

Prevalence and Associated Factors of Khat Chewing among Amoud University Students in Awdal Region, Somalia

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Abstract

Background: Khat is a stimulant obtained from the fresh leaves of the shrub *Catha edulis*, common in the horn of Africa and parts of Arabian Peninsula and has serious public health implications. The use of khat increased in Somaliland in the past decades and is associated with fewer opportunities for employment and education. Peer pressure and Cigarette smoking are observed to be connected with khat use and in universities students start chewing khat at a higher rate in the first year of university to enhance their coping capacities in view of the new environment, academic stress, separation from their families, and learning pressure. **Objective:** The study aims at finding the prevalence of khat chewing among Amoud University students and its associated factors. **Method:** A cross-sectional study was conducted and a total of 1153 people were chosen for the sample using a two-stage stratified cluster sampling method. Ten departments (main sampling units) from Amoud University's undergraduate programs were chosen at random for the first stage. In the second stage, one section (secondary sample unit) from each year of study in each chosen program was randomly chosen (if there were more than one section). All of the male students in the chosen sections were included in the study. The World Health Organization (WHO) questionnaire for surveys on drug usage among students was used as bases for questionnaire development. The study excluded female students, to avoid response bias as stigma is associated with the females that chew Khat in Somalia. **Results:** Findings revealed that 29.4% (339/1153) of Amoud University students chew khat at least one time in their life. About 17% (196/1153) of total students are current chewers, of whom the majority started chewing khat regularly for less than a year. Those aged 24 years and above had the highest prevalence 39.2% (116/296). The rate of smokers who chew khat was 78% (213/270) and non-smokers 14.2% (125/881). Having friends who chew khat was associated with the chewing habit 44.5% (266/598) compared to those who do not have friends who chew khat 13.3 (74/555). Furthermore, having a father 34.2% (177/517), or siblings 40.2% (138/343) who chew khat was related to the person chewing khat. The chewing trend was not statistically significant between students in the different years from the first to the final-year students. **Conclusion:** The study indicates that khat chewing among university students is higher among Amoud students relative to studies conducted among university students in neighboring countries. In view of the high prevalence of khat use, educational institutions and the health sector should increase public health awareness about the multiple adverse health risks of this practice.

Keywords: Khat, Associated Factors, University Students, Amoud University, Prevalence

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Introduction

Khat leaves or twigs are chewed for stimulant and euphoric properties and have the same chemical structure with a lesser effect than amphetamine. It contains a psychoactive substance called cathinone, which produces central nervous stimulation analogous to amphetamine. It has an immediate effect which is desirable, and long-term negative consequences. The immediate effect includes enhancing energy and alertness while at the same time decreasing the need for food and sleep. Regarding the long-term consequences, chewing khat causes gastritis, constipation, loss of appetite, malnutrition, and teeth deterioration or darkening (Basker, 2013). Likewise, it elevates blood pressure and can cause hypertension, cardiovascular diseases, obesity, and many more problems (Al'Absi et al., 2013; Al-Motarreb, Al-Habori, & Broadley, 2010; Getahun, Gedif, & Tesfaye, 2010). Khat also affects the respiratory center and can cause bronchodilation, which can explain the sensation of the well-being of asthmatic users (Al-Motarreb, Al-Habori, & Broadley, 2010; Sallam et al., 2018).

Khat consumption is also related to the risk of experiencing psychiatric problems such as insomnia, lethargy, hopelessness, anxiety, stress, and depression (Daud, Mahmood, Naeem, and Saleem, 2018). In some cases, it is reported that the chewers experience a state of mania or hypomania (Basker, 2013). Khat chewing also contributes to the preexisting psychotic disorder as confirmed by many types of research (Bimerew, Sonn, & Kortenbout, 2007; Odenwald et al., 2005; Odenwald et al., 2012; Teferra, Hanlon, Alem, Jacobsson, & Shibre, 2011). In any case, the exacerbation of psychotic symptoms depends on how to use khat, such as more hours of Khat chewing, daily use, nighttime use, and a high quantity of Khat use. What is more, few researchers have addressed the inquiry that chewing khat can initiate the development of chronic psychotic disorders (Kroll, Yusuf, & Fujiwara, 2011; Odenwald et al., 2005; Olani et al., 2023; Tulloch, Frayn, Craig, & Nicholson, 2012;) and limited researches on khat chewing treatment (Daud, Saleem, & Mahmood, 2019).

Chewing of the substance became a problem in the 1960s. Prior to that, the plant was grown on a very small scale and consumed only in the country's northern side. The problem was confined at the beginning only to a small portion of the population, like drivers musicians, who, for the sake of their work, need stimulation from the substance. Later, a large portion of the population from different ages and backgrounds began to chew it; the only exception was being a child. Different parts of the country started consumption of the plant at different times. If we put it in chronological order, khat started in the northwest of the country, near the Harar district of Ethiopia, where the khat originated. There are no written documents about the real history of khat. However, many factors played a role in why the people in the North-west started chewing khat first, and one of these factors is because the area is proximal to the area of origin. In former British Somaliland, khat consumption started after the 2nd world war (Elmi, 1983).

For the past decades, a dramatic increase in khat consumption has been seen in Somalia/Somaliland. Khat was typically chewed once a week or only on special occasions like weddings, funerals, and religious gatherings prior to the Somalian civil war. Khat was rarely used, and those who did were typically drivers and artists. The social standards that used to control the habit of chewing khat have changed significantly or disappeared as war and turmoil have broken out in the nation. The majority of the Somali men began to regularly chew khat. This was further aided by the lack of educational and employment opportunities, the accessibility of khat on a

large scale, the abundance of unscheduled free time, and the acceptance of khat chewing among men. Khat use grew among women and teenagers as well, since it was extremely uncommon and stigmatized before the war. It is not only the consumption of khat that has increased, but also the utilization of yesterday's khat, the utilization of khat outside private homes, and the utilization of khat before lunch (Hansen, 2010).

Regarding the prevalence of Khat in Somalia/Somaliland, a three-decade-old cross-sectional study of khat use in Somalia detailed that 64% of adult males from general populations frequently chew khat in the north side (Somaliland) contrast with 21% in southern Somalia (Elmi, 1983). A cross-sectional study in Somalia found that 36.4% (3175/8723) used khat the week before the interview (Odenwald et al., 2007). Another study that is done on active combatants reported that use of khat a week before the study was 26.2% (4611/17600) in the north and 50.7% (8619/17000) in the south of Somalia, and extreme Khat utilization were seven times higher in the south (Odenwald et al., 2009).

A cross-sectional study in Somaliland shows that the use of the substance is more in the people who are ex-combatants 60%, compared to male civilian war survivors 28% of those who do not experience war 18% (Odenwald et al., 2005). Recently, evidence came which supports that the business of khat is overtaken by different militia's as a source of funding for their political gain and growing and export of cannabis and other recreational drugs pose a problem, but the availability of data is limited. Overall the country has no authority to tackle the problems of khat and other illicit drugs. In fact, different factions legally trade the khat, and there is little awareness about the depth of the problem. Alcohol is banned in the country because of religious beliefs, whereas most other recreational drugs are ignored or get less attention (Odenwald et al., 2007).

In a study of a non-representative sample of 207 Somalis (male 152, female 55) living in London, Paul Griffiths discovered 78% (79% of male and 76% of females) with a lifetime history of khat utilization, 67% had been utilizing it in the week prior to the interview, and 6% on a daily basis (Griffiths et al., 1997). Another study with 602 Somalis (324 males, 278 females) in four urban areas in the United Kingdom found that 38% (231) had lifetime used khat (male 58%, female 16%), and 34% had been utilizing it in the month before the interview, and 3% use it daily (Patel, Murray, & Britain, 2005). However, no prevalence study has been conducted on khat chewing in Somali university students so far. For that reason, the current study is to find the prevalence and associated factors of khat chewing among Amoud University.

Method

The study was taken from Amoud University, situated in Borama city, in the northern region of Somalia (Somaliland: an independent rejoin of Somalia). The university provides many programs that include undergraduate diplomas, bachelor's degrees, master's degrees, and it has three campuses. The prevalence study was done only four years programs of bachelor degrees. The bachelor programs consist of thirteen departments and have total students of 4246, which are regular. The male students are 2838, while female students are 1408. The study used a cross-sectional research design. The study included only male students to avoid response bias from female students as stigma is associated with the female that chews Khat in Somalia (Kassim, Dalsania, Nordgren, Klein, & Hulbert, 2015). The undergraduate diploma and bachelor of medi-

cine and surgery were also excluded from the study because both did not meet the four-year program requirement.

Sample size and sampling

The sample size was determined using Openepi version 3 (Dean, Sullivan, & Soe, 2014) and based on the formula developed by Schaeffer and Mendenhall in 1990. First, the largest sample size ($n=1134$) was selected. This sample size was calculated using the single population proportion and assumptions listed below: 95% confidence level, 4500 reference population size, 50% expected prevalence of khat chewing (this expected percentage of prevalence was taken as there hasn't been a prevalence study conducted for the past years in Somalia), a design effect of 1, complex sampling, and a 5% anticipated non-response rate. After that, a two-stage stratified cluster sampling design was used to choose study participants. Ten departments (main sampling units) from Amoud University's undergraduate programs were chosen at random for the first stage. In the second stage, one section (secondary sample unit) from each year of study in each chosen program was randomly chosen (if there were more than one section). The study used the preferred strategy in most school surveys, which was to include all the male students in the chosen sections.

Procedure

A well-structured self-administered questionnaire served as the data gathering tool. The questionnaire was first written in English before being translated into Somali. To ensure the conceptual coherence of the items, an independent translator (language specialist) back translated the questionnaire into English. The World Health Organization's (WHO, 1993) student drug use survey questionnaire served as the basis for the majority of the items in the questionnaire. The questionnaire included questions about general background characteristics, khat chewing behavior, and other relevant data. Prior to the real data collection, a pilot study involving 30 university students was carried out to determine the clarity and comprehension of the items. Some of the items were rephrased based on the suggestions taken from the pilot study students. After taking permission from the university, the students were approached while seated in their classes. With the help of some of the university staff and two facilitators, the students were made spaces between every two students to avoid working together to fill the form. The students were told the aims and objectives of the study, the reason for their selection to the study, and how to fill out the form. After the student understood the study objectives and how to fill out the form, the questionnaire was provided to them. Only facilitators who were not known to the students were monitored.

Variables such as age, field of study, year of study, region of belonging, having father or brother or friend who chewed khat, were used as an independent variable. Whereas, Khat related habit (lifetime chewed khat, lifetime smoking, frequency of chewing khat, number of hours of chewing per day, and how long chewed khat) were taken as dependent variables. SPSS version 25 was used to analyze the data. First, it was started to describe the data and find out the prevalence of Khat usage among Somali undergraduate students. Subsequently, a Chi-square test was done to assess the relationship between regular Khat chewing and other factors. In doing so, P value of 0.05 was used for determining the statistical significance of differences between the groups.

Result

Prevalence study was analyzing by showing the demographic characteristics of participants, prevalence of chewing Khat among the students, and factors that are related to life time chewing Khat.

Table 1: Frequency and percentages of demographic variables

Variable	Category	Frequency	Percentage
Age	18-20	345	29.9
	21-23	512	44.4
	24+	296	25.7
	Agriculture	152	13.2
Field of Study	Engineering	197	17.1
	Education	228	19.8
	Economy	48	4.2
	Nurse	28	2.4
	Laboratory	49	4.2
	Pharmacy	19	1.6
	Public Health	44	3.8
	Sharia and Law	81	7.0
	Freshman	307	26.2
	Year One	313	27.1
Years of University	Year Two	319	27.7
	Year Three	301	26.1
	Year Four	220	19.1
	Somaliland	939	81.4
Region of Belong	Puntland	120	10.4
	South-central Somalia	94	8.2
Lifetime Prevalence of Khat	Yes	340	29.5
	No	813	70.5
Lifetime Prevalence of Smoking	Yes	270	23.4
	No	883	76.6

Table 1 showed the frequency and percentage of socio-demographic characteristics of the participants. The students were grouped into three interval ages that includes 29.82% (345/1153) between the age ranges 18 to 20 years old, 44.41% (512/1153) between 21 to 23 years old, and 25.67% (296/1153) above the age of 24 years old. The majority of the students were belonging to science departments, Somaliand region, not smoke any time in their life. The proportions of education levels were almost equal of the number of participants in which in 26.62% studying year one, 27.67%, year two 26.11% year three, and 19.60% year four. Out of 1153 students 44.84% (517/1153) have a father who chews khat, 29.75% (343/1153) have siblings/s who chew/s khat, and 51.86% (598/1153) have friend/s who chew/s khat.

Table 2: Association of lifetime prevalence of khat with “age, field of study, year of university, region of being, pattern of chewing khat, income received from, duration of chewing khat, frequency of chewing, type of khat chewed, hours chewed per day, has father who chews khat, has sibling who chews khat and has friend who chews khat”.

Variable Category		Lifetime Prevalence of Khat		Chi-Square p-value	
		Yes	No		
Age	18-20	91	254	18.040	.000
	21-23	133	379		
	24+	116	180		
Field of Study	Agriculture	40	112	26.113	.002
	Engineering	43	154		
	Education	74	154		
	Economy	14	34		
	Nurse	4	24		
	Laboratory	8	41		
	Pharmacy	3	16		
	Public Health	14	30		
	Sharia and Law	34	47		
	Freshman	106	201		
Years of University	Year One	107	206	6.045	.109
	Year Two	81	238		
	Year Three	86	215		
	Year Four	66	154		
	Somaliland	308	631		
Region of Belong	Puntland	20	100	27.085	.000
	South-central Soma-12		82		
	lia				
Pattern of Chewing Khat	Not Using	146	813	557.730	.000
	Used Khat Alone	43	0		
	Used Khat with Group	151	0		
	Not Using	146	812		
Income Received From	Jobholder	47	0	553.139	.000
	Family	44	1		
	Relative	14	0		
	Friends	63	0		
	Others	26	0		
	Not Using	146	813		
	Less Than 30 days	61	0		
Duration of Chewing Khat	Less Than 1 Year	65	0	557.730	.000
	1-3 Years	28	0		
	4-6 Years	20	0		
	6+ Years	20	0		
Frequency of Chewing	Not Using	146	813	557.730	.000

	Once a Week	98	0		
	2-4 Days Per Week	61	0		
	Daily	35	0		
	Not Using	146	813		
	Daba Musbaar	37	0		
Type of Khat Chewed	Jabis	120	0	557.730	.000
	Dadar	5	0		
	Boondaro	9	0		
	Others	23	0		
	Not Using	146	813		
Hours Chewed Per Day	1-4 Hours Per Day	100	0	557.730	.000
	5-8 Hours	59	0		
	8+ Hours	35	0		
Has Father Who Chews Khat	Yes	177	340	10.161	.001
	No	163	473		
Has Sibling Who Chews Khat	Yes	138	205	27.110	.000
	No	202	608		
Has Friend Who Chews Khat	Yes	266	332	134.314	.000
	No	74	481		

The above table shows the results for the association of lifetime prevalence of khat with “age, field of study, year of university, region of being, pattern of chewing khat, income received from, duration of chewing khat, frequency of chewing, type of khat chewed, hours chewed per day, has father who chews khat, has sibling who chews khat and has friend who chews khat”. From the results we conclude that lifetime prevalence of khat is significantly associated with “age, field of study, region of being, pattern of chewing khat, income received from, duration of chewing khat, frequency of chewing, type of khat chewed, hours chewed per day, has father who chews khat, has sibling who chews khat and has friend who chews khat” while do not significantly associated with year of university.

Table 3: Association of lifetime prevalence of smoking with “age, field of study, year of university, region of being, pattern of chewing khat, income received from, duration of chewing khat, frequency of chewing, type of khat chewed, hours chewed per day, has father who chews khat, has sibling who chews khat and has friend who chews khat”.

Variable Category		Lifetime Prevalence of Smoking		Chi-Square p-value	
		Yes	No		
Age	18-20	82	263	.056	.056
	21-23	120	392		
	24+	68	228		
Field of Study	Agriculture	30	122	26.601	.015
	Engineering	37	160		
	Education	62	166		
	Economy	7	41		
	Nurse	2	26		
	Laboratory	9	40		

	Pharmacy	4	15		
	Public Health	7	37		
	Sharia and Law	21	60		
	Freshman	91	216		
	Year One	92	221		
Years of University	Year Two	65	254	10.179	.017
	Year Three	71	230		
	Year Four	42	178		
	Somaliland	235	704		
Region of Belong	Puntland	20	100	7.322	.026
	South-central Soma-	15	79		
	lia				
Pattern of Chewing Khat	Not Using	145	814		
	Used Khat Alone	26	17	219.286	.000
	Used Khat with	99	52		
	Group				
Income Received From	Not Using	145	813		
	Jobholder	23	24		
	Family	31	14	226.116	.000
	Relative	11	3		
	Friends	44	19		
	Others	16	10		
Duration of Chewing Khat	Not Using	145	814		
	Less Than 30 days	37	24		
	Less Than 1 Year	42	23	225.077	.000
	1-3 Years	15	13		
	4-6 Years	15	5		
	6+ Years	16	4		
Frequency of Chewing	Not Using	145	814		
	Once a Week	61	37	224.790	.000
	2-4 Days Per Week	36	25		
	Daily	28	7		
Type of Khat Chewed	Not Using	145	814		
	Daba Musbaar	24	13		
	Jabis	75	45	221.279	.000
	Dadar	4	1		
	Boondaro	5	4		
Hours Chewed Per Day	Others	17	6		
	Not Using	145	814		
	1-4 Hours Per Day	57	43	225.185	.000
	5-8 Hours	43	16		
	8+ Hours	25	10		
Has Father Who Chews Khat	Yes	146	371	12.155	.000
	No	124	512		
Has Sibling Who Chews Khat	Yes	110	233	20.384	.000
	No	160	650		

Has Friend Who Chews	Yes	214	384		
Khat	No	56	499	105.980	.000

The above table shows the results for the association of lifetime prevalence of smoking with “age, field of study, year of university, region of being, pattern of chewing khat, income received from, duration of chewing khat, frequency of chewing, type of khat chewed, hours chewed per day, has father who chews khat, has sibling who chews khat and has friend who chews khat”. From the results we conclude that lifetime prevalence of khat is significantly associated with “field of study, year of university, region of being, pattern of chewing khat, income received from, duration of chewing khat, frequency of chewing, type of khat chewed, hours chewed per day, has father who chews khat, has sibling who chews khat and has friend who chews khat” while do not significantly associated with age of the respondents.

Discussion

The study result generally seems to be higher than most of the studies taken from the students in the neighboring countries of Somalia. Because of no prevalence study in Somalia for the past decades, the study was used to compare the prevalence of neighboring countries. The result revealed that students' lifetime prevalence was 29.4% (339/1153), and the current prevalence was 17% (196/1153). The meta-analysis of 24 studies from Ethiopia revealed that the pooled prevalence of khat chewing among university students in Ethiopia was 23.22%. The subgroup analysis showed the highest prevalence in the Oromia region, 31.6%, whereas the lowest prevalence was observed in the Amhara region, 18.1% (Gebrie, Alebel, Zegeye, & Tesfaye, 2018). Another study showed that the pooled prevalence of current khat use among university students in Ethiopia, Yemen, and Saudi Arabia was 14.16%. The pooled prevalence of current khat use was highest in Saudi Arabia, 18.85%, and was 13.59% in Ethiopia and 13.04% in Yemen. Moreover, the lifetime prevalence of khat use was 43.27% in Yemen, 37.32% in Saudi Arabia, and 24.82% in Ethiopia (Ayano, Yohannis, & Abraha, 2019). More recent evidence indicates that khat chewing remains a significant public health concern among young people in Ethiopia. A 2024 cross-sectional study among high school students in Addis Ababa found a high prevalence of khat chewing and identified several sociodemographic and behavioral factors associated with its use (Lemma et al., 2024). Similarly, a 2025 analysis of Ethiopian Demographic and Health Survey data examined predictors of khat chewing among men aged 15–59 years and found substantial variation in khat use according to demographic and socioeconomic characteristics (Melaku et al., 2025). These recent findings suggest that khat use continues to be prevalent across different population groups in Ethiopia and highlight the importance of examining its associated factors among university students. Comparing the current prevalence of our study, only Saudi Arabia's current prevalence was higher, and lifetime prevalence in Saudi Arabia and Yemen was higher.

Moreover, variables such as having a father or friend or siblings who chew Khat or being ever smoked cigarettes contribute to the chances to use Khat. Fatherly substance use, in general, has been appeared to be related to higher chances of substance use among students in secondary schools (Dida, Kassa, Sirak, Zerga, & Dessalegn, 2014; Johnson & Pandina, 1991). Similarly, past researches have additionally indicated that adolescent or young adult alcohol abuse is to be linked with paternal alcohol abuse (Lieb et al., 2002; Van Der Vorst, Vermulst, Meeus, Deković, & Engels, 2009). This appears that youngsters are following the footsteps of their fathers. Having a friend or friends or friends who chew Khat has also been linked to an increase of chewing

Khat which is additionally reliable with past investigations which announced higher chances of Khat using among students who had Khat chewing friends (Deressa & Azazh, 2011; Gebreslassie, Feleke, & Melese, 2013). Peer influence is a well-known perspective for addiction, in which having a friend who dependent on any substance makes the individual be vulnerable to start that substance. This affiliation can be seen from two points of view. From one perspective, students who were not Khat chewers could start chewing Khat because of their Khat user friends. In another perspective, being chewing Khat can be the reason behind having a friendship with Khat users in the first place, because students prefer to have a company with other students who had similar Khat use status. Studies have demonstrated the propensity of young people's inclination to become close friends with companions who are like them as far as marijuana use (De La Haye, Green, Pollard, Kennedy, & Tucker, 2015) and alcohol use (Osgood et al., 2013).

Cigarette smoking is additionally observed to be fundamentally connected with Khat use. This finding is in agreement with past researches (Deressa & Azazh, 2011; Gebreslassie et al., 2013), which revealed higher chances of chewing Khat with the participants who smoke a cigarette. Kassim, Rogers, and Leach (2014) have shown that cigarette smoking initiate chewing Khat up to 45% of those who use Khat. Thus, as Smoking could be a passage point to the Khat chewing propensity, the turn-around could likewise be true. It can be that Khat is the gateway of other addictions in the Somali context, which people, especially youngsters, start chewing Khat first and then Smoking. Finally, the peak age of chewing Khat in this study was observed to be 24+ years old, which was similar to other studies such as college students in Bahir Dar town and furthermore among high school and college students in Jazan, Kingdom of Saudi Arabia (Al-Sanasy, 2009; Odenwald et al., 2005; Widmann et al., 2014).

One of the potential limitations of this study can be the social desirability bias; however, the researchers took some steps to minimize it. The tool used to collect the data was self-administered questionnaire and it was make sure the privacy of the students during data collection. An option of “not using were included the responses of each item in the questionnaire, to make sure all the students to have similar time to complete it. The students were seated appropriately by giving space between each two students. Moreover, the researchers obtained high level of response which is more than expected sample, because of the unite of sample was the whole class and it is mentioned on detail in method session. In any case, the data cannot be representative for all the students as those who absent during data collection can be possible to be delinquent and have a higher proportion of chewing Khat.

Conclusion

The result of this study shows that the lifetime prevalence was 29.4% (339/1153). It was associated with factors that include having a father, a sibling or a friend who chew khat. Similarly, being 24 years or older was also related to the lifetime prevalence of chewing khat. Nearly 75% of the students in this study were younger than 24 years. These findings indicate that as the students reach 24 years or older, the chance of using khat will increase. So, the lifetime prevalence of this study will increase as time goes. On another way, these students are siblings or friends to another student, so as the prevalence of khat chewing increases in this study, so as the prevalence of khat use will increase on their friends and family members. These are alarming and need to address it.

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Data Availability Statement

Datasets will be available upon request from the corresponding authors.

Conflicts of Interest

The authors declare no conflict of interest.

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