

ORIGINAL ARTICLE**THE PREVALENCE AND SOCIO-DEMOGRAPHIC CHARACTERISTICS OF KHAT CHEWING IN JIMMA TOWN, SOUTH WESTERN ETHIOPIA****Andualem Mossie^{*}, MSc****ABSTRACT**

Background: *Khat (Catha edulis forsk) contains a psychoactive substance, cathinone, which produces central stimulation analogous to amphetamine. It is widely abused in East Africa in general and in Ethiopia in particular for various purposes. Habitual use of khat renders certain influence on the physical, psychological, physiological and economical well being of the community under its usage. The aim of this study was to determine the prevalence and sociodemographic profile of khat use in Jimma town.*

Methods: *In this study, across-sectional house-to-house survey on 1000 adults was conducted in Jimma town, southwestern Ethiopia, from January to September 2000.*

Results: *Out of the total 1000 study subjects, 51.9% were male, 61.2% Muslims, 54.3% Oromos, 65.9% were in the age group between 16-35, 74.2% were literates and 49.2% were married. The prevalence of khat chewing was 30.6%. More males (60.1%) than females, Muslims (77.1%) more than Christians, Oromos (64.7%) more than other ethnic groups, married (50.3%) more than singles, literates (72.9%) more than illiterates, unemployed plus housewives (43.6%) more than government employees (18.3%) and students (18.3%) were found to be khat chewers. Among the khat chewers, 57.8% were regular daily khat chewers and 81.4% have started khat chewing before two years. The amount of khat consumed at a time was roughly estimated as per cost in birr. About 76.1% of the chewers consumed khat that costs 1-5 Birr. About 32.4 % of the chewers were smoking cigarettes during khat chewing, 78.8% of the chewers drink coffee during chewing and 27.8% of them used to take alcohol after khat chewing.*

Conclusion: *Gender, religion, age group, ethnicity, educational level, occupation, smoking, and coffee consumption showed a strong association with the habit of khat chewing.*

Key words: *Khat, cigarette smoking, coffee drinking, alcohol intake, hypertension, tachycardia, asthmatics.*

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INTRODUCTION

Khat (*Catha edulis forsk*) contains a psychoactive substance, cathinone, which produces central stimulation analogous to amphetamine. It is widely abused and highly praised in East Africa, including Ethiopia, and the Arabian Peninsula for its euphoric effect. The use is deeply anchored to regional customs and traditions (1). College and university students to get mental alertness and to work hard also consume it. Perhaps, the central stimulant effect of cathinone is enhanced when it is combined with caffeine and cigarette smoking (2). *Catha edulis forsk* is commonly known as "chat" in Ethiopia. It is now referred to consistently in literatures as khat. It is socially and economically an important plant all over East and South Africa and in Arabian Peninsula (3). Khat is an evergreen flowering tree or shrub, first identified by a botanist whose name was Forskal in 1762 in Yemen. He has categorized this plant in the group spinosa. However, now-a-days khat is botanically classified under the family *Celastraceae*, genus *Catha*, and species *edulis* (4).

Once controversial, the chemical properties of khat are now well documented. The active agent responsible for the physical and mental effects observed when the leaves are chewed is cathinone or alpha aminopropiophenone. The most succulent part of the plant, the young leaves and stem buds are preferred to be chewed for various purposes. These parts of the plant are crushed, packed and exported as a source of foreign currency (5). When the leaves, which contain the psychoactive substance, cathinone are chewed and the juice is ingested, it produces stimulation of the central nervous system in man analogous to amphetamine (6).

Studies suggested that cathinone, which is an active ingredient of khat increases

heart rate, arterial blood pressure and respiratory rate transiently. It also improves cerebral blood flow, mental alertness and increases energy (7). In relation to this effect, regular khat chewing is thought to be a predisposing factor for gastritis and peptic ulcer disease, mental illness cardiac arrhythmia tooth rust and constipation. The mechanism of action of cathinone, although not proven, is thought to be mediated via its sympathetic like action in the body (8).

In Ethiopia khat is commonly used for social recreation, but occupational groups such as motor vehicle drivers, who chew khat during long distance driving, to keep awake, also use it under a variety of other conditions. A significant number of students chew khat especially during examination periods to get mental alertness. There is also specific usage of khat by the special sections of the community: craftsmen and farmers use khat to reduce physical fatigue, and traditional drug healers to heal ailments (6, 9).

Chewing of khat alone has a bitter taste. In order to avoid this, it is usually taken in combination with sugar. Khat chewing is also combined with cigarette smoking to enhance the degree of excitement. Most often alcoholic beverages are taken after khat chewing to terminate excitation (10,11).

According to definition of the World Health Organization, khat is not classified as an inevitably addictive drug. However, recent reports indicate that khat abuse is suspected to be one cause of psychosis. Should khat be prohibited? Great Britain and the United States have raised new alarm in Narcotics commission of the United Nations. International law on this issue is currently highly ambiguous. Importation of khat is illegal in France as in Switzerland, but legal in the United States and Great Britain as in most African countries (12). The main aim of this study

was to determine the prevalence and socio-demographic picture of khat chewing alone and combined with coffee, cigarette, and alcohol in the Jimma town.

MATERIALS AND METHODS

A cross-sectional, house-to-house survey was conducted in Jimma town from January to September 2000. Jimma is located 335 km south west of Addis Ababa. The town has an average altitude of 1760 mt above sea level with the minimum and maximum temperature of 11°C and 27 °C respectively. According to the 1994 national census, the total population of Jimma town was estimated to be 88,868 (20). The population composed of Muslims and Christians with diversified ethnic groups. Muslims and Oromos are predominant in number. Jimma is one of the cash crop producing areas in Ethiopia where coffee and khat are grown abundantly.

The whole population of Jimma town age older than sixteen years, adolescent age at which certain habits are developed, was taken as a source population. The sample size was estimated to include a total of 1050 subjects based on the expected prevalence rate of khat chewers 50%, marginal error 4%, with 95% confidence interval. The sampling procedure was done as follows. Ten kebeles were selected randomly out of a total of twenty kebeles in Jimma town. One hundred households were selected randomly from each kebele and one adult member of a family in each household was chosen by the lottery method to respond to the questionnaire. In case of absent households, the nearby available subjects were taken as a substitute.

For data collection, the drug addiction questionnaire developed by World Health Organization (WHO), (13) was modified and certain questions pertinent to the study

objective were added up (see the appendix). The questionnaire was pretested on 10 people who were not included in the study. None of them had negative reaction to the questionnaire. Three trained technical assistants (nurses) were involved in the process of data collection under supervision. This community survey was performed between January to September 2000. Measurements of such vital signs as blood pressure and heart rate were taken during surveying.

The ethical aspect was strictly considered. The aim of the study was clearly explained to the sampled subjects and their consent was asked before interview and vital measurements were taken. The ethical committee, research and publication office, Jimma University, gave ethical approval.

The following operational definitions were used: (a) pattern of chewing:- a description of frequency, duration (chronicity) of khat chewing, (b) current khat chewers:- subjects who have a habit of khat chewing till interview has made, (c) Non chewers, Subjects who have never chewed khat, (d) Hypertensives:- according to the definition of WHO for hypertension (17) subjects whose blood pressure above 140/90 mm Hg were considered as hypertensives, (e) Tachycardics:- subjects whose heart rate above 100 beats/minute were considered as tachycardics. (f) Asthma: a respiratory disease characterized by an intermittent attack of spastic contraction of bronchiole smooth muscles due to allergic hypersensitivity that leads to breathing difficulty.

Data Analysis and Presentation:- Frequencies tables are used for data presentation and chi-square testes were used for comparing different groups. SPSS version 7 of windows package was employed for this data analysis.

RESULTS

The study population consisted of 1050 subjects and the overall response rate was 95.24%. The questionnaires of 50 respondents were rejected during data cleaning because of their incompleteness.

The mean age of respondents was found to be 32.7 years. About 51.9% of them were males, 61.2% were Muslims, and 54.3% were Oromos in their ethnicity. The majorities, 65.9%, were young in age group range between 16 and 35 years and 49.2% were married. About 74.2% of the subjects had formal education, elementary school complete and above.

The current prevalence rate of khat chewing was found to be 30.6%. As it is presented in table-1, males (60.1%) more than females, Muslims (77.1%), more than Christians, Oromos (64.7%) more than other ethnic groups, literates (72.9%) more than illiterates were found to be khat chewers. About 50.3%, of the chewers were married. As per occupation, 24.5% of the chewers were unemployed, 18.9% were housewives, 18.3% were government employee, 18.3% were students and 19.9% were merchants and others (Table 1).

Table 1: Prevalence and Sociodemographic characteristics of Khat chewing in Jimma, southwestern Ethiopia, 2000.

Variables	Khat chewers			Non chewers		X ²	P-value
	Population (n)	n	%	n	%		
Sex	1000	306	30.6	694	69.4		
Male	519	184	60.1	335	48.9	10.14	<0.001
Female	481	122	39.9	359	51.7		
Age							
16-25	423	101	33.0	322	46.4		
26-35	236	88	28.8	148	21.3		
36-45	165	60	19.6	105	15.1	16.82	<0.01
46-55	77	25	8.2	52	7.5		
>55	99	32	10.5	67	9.7		
Religion							
Muslim	612	236	77.1	376	54.2		
Orthodox	350	63	20.6	287	41.4	50.66	<0.001
Others*	38	7	2.3	31	4.5		
Ethnicity							
Oromo	543	198	64.7	345	49.7		
Amhara	256	68	22.2	188	27.1		
Gurage	76	16	5.2	60	8.7	24.58	<0.001
Keffecho	41	9	2.9	32	4.6		
Dawro	48	6	2.0	42	6.1		
Others**	36	9	2.9	27	3.9		
Marital Status							
Married	492	154	50.3	338	48.7		
Single	420	124	40.5	296	42.7	3.20	>0.05
Others***	88	28	9.2	60	8.7		
Education							
Illiterate	256	83	27.1	173	24.9		
Elementary	387	126	41.2	261	37.7		
High school	286	71	23.2	215	31.0	8.17	<0.05
Higher	71	26	8.5	45	6.5		
Occupation							
Gov't Employees	186	56	18.3	130	42.5		
Unemployed	185	75	24.5	110	15.9		
House wives	170	58	19.0	112	16.1	15.39	>0.05
Students	244	56	18.3	188	27.1		
Merchants	134	42	13.7	92	13.3		
Others****	81	19	6.2	62	8.9		
Total	1000	306	30.6	694	69.4		

* Protestants, Catholics, Adventists and Jovan.

** Harari, Tigre, Wollita, Yem.

*** Divorced, Widowed.

**** Farmers, Sex-workers, waiters

Table 2: The association between Khat chewing and smoking Coffee use and alcohol intake, Jimma, Southwestern Ethiopia, 2001.

Variables	Khat chewers		Non chewers				Total		X ²	P-value	
	n	%	n	%	n	%	n	%			
Smoking											
Yes	96	52.2	3	2.5	71	21.2	2	0.6	172	17.2	
No	88	47.8	119	97.5	264	78.8	357	99.4	828	82.8	12.43
Coffee using											
Yes	138	75.0	103	84.4	168	50.2	228	63.5	637	63.7	
No	46	35.0	19	15.6	167	49.9	131	36.5	363	36.3	39.20
Alcohol intake											
Yes	78	42.4	7	5.7	41	12.1	9	2.5	135	13.5	
No	106	57.6	115	94.3	294	87.8	350	97.5	865	86.5	14.32

Among khat chewers, 57.8% were regular daily khat chewers (Table-3). Of these 81.4% had started khat chewing before two years. The amount of khat consumed at a time was estimated per cost in birr, and 76.2% of the chewers consumed khat that costs 1-5 Birr. As shown in Table-2, the prevalence of cigarette smokers in the study was 17.2%, of which 32.4% of the smokers were found to be khat chewers. Out of the total studied subjects, 63.7% were said yes for coffee consumption, of which 24.2% were found to be khat chewers or drink coffee during khat chewing and 14.7% of the khat chewers ingest alcohol after chewing.

The effect of khat chewing and associated habits on health was evaluated

(Table 4). The prevalence of hypertension was found to be 10.2 %, of which 9.5% of them were khat chewers. About 10.7% of them are regular chewers, 19.2% of the hypertensives were smokers, and 13.7% of them were coffee users. Similarly, 17.4% of the studied subjects were found to be tachycardic, of which 18.3% were khat chewers, 26.6% are regular chewers and 17.4% are smokers. The prevalence of asthmatics in the study group was determined to be 18.7 %, of which 28.1% of them were khat chewers, 23.7% of them were regular daily chewers, 19.8% of them were smokers, and 21.5% of these asthmatics used to drink coffee.

Table 3: Pattern of khat chewing, Jimma, Southwestern Ethiopia, 2001.

Chewing Pattern	Male		Female		Total	
	n	%	n	%	n	%
Chewing Frequency						
Every day	115	62.5	62	50.8	177	57.8
1-3 days/wk	49	26.6	38	31.2	87	38.4
Occasionally	20	10.9	22	18.0	42	13.7
Duration of start (chronicity)						
1 Year	12	6.5	9	7.4	21	6.9
2 Year	25	29.8	11	9.0	36	11.8
>2 Years	147	79.9	102	83.6	249	81.4
Amount chewed/cost in Birr						
1-5 Birr	133	72.3	100	82.0	233	76.1
6-10 Birr	46	25.0	20	16.4	66	21.6
>10 Birr	5	2.7	2	1.6	7	2.3
Smoking during chewing						
Yes	96	52.2	3	2.5	99	32.4
No	88	47.8	119	97.5	207	67.7
Coffee using during chewing						
Yes	138	75.0	103	84.4	241	78.8
No	46	25.0	19	15.6	65	21.2
Alcohol intake after chewing						
Yes	78	42.4	7	5.7	85	27.8
No	106	57.6	115	94.3	221	72.2
Total	184	60.1	122	38.9	306	30.6

Table 4: Effect of Khat chewing and associated habits on health Jimma, South western, Ethiopia, 2001.

	Hypertension		Tachycardia		Asthmatics	
	Yes n (%)	No n (%)	Yes n (%)	No n (%)	Yes n (%)	No n (%)
Habit of khat chewing						
Chewers (n=306)	29(9.48)	277(90.52)	56(18.30)	250(81.70)	86(28.10)	220(71.90)
Non chewers (n=694)	73(10.52)	621(89.48)	118(17.00)	576(83.00)	101(14.55)	593(85.45)
P-value	>0.05		>0.05		<0.01	
Frequency of chewing						
Regular chewers (n=177)	19(10.73)	158(89.27)	47(26.55)	130(73.45)	42(23.73)	135(76.27)
Non chewers (n=694)	83(11.96)	611(88.04)	127(18.30)	567(81.70)	145(20.89)	549(79.11)
P-value	>0.05		<0.05		>0.05	
Smoking habit						
Smokers (n=172)	33(19.19)	139(80.81)	30(17.44)	142(82.50)	34(19.77)	138(80.23)
Non smokers (n=828)	69(8.33)	759(91.67)	144(17.39)	684(82.61)	153(18.48)	675(81.52)
P-value	<0.01		>0.05		>0.05	
Coffee using habit						
Users (n=363)	87(13.66)	550(86.34)	110(17.27)	527(82.73)	137(21.51)	500(78.49)
Non users (n=363)	15(4.13)	348(95.87)	64(17.63)	299(82.37)	50(13.77)	313(86.23)
P-Value	<0.001		>0.05		<0.01	
Total	102(10.2)		174(17.40)		187(18.70)	

DISCUSSION

Epidemiological studies on khat chewing are rare. Our finding on the current prevalence of khat chewing was found to be 30.6%. This figure is lower than the one that is reported for Butajira (50.0%), [14]. This could be due to the preponderance of Muslims in the Butajira where they account for 90 % of the population whereas; the proportion of Muslims in Jimma town is 61.2 %, as the present study indicates. The prevalence of khat chewing determined in this study is comparable to the one that is reported for Adamitulu (31.7 %), [16]. This is because of more or less similar proportion of Muslims in the population composition.

Similar studies among Mogadishu inhabitants in Somalia (15), and among students of Gondar College of Medical Sciences (2), found the prevalence of 18.3 % and 22.3% respectively. The lower prevalence than the present one in this study might be explained by relatively greater distance between those places from khat growing areas. Availability of khat, accessibility to it and social acceptance to the habit contribute to the low prevalence khat chewing especially among students of Gondar College of Medical Sciences.

According to this study, it seems that there is a significant association ($P < 0.001$) of khat chewing habit among Muslims more than Christians. This finding is in line with those studies reported for Agaro Secondary School students (10), for Butajira (14), and for Adamitulu (16). The possible reason for the observed higher prevalence of khat chewing among Muslims more than Christians could be the composition of population of Jimma town is predominantly Muslims (61.2%). Khat growing and the practice of chewing have traditionally been confined to the low land areas of Ethiopia, where the Muslim population predominates and the habit is

socially accepted and could be easily passed from generation to generation. Muslims chew khat to obtain maximum concentration level during group praying session, to keep awake during night long pray and its use for socialization purposes by the community may further explain the high prevalence. Although there are few Muslims in the community who condemn khat chewing as "Haram", it is socially accepted as a culture.

Khat chewing was found to be commoner among males than females ($P < 0.001$), as in the Butajira (14) and Adamitulu (16) studies showed. This may be because females are more culturally restricted from exposure to khat chewing and cigarette smoking than males.

In this study, the habit of khat chewing was more frequent in the age group between 16 and 45 years and less common above the age of 55. This finding has agreed with similar studies done in Butajira (14) and Mogadishu (15) that has reported, as the peak age of khat chewing were 21-44 and 20-40 respectively. Adults of age older than 16 years were considered in this study population. This was based on the study reported for Gondar College of Medical Sciences, that the median age of start of khat chewing habit was 16.4 years. This indicates that khat consumption starts during the teenager years, peaks during early adulthood and declines after middle age. The young adults and middle aged and educated groups who represent the most productive section of the community are most affected by khat chewing.

A significant association has also seen in this study between educational level and khat chewing ($p < 0.05$). Literate who educated elementary school and above were found to be more commonly khat chewers than illiterates. The fact is that the study area, Jimma town is the urban population where majority of whom can read and write, educated at elementary

level or above. This suggests that, when people are engaged in mental activities, where alertness, concentration, high imaginative capacity and social interaction are demanding, they prefer to chew khat. The increased association of khat chewing among educated people in this study might be able one to suggest that people think that it helps them to concentrate when studying enable them to read for a longer period of time than non chewers. Khat chewing may also enhance individuals to progress their education better than non-chewers.

The strong association ($P < 0.001$) between khat chewing and cigarette smoking in this study does agree with other studies done in Somali (15). Traditionally, cigarette smoking and coffee drinking in order to get maximum excitement accompany khat chewing. The prevalence of cigarette smoking was determined in this study to be 17.2%. Some khat chewers (27.8%), take alcohol usually after chewing in order to neutralize the stimulant action of khat by the central inhibitory effect of alcohol. A significantly higher ($p < 0.001$) number of khat chewers were not used to drink alcohol after chewing. This is because most of the chewers are Muslims who are restricted from alcohol intake.

The effect of khat chewing and associated habits on health was evaluated. The prevalence of hypertension was determined to be 10.2% ($n=102$). This figure is agreed with the study reported by WHO experts on hypertension control (17). In the present study, Khat chewing and hypertension showed to have no significant association ($p > 0.05$). A similar result has reported from a study done in Adami-Tulu (16). In contrast to this finding, other studies done on experimental animals reported that both systolic and diastolic pressure elevated following administration of khat extract (18). Blood pressure increased an hour after khat chewing, as the study done in human

volunteer indicates (19). Virtually, further research is recommended in order to reach the consensus in this aspect.

Hypertension was found to be significantly higher among cigarette smokers ($p < 0.01$) than nonsmokers and among coffee users ($p < 0.001$) than non users. Tachycardia is significantly ($p < 0.05$) higher in regular khat chewers as compared to non-chewers. The possible explanation of all these things is that the central stimulating effect of nicotine, caffeine and cathinon respectively.

The prevalence of asthma was determined to be 18.7% ($n=187$) in the present study. Already diagnosed cases were considered in this report. Asthma has showed significant association with khat chewing habit ($p < 0.01$) and coffee drinking habit ($p < 0.05$). The possible explanation for this link is that caffeine in coffee and cathinon in khat may produce bronchodilation effect, so that more number of asthmatic patients intended to drink coffee and chew khat to facilitate ventilation.

In conclusion, the present study and consulted literatures stated that the habit of khat chewing has negative impact on health, socioeconomic and political matters. This is because the habit of khat chewing reinforces the development of other habits such as cigarette smoking, alcohol intake and use of narcotics. Moreover, it spares money and wastes time of the productive citizen. In contrary to this, few reviewers argued that khat chewing might improve working performance and increase efficiency because of its central stimulant effect. Economically, khat is not expensive, is affordable to buy or it can be very easily cultivated in lowland areas.

Therefore, simple epidemiological studies would not allow us to discuss the negative and positive socioeconomic impact of this habit on those communities

where khat chewing is a common practice. However, taking into account all the evidences together, one can conclude that the negative effect of khat chewing outweighs the possible positive effect.

In conclusion, this study has shown that the habit of khat chewing affected 30.6% of the adult population of Jimma town. The group most affected by the habit comprised of Muslims, males, educated and most productive age group of the community.

In recommendation, using this as a base line study, further investigation should be continued to disclose exhaustively the effect of chronic khat chewing on the mental health and effect on the cardiovascular system. Khat chewing is also suspected to be the risk factor of peptic ulcer disease. This again needs keen minds to look in. Hereafter, health education about the adverse effect of khat chewing should be delivered to the community though health Institutions and policy makers should control the production and distribution of khat.

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