

## CONCLUSION AND RECOMMENDATION

Mastication of khat among high and preparatory school students is prevalent and unacceptable in magnitude. Major factors that affect khat chewing were being male, peer influence, similar habit among family members and residential place. Therefore, to reduce the prevalence, social, economic and health effect of khat chewing, Minister of Education in collaboration with Ministry of Health has to work to incorporate life skill training in high school students' curricula. Moreover, open discussion system should be established to create an understanding on the ill effects of khat thereby to bring behavioral change. Not only that, schools also need to establish and strengthen teaching and monitoring system of their students through mass media (Local FM Radio) with special focus on khat control mechanism in collaboration with Ministry of Health, local administration and merchants who buy and sell khat. Last but not least, legal rule and regulations are recommended towards the cultivation, use and sell of khat.

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