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Research Article

Prevalence and Correlates of Khat (*Catha edulis*) Chewing among Adult Residents in Dilla Town, South Ethiopia 2019: A Cross Sectional Study

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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 south Ethiopia. So the aim of this study is to narrow this gap by assessing prevalence of khat chewing and its determinants among adult residents at Dilla town, South West Ethiopia from May 1st-30th 2019.

Methods: Quantitative community based cross sectional study was conduct to determine prevalence of khat chewing and associated factors using self-structured interviewer administered questionnaires on a total of 489 sampled participants using two stage sampling method. Descriptive statistics was done to summarize the dependent and independent variables. Data analysis was done by using SPSS version-20. Multiple logistic regression was used to test the association between determinants and chat chewing and P-value of <0.05 was considered as statistically significant.

Results: In this study, the lifetime prevalence of khat chewing was found to be 30.4% while the current prevalence of chewing was 34.3%. Bing male (AOR=3(0.345-0.491), 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: One third of the respondents chewed khat in their life and current time. Community based health education should be provided to the people about the adverse effects of khat by invited psychiatric professionals of Dilla university referral hospital.

Keywords: Dilla; Khat; South Ethiopia; Prevalence; Associated factors; Adult residents

INTRODUCTION

Khat (*Catha edulis)* is a natural stimulant from the *Catha edulis* plant which is found in the flowering ever green large shrubs of Catha evacean family that grows at high altitudes in the region extending from eastern Africa to southern Africa, as well as on the Arabian Peninsula. Khat contains a number of chemicals from these two well-known are cathinone and cathine. As leaves mature or dry cathinone is converted to cathine which significantly reduces its stimulatory potency. Cathinone is ten times (10x) more potent than cathine and only present in fresh leaves and it produces amphetamine like effect [1].

The origin of khat is not clear, but generally agreed that it is native to Ethiopia and it also now grows in Somalia, Kenya, Malawi, Uganda, Tanzania, Congo, Zambia, Zimbabwe,

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Afghanistan, Yemen and Madagascar. Legend has it that the use of khat was first discovered by a herder who noticed the effect of the plant on his goats and who tried experienced wake fullness and added strength. Khat is given numerous names by different countries like khat, qat, chat, qaeda, kus-esalahinmirra. Tohai, Tschat, Abysinia tea, African tea, African salad and brow cows (in tablet form), but in most literature, it is known by name Khat. The chewing of Khat leaves is a wide spread habit of the male population that has a pro-found socio-cultural importance, credited with fostering amity and building social relationships. In some countries where the use of khat is widespread, the habit has a deep rooted social and cultural tradition. This is particularly true for Yemen, Somalia and Ethiopia, where many house have a room called Muff raj, Mafrashi and Bercha respectively that are specifically arranged for regular sessions of Khat chewing. The buyer's select from among various type of khat available, which also vary considerably in price, the most expensive (because the most potent) materials being, in general, the freshest and that with the youngest leaves. 10 million people chew khat daily worldwide. Today it is consumed everywhere in the country by all population groups and highly prevalent problem as previous studies revealed. A cross-sectional survey under taken in three urban in Yemen revealed 81.6% of men and 43.3% of women were life time chewers, reports indicated that 80%-90% of male adults and 10%-60% of female adults in East Africa and the Arabian Peninsula use khat, a house-to-house survey held in 1997, 1200 adults from urban Ethiopian community showed the prevalence of khat use was 32%, cross sectional study done in Dera woreda Amhara region showed 19.9% and 17% of the respondents were ever and current khat chewers respectively, cross-sectional descriptive study done in 2006 in Addis Ababa showed 18% of men and 2% of women reported current khat chewing, there are many reasons to start and continue chat chewing. Study conducted at Amhara region in north Shewa revealed that peer pressure, family chewing habit, religion purpose and production of khat in residence were main reasons that initiated khat chewers to begin khat chewing for the first time. In this study khat chewing practice was found to be 4 times more likely among muslims as compared to orthodox christians. The possible reason for the observed higher prevalence of khat chewing practice among muslims, this could due to traditionally common habit of chewing and chewing interest to gain maximum concentration during praying time in muslim population, although there were few muslims in the community who condemn khat chewing practice and said not culturally accepted. The studies carried out in different parts of the countries revealed that the prevalence of khat use and its adverse effects on health status of the society is high (31.8%) [2].

With it's highly prevalence, khat has become an epidemic in all parts of Ethiopia region, adolescent being the main victims of all health and social effects of substance use. There is fairly extensive literature on the potential adverse effects of habitual use of khat on mental, physical and social well-being. Some khat chewers experience anxiety, tension, restlessness, hypnologic hallucinations, hypomania and aggressive behavior or psychosis. Chronic consumption can lead to impairment of mental health, possibly contributing to personality disorders and mental deterioration.

In addition to above, recent study described a positive association between the occurrence of anxiety and depression in khat users. There have been sporadic reports of a possible association between khat use and the occurrence of hypomania, aggressive behavior or psychoses among users. When chewing ceases, unpleasant after-effects such as insomnia, numbness, lack of concentration and low mood tend to dominate the experience. Some chewers also reported unpleasant effects during the chewing, describing anxiety, tension, restlessness and hypnologic hallucinations. Objectively, those who chew khat show a range of experiences, from minor reactions to the development of a psychotic illness. Minor reactions being over-talkativeness (chatty), hyperactivity, insomnia, anxiety, irritability, agitation and aggression. From different perspective, khat seriously can harm the economy of any state by encouraging laziness and absenteeism besides unwise income spending; the thing that adversely affected the economies of states such as Ethiopia, Yemen and Djibouti where the statistics suggest, nearly every family spends one third of disposable income on khat [3].

According to the world drug report 2004, in Ethiopia khat was the main drug of abuse among; in Kenya the figure was 14.3%. Decreased productivity that chewing leads to loss of work hours decreased economic production, malnutrition and diversion of money in order to buy further khat. This indirectly result a fall in overall national economic productivity. In Ethiopia, khat is commonly used for social recreation, occupational groups such as motor vehicle drivers, truck drivers, who chew khat during long distance deriving, to keep them awake, also use it under a variety of other conditions. A few studies have addressed the health effects of using substances such as cigarettes and khat in Ethiopia, focusing on psychiatric morbidity and psychosocial problems and their association with unsafe sexual behavior.

Although khat chewing is a wide spread problem among community residents 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 adult residents of southern Ethiopia generally and in Dilla specifically despite there is abundant cultivation and day today observation of chewing in urban. Therefore this study is designed to indicate the magnitude of khat chewing and associated factors among peoples of Dilla town from May 1st-30th 2019. This study may be used to put possible solutions to overcome the problem by assessing the current magnitude of the problem in the Dilla town with aim of tackling the problem as earliest time as much as possible by projects designed on tackling substance related problems of the community of Dilla town using huge number of psychiatric professionals available at Dilla university referral hospital of Dilla university and to give direction on the magnitude of the problem with identified potential modifiable factors.

MATERIALS AND METHODS

Study design and setting

The study was conducted from May 1st-30th 2019 at Dilla town which is located to southern at a distance of 359 km from A.A, which is the capital city of Ethiopia and 90 km 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. It has 3 sub cities and each sub cities has 3 keble. It is located at an altitude of 1300-3000 meters above sea level and its climatic condition is Woynedega. Its average rainfall is form 1200 mm-1800 mm per year. The town is surrounded in north by Sidama, in south by Wenago, in east by Bule and Oromia and in west by Oromia regional state. The total population is 94,189. Among which 46,058 (49.9%) are males and 48,131 (50.1%) are females. The major dominant ethnic group in Dilla town is Gedeo followed by others and most of the people speak Amharic language. The major dominant religious belief in the town is protestant followed by orthodox, muslim and others. This study was conduct from May 1st-30th, 2019 [4].

Study variable measurements

Two categories of variables were used in this study. The dependent variable was khat chewing status of the community. 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 489 randomly selected adult residents were included in this study using multistage sampling procedure. At stage one from the nine kebeles, three were selected randomly using lottery method. Then individual households in the chosen kebeles were selected using a systematic sampling technique after identifying an initial starting household by use a random number. The sample size was distributed to each kebele proportional to the household size of the kebeles. The households in each of the selected kebeles were obtained from the kebele offices and the numbers of households were included among the selected kebeles were determined using proportional to household size. Adults in the selected household will be further selected and interviewed. In the case of more than one eligible participant in the household, lottery method was used to select only one. Sample size was determined using single population proportion formula. Taking prevalence of khat chewing 17% conducted in Amhara region, Dera Woreda. By using this prevalence to obtain the maximum sample size at 95% certainty and a maximum discrepancy of +5% between the sample and the underlying population. Thus a minimum number of adults was the required number in the study. The formula to determine the sample size was below. $n=(z\alpha/2)2p(1-p)/d2=217$. By multiply with 1.5 to reduce design effect the final sample was 489. People who were sick were excluded from the study.

Data collection procedure

The English version of interviewer 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 universtiy. 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 adults who were not included in the study [5].

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 (β)) 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 [6].

RESULTS

Socio demographic characteristics of studied participants

Three hundred and twenty six respondents were interviewed, making a response rate of 100%. Among the respondents, 194 (59.5%) were males and 132 (40.5%) were females. 87 (26.7%) were at the age range of 25-29 years; whereas, the smallest number 20 (6.0%) were 30-34 years old. Regarding to religion 172 (52.8%) were protestant followed by 108 (33.1%) of muslims. Among the respondents the major ethnic group was Gedeo 112 (34.4%), while the least ones were Amhara 10 (5.8%). Concerning their educational status, 166 (50.9%) were from grade 1^{st}-8^{th}, 27 (8.3) were illiterate, 93 (28.5%) were educated from 9^{th}-12^{th} grade while the remaining 40 (12.3%) graduated from college and university. Occupationally, 76 (23.3%) were merchants, 111 (34.0%) were private employed, 46 (14.1%) were daily laborers and 53 (16.3%) were house wives. 208 (63.8%) were having <500 birr, while 27 (8.3%) of the

respondents had monthly income of >2001 birr, 150 (46%) were married, 128 (39.3%) were single, 41 (12.6%) widowed and 7 (2.1%) were divorced (Table 1) [7].

Table 1: Socio demographic characteristics of the respondents of Dilla school students, Dilla town, south, Ethiopia, June 2019.

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
	Others	10	3
Religion	Orthodox	67	22.4
	Muslim	53	16.1
	Protestant	178	53.9
	Catholic	24	7.2
	Others	10	3.1
Grade	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 with whom	Alone	5	1.5
	Parents	271	81.63
	Brother/sister	48	14.46
	With relatives	6	1.81
	With others	2	0.6

Practice of khat chewing of respondents

The lifetime prevalence of khat chewing was found to be 30.4% while the current prevalence of chewing was 34.3%. The frequency among males (22.1%) was higher compared to females (8.3%). The majority of the chewers were in the range of 25-29 years old while the least were whose age is above fifty. Oromo is the most frequent ethnic group that have khat chewing habit 10.4% followed by Gedeo (6.14%), while Tigre is the least one (2.12%). According to the religion muslims are most frequent chewers (16.5%), paradoxically orthodox followers were accounted minimum number (4.0%). Regarding to marital status

divorced were most chewers (34%) followed by singles 33% (Table 2).

Table 2: The frequency khat chewing and from where they got, in Dilla secondary school students, Dilla town, south, Ethiopia, June 2019.

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
	Other	7	7.6
From where do you get khat	I bought	43	42.2
	Owen farm	26	25.4
	Others	33	32.4
	Friends	51	50
Who did introduce you to chew khat	Religious group	8	7.84
	Accidental	18	17.65
	Family	12	11.76
	Traditional healers	3	2.94
	Others	10	9.8

Educationally those who were completed grade 9th-12th were most frequent. Among khat chewers, (5.3%) were chewing 2-3 times per week, 54 (54.5%) chew every day. (74.7%) have started khat chewing before four years. 85.9% of chewers chew quarter per day. Various reasons for chewing khat were given by current chewers. The main reason mentioned was to socialize (40.4%) followed by to pass time (20.2%) and for pleasure (6.1%). Some of the respondents (72.7%) reported that they like to see their friends or families or students/colleagues chew khat and 27.3% were initiated by the traditional healer while they were start chewing. Majority of the current chewers (78.8%) believed they wish stop chewing in the future and out of these, (33.3%) would

when they get chewing cause health problem, (40.4%) when they get against of chewing from his\her beloved one, (19.2%) when they get financial problem and (21.20%) don't know when to stop. Fifty four per cent of the respondents were found to have strictly opposed towards khat chewing. Nearly (20.9%) were indifferent and (13.8%) of them were found to have positive attitudes. 130 (39.9%) of the respondents were their friends chew khat and 119 (36.5%) have family history of khat chewing. Among those who have family history of khat chewing 34 (28.6%) were chew their brothers, 32 (26.9%) were their fathers, 3 (10.1%) were their husbands [8].

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 respondents 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 Ataye 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, 6.3s7)). 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 3: Bivariate and multivariate regression model estimates of risk factors for khat chewing among Dilla high school students in south Ethiopia, 2016.

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)	-1
Female	11 (3.3%)	143 (43%)	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				
9th	13 (3.92%)	103 (31.02%)	1.98 (0.86, 4.58)	
10th	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

DISCUSSION

In this study the current prevalence of khat chewing was found to be 30.4%, which is almost similar to the one that is reported for Adamitulu town (31.7%). This could be due to the fact that both studies were conducted in the same environmental condition in which khat is cultivated mostly. The prevalence of

khat chewing determined in this study is also comparable to the one that is reported for Jimma town (30.6%), this also due to the fact that khat chewing is common in both area, but lower than that was conducted in Butajira (50%). This could be due to the fact that the population in Butajira where had khat as a tradition and most of the population where Muslims, whereas the proportion of Muslims in Dilla town is not much as Butajira. Similarly among students of Gondar college of medical sciences found the prevalence 22.3%. This great difference may be due to the fact that Gonder is a well-known place where khat source found far from the town [9].

According to this study, there is a statistically significant association (P=0.003) between khat chewing habit and the Muslim religion compared to other religions. This finding is in line with other studies, like conducted in Jimma town and Amhara region, Dera woreda). This might be due to the fact that khat growing and the practice of chewing have traditionally been confined to some areas of Ethiopia, where the muslim population welcome the habit is socially accepted and could be easily passed from generation to generation. In the current study khat chewing was found to be more prevalent among males than females (P=0.01) and this is consistent with other reports. This may be because females are more culturally restricted from exposure to khat chewing than males. In this study, the peak age of khat chewing was found to be between 25 and 29 years. This finding is closer to the results of similar studies done in Butajira and Jimma town which reported that the peak age of khat chewing was 20-40 and 18-44 years respectively. About 39.9% of the respondents reported that their friends chew khat and36.5% were their parents chew khat. This is in line with conducted in Jimma town [10].

In the present study, no association was found between khat chewing and membership of specific ethnic group, monthly income, occupation, age group, marital status and educational level. A statistically significant association was found between educational level and khat chewing in other studies which were conducted on the general population which is comprised of illiterates and literates. The reasons given by the study population for chewing khat were to increase performance, to pass time and to avoid withdrawal effects. This finding is similar to previous reports and it indicates that khat has similar effect on users as that of amphetamine and other psycho stimulants. The statistically significant association (P=0.003) between khat chewing and Muslim religion in this study is in line with findings from other studies done in Butajiraand Jimma town. In one large study done in Yemen there were 82% of men and 43% of women reported at least one life time episode of khat chewing but, this is higher compared to my study, the possible reason might be the difference of instruments used to assess khat chewing, this might also be due to the different study design and sample size used [11].

The most recent estimates suggest that Europe accounts for about 40% of the Khat prevalence worldwide. Which is higher as compared to my study it might be due to high coverage of study area? In some parts of our country where studies were conducted, it has been understood that the high prevalence of khat use. It is highest in Harari, 39% of women and 82% of men. Which is higher as compared to my finding it might be assumed due to study area evidently it is known that Harari is most area in which khat is grow and utilized. In one research conducted in 2010 in Ethiopia the prevalence of khat chewing in high school was be 24.2%. This is lower than our study it might be assumed that the participant in the study were educated than that we conducted [12].

CONCLUSION

In general the prevalence of khat chewing seems to increase among the study population. There were no significant association between the independent variables and outcome variable except muslim religion followers and male respondents. From the findings of this study, it emerged that khat chewing is high among people who participated in the study. For all the socio-demographic factors and khat related factors that were only religion and sex had significant association. Based on the finding we forward messages for zonal health office of Gedeo zone to incorporate mental health care services in primary health care services that related to khat chewing. Health professionals should be alert while they are giving care for those participants having the possible higher risk for khat chewing when they are attend at heath institution, health beurue of SNNPR should give special attention for khat chewers by developing regular education and researchers should conduct further longitudinal research in Dilla town to know the temporal relationship of khat chewing and its effect.

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 is ethical clearance 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.

CONSENT FOR PUBLICATION

Not applicable.

AVAILABILITY OF DATA AND MATERIALS

The data that support the findings of this study has a sort of identifier of individual participants and researcher reserved to send it.

COMPETING OF INTEREST

All of the authors declare they have no conflict of interest.

FUNDING

Not applicable.

AUTHOR CONTRIBUTIONS

YB has contributed in idea conception, topic selection and writes up of proposal for funding. AE has contributed idea generation in title selection, contributed in organizing literatures important to the study, commented both proposal draft and result. SH involved in data collection and analysis of data and in writing the manuscript. Finally all authors read and approved the final manuscript for publication.

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