

Adverse Effects of Chewing Khat (*Catha edulis*): A Community-based Study in Ethiopia

Likawunt Samuel Asfaw

Hosanna College of Health Sciences, Department of Health Information Technology, Hosanna, Ethiopia

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ABSTRACT

Objectives: The purpose of this study was to assess the effects of habitual chewing of khat (*Catha edulis*) on blood pressure, body mass index, and physiological aspects of sexuality among residents of an Ethiopian town. **Methods:** A statistically determined and randomly selected sample of khat-chewing individuals in the town of Hosanna in Southern Ethiopia were included in the study. We used physical measurements and a self-administered questionnaire to collect the data, which was statistically analyzed. **Results:** The participants comprised a total of 420 with mean age = 28.7 ± 5.7 years; 336 (80.0%) were male. Nearly half (201; 47.9%) were in the age-group 30–34 years. The adverse effects of khat use were assessed from the median score of each outcome, namely, physical problems, abuse potential, and social effects. Having a score above the median on each of the three target outcomes was equated with the presence of adverse effects. Adverse effects were reported among 341 of 420 (81.2%) participants, of whom 277 of 341 (81.2%) were male and 64 of 341 (18.8%) were female. The reported adverse effects were significantly higher among those who co-used tobacco, coffee, or tea with khat, with adjusted odds ratio = 4.8; CI: 2.86–8.22. **Conclusions:** Khat chewing was found to have a significant adverse effect on the health of individuals who indulged in it. This finding implies the need for urgent intervention from health authorities.

Consumption of various plant-based psychotropic substances has been prevalent among humans since ancient times.^{1–4} *Catha edulis* is an evergreen shrub with mildly psychoactive properties, growing wild or cultivated in parts of Eastern Africa and the Arabian Peninsula. The plant is known by several regional names, such as *khat* (Ethiopia), *qat* (Yemen), *qaad/jaad* (Somalia), *miraa* (Kenya), *mairungi* (Uganda), *muhulo* (Tanzania), and *hagigat* (Hebrew).^{5,6} The tender leaves and young buds are chewed to attain states of mild euphoria and stimulation [Figure 1].⁶ Fresh leaves and stems are the favored parts of the plant. When chewed, it emits a characteristic odor and produces mild cocaine or amphetamine-like euphoria.⁶ The harvested leaves are usually packaged in plastic bags or wrapped in banana leaves to retain their moisture and freshness.

Khat is estimated to be chewed daily by over 10 million people in the Arabian Peninsula and East Africa.⁷ The habit is deeply rooted in the socio-cultural traditions of these regions and is particularly widespread in Kenya, Yemen, Djibouti, and Ethiopia.^{7–9} In Ethiopia, 32.5–42.0% of the

adult population are reported to consume khat daily.¹⁰ Khat-chewing habit is reportedly spreading overseas also, especially in the USA, Europe, and Australia.¹¹

Among the numerous chemicals found in the leaves of *Catha edulis* are alkaloids, glycosides, tannins, and amino acids such as tryptophan, glutamic acid, alanine, glycine, and threonine. The leaves also contain vitamins such as ascorbic acid, thiamine, riboflavin, niacin, and carotene; minerals including calcium, iron, manganese, zinc, copper, and toxic metals lead, and cadmium.^{6,12} Cathinone, with mild amphetamine-like properties, is the plant's principal psychoactive ingredient.^{6,12}

Concerning the adverse effects of khat-chewing, contradicting opinions are documented. World Health Organization (WHO) has positioned khat as the least harmful substance in a group of psychoactive substances evaluated by a panel of experts with low abuse potential.¹³ At the same time, several potentially harmful effects of khat—physical, physiological, public health, and social—have been documented.^{5,8–10}

Traditionally, khat leaves have been used to treat depression and for social and academic purposes. The



Figure 1: Leaves of the khat plant (*Catha edulis*) and coconsumed substances (such as coffee and cigarettes) are seen arranged for consumption in a ‘khat-chewing room’ in the town of Hosanna, Southern Ethiopia.

adverse consequences of khat-chewing range from mild emotional instability and irritability to more severe ones such as impaired cognitive functioning, chronic gastritis, constipation, anorexia, weight loss, cirrhosis, urinary retention, impotence, tachycardia, arrhythmia, hypertension, vasoconstriction, and myocardial infarction.^{9,14-16} It is also claimed to be associated with impotence in men and increased sexual desire in women.¹⁷ However, the reported adverse effects cover a vast spectrum of medical issues and may not be amenable to focused intervention [Figure 2]. Therefore, further research is called to verify and summarize the presumed adverse effects and settle the controversies. This study was therefore

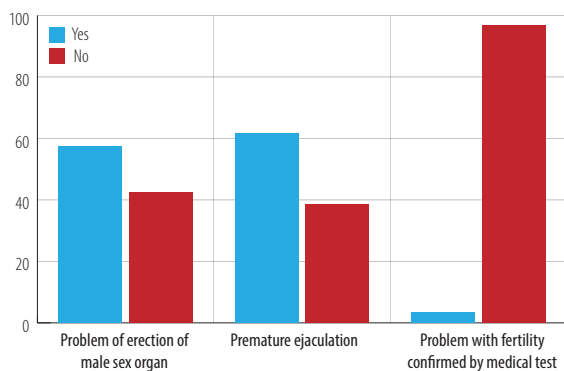


Figure 2: Harmful effects on male sexual behavior attributed to the khat-chewing.

planned to identify the major adverse effects of khat-use and its associated factors.

METHODS

We used a cross-sectional design to conduct this study, which was carried out among the townspeople in Hosanna, southern Ethiopia, many of whom habitually chew the leaves of *Catha edulis*.¹⁸ The sample size was estimated by taking the prevalence of adverse effects attributed to khat use at an estimated 50% (due to absence of published data), 95% CI, 5% margin of error, and 10% non-response rate. Consequently, the required sample size was estimated at 424. We used a single population proportion formula that would be used for calculating the adequate sample size in prevalence study.^{19,20}

$$n = (Z \alpha^2 / 2 p (1-p)) / d^2$$

Here, n is the sample size, Z is the statistic corresponding to the level of confidence, p is the expected proportion, and d is the precision (corresponding to the effect size).

$$n = \frac{(1.96)^2 \cdot 0.5 (1-0.5)}{(0.05)^2} = 385 + (10\% \times 385) = 424$$

This study was conducted between June and September 2016 and approved by the institutional review committee of Hosanna College of Health Sciences (RefNo. HHSC 56/2016/013). Informed oral consent was obtained from all participants before data collection after explaining the objectives of the research.

During our initial screening visits, potential participants were contacted, informed, and asked for their consent to participate in the main study. Subjects who were willing to participate were assigned a code number (for use as a sampling frame) and asked when and where they could be contacted (mobile phone number and public khat chewing place) later for data collection. They were assured that their contact details would be used only for research purposes. We excluded pregnant women from the study due to the possible confounding effect of pregnancy on weight and blood pressure (BP). We used randomly generated numbers to select each sub-unit from the created sampling frame.

WHO mental health and substance abuse questionnaires were translated and modified for the local population and used for data collection. The composite questionnaire comprised three sections. The first section sought demographic data such as age, sex, marital status, level of education, occupation, and religion. The second section had questions on the participant's khat-use practices. The third section consisted of questions that sought perceptions of participants regarding the adverse health effects attributed to khat-chewing. The fourth section comprised physical measurement data and the fifth section had questions to assess the abuse potential of khat. The English version of the questionnaire was translated into Amharic, the official language of the region, by a team of language experts. The Amharic language version of the questionnaire was used to collect data. The original English version of the questionnaire is attached as supporting information in Appendix.

The weight, height, and BP of all participants were taken after they completed the self-administered questionnaire. The WHO STEPS procedure was followed to measure BP.²¹ A mercury sphygmomanometer with best-fit cuff size was used to measure BP. Two consecutive measurements were taken after the subject had rested for at least 3–5 minutes before and after a khat-chewing session.

Most participants would start chewing at noon and stop around 6 PM. The measurements were taken while the participant remained seated, from the right arm with the arm placed at the heart level. We used the difference in levels of BP recorded before and after a khat-chewing session to evaluate the influence of khat use on BP. We measured the height using a fixed-height measuring instrument with the participants standing upright with their heel, back, and buttocks in contact with the wall. Weight was measured using a calibrated weighing scale on which the participant stood barefoot and wearing light clothing.

We analyzed the consistency of the data collection tool using a reliability scale test, and the tool was found to be internally consistent (Cronbach's Alpha = 0.83).²² Data was entered into Epi-Info version 3.5.2 and exported to STATA software (StataCorp. 2007. Stata Statistical Software: Release 10. College Station, TX: StataCorp LP.). A *p*-value of < 0.050 was considered statistically significant. We used frequencies and proportions to describe the data. Bivariate and multivariate analyses were conducted using logistic regression to examine the association between the adverse effects of khat use and selected sociodemographic and behavioral correlates. The multivariate logistic regression model was derived through simultaneous entry analysis. Odds ratio (OR) was used to estimate the strength of associations. Microsoft Excel 2007 was used to create tables and figures.

For the physical harm, we asked the participants to respond to questions designed to assess the physical harms of khat-use. Each item had 'Yes' or 'No' responses. 'Yes' scored 1 and 'No' scored 0. The physical harm score was dichotomized to physical harm present (score \geq the median score) or not present (score < the median score). Participants who scored above the median score of items were taken as 'exposed to physical harm from khat use'.

For abuse potential, we adopted the WHO definition of substance dependence, as a cluster of physiological, behavioral, and cognitive phenomena in which the use of a substance or a class of substances takes on a much higher priority for a given individual than another behavior that once had greater priority. We used four items to measure the abuse potential of khat use. Here too, each item had 'Yes' or 'No' responses with 'Yes' scoring 1 and 'No' scoring 0. We dichotomized and defined the final average score into

Table 1: Sociodemographic characteristics of the study participants.

Variables	All cohort		Male		Female	
	Number	% of N = 420	Number	% of n = 336	Number	% of n = 84
Age group						
15–19	6	1.4	2	0.6	4	4.8
20–24	115	27.4	60	17.9	55	65.5
25–29	58	13.8	52	15.5	6	7.1
30–34	201	47.9	187	55.7	14	16.7
35–39	37	8.8	32	9.5	5	6.0
40–44	0	0.0	0	0.0	0	0.0
45–49	0	0.0	0	0.0	0	0.0
50–54	2	0.5	2	0.6	0	0.0
55–59	1	0.2	1	0.3	0	0.0
Total	420	100	336	100	84	100
Marital status						
Single	63	15.0	48	14.3	15	17.9
Married	128	30.5	116	34.5	12	14.3
Divorced	139	33.1	100	29.8	39	46.4
Widowed	90	21.4	72	21.4	18	21.4
Total	420	100	336	100	84	100

two categories. *Category 0*: participants with ‘low abuse potential’ (scored < the cohort’s median score), and *Category 1*: those with ‘high abuse potential’ (score \geq the median score).

For adverse effects of khat-use, we used physical influences, social influences, and abuse potential of khat. The final score of these three constructs was dichotomized into adverse effects of ‘khat use present’ (score \geq the median score) and adverse effects of ‘khat use absent’ (score < the median score).

RESULTS

Of the 424 filled questionnaires received, those from N = 420 participants were valid and were chosen for the study. The selected participants comprised 336 (80.0%) male and 84 (20.0%) female. Their mean age was 28.7 ± 5.6 years, with an overall age range of 17–55 years. Nearly half (201 of 420; 47.9%) were in the age group 30–34 years; 201 (47.9%; CI: 43.1–52.9) participants had completed higher education. A quarter (110; 26.2%) spent most of their lives with their siblings (not parents), 25.2% (n = 106) spent most of their life with their mothers only, while 65 (15.5%) participants spent most of their life with both parents [Tables 1 and 2].

Nearly half (46.9%) of the participants (42.9% of male and 63.1% of female) had been chewing khat for 4–10 years (median = 9.2 years). The majority

(70.2%) of male and (57.1%) of female chewed khat daily. Most participants (78.2%) were in the habit of chewing khat for three hours in a single session (median = 3.2 ± 0.8 hours).

The participants gave various reasons for their khat habit including: ‘for relaxation purposes’ (n = 154; 36.7%) and ‘social purposes’ (n = 25; 6.0%). Most (64.8%) subjects knew of the harms associated with chewing khat. While 171 (40.7%) participants (42.0% of males, 35.7% of females) used public khat-chewing rooms (*Mekamiya Bet* in local language), 90 (21.4%) preferred hotels [Tables 3 and 4].

Most (265; 63.1%) participants reported that they used other substances while chewing khat. Only male participants (295 of 336; 87.9%) used tobacco products while chewing khat. Most men (269; 80.1%) also revealed consuming alcohol after chewing khat.

Overall, 81.4% of khat chewers reported experiencing adverse effects of its use. Nearly half of participants (187; 44.5%) reported social problems, 102 (24.3%) acknowledged dependency, and 53 (12.6%) reported physical harm related to khat use. Evaluation of the overall score suggests that with a score of ≥ 4 in 275 (65.5%) of the participants, khat has a high potential of abuse [Table 5].

The influence of khat habit on participants’ nutritional status was assessed through self-reported data and measurement of body mass index (BMI).

Table 2: Characteristics related to the participants' family history, occupation, and education.

Variables	All cohort (N = 420)		Male (n = 336)		Female (n = 84)	
	Number	%	Number	%	Number	%
Grew up with						
Both parents	65	15.5	58	17.3	7	8.3
Only with mother	106	25.2	86	25.6	20	23.8
Only with father	32	7.6	23	6.8	9	10.7
Siblings	52	12.4	47	14.0	5	6.0
Sister only	110	26.2	85	25.3	25	29.8
Other	55	13.1	37	11.0	18	21.4
Occupation						
No job	127	30.2	117	34.8	10	11.9
Government employee	130	31.0	125	37.2	5	6.0
Student	37	8.8	22	6.5	15	17.9
Daily laborer	27	6.4	14	4.2	13	15.5
Merchant	56	13.3	42	12.5	14	16.7
Commercial sex worker	25	6.0	0	0.0	25	29.8
Others	18	4.3	16	4.8	2	2.4
Education						
Primary	37	8.8	12	3.6	25	29.8
Secondary	182	43.3	142	42.3	40	47.6
Higher education	201	47.9	182	54.2	19	22.6

Table 3: History and patterns of khat use among male and female participants.

Characteristics	Male		Female		Total	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Duration of khat habit, year						
< 1	35	10.4	5	6.0	40	9.5
1–3	87	25.9	6	7.1	93	22.1
4–10	144	42.9	53	63.1	197	46.9
> 10	70	20.8	20	23.8	90	21.5
Usual place for chewing khat						
Public khat-chewing rooms	141	42.0	30	35.7	171	40.7
Hotels	65	19.3	25	29.8	90	21.4
Home	58	17.3	11	13.1	69	16.5
Elsewhere	72	21.4	18	21.4	90	21.4
Frequency of khat use						
Daily	236	70.2	48	57.2	284	67.7
Weekly	76	22.6	30	35.7	106	25.2
Occasionally	24	7.2	6	7.1	30	7.1
Consumption of other substances[†] while chewing						
Yes	265	78.9	0	0	265	63.1
No	71	21.1	84	20.0	155	36.9

[†]Tobacco, coffee, tea, etc.

Most subjects (300; 71.4%) reported the habit had a negative influence on their food intake. This was supported by the fact that 220 (52.4%) participants had BMIs below the WHO minimum of 16 kg/m².

The overall mean BMI was 16.0±2.0 kg/m² (range = 12–28 kg/m²).

A typical khat-chewing session was associated with a significant increase in the chewer's BP. The

Table 4: Participants' reasons of using khat and their awareness of its harmful potential (N = 420).

Characteristics	Male		Female		Total	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Reason for khat use						
To concentrate on studies (academic purposes)	40	11.9	15	17.9	55	13.1
For better work performance	37	11.1	9	10.7	46	11.0
For relaxation	123	36.6	31	36.9	154	36.7
For socializing with friends/family	22	6.5	3	3.5	25	6.0
Uncertain reason	114	33.9	26	31.0	140	33.2
Knows harm of khat use						
Yes	220	65.5	52	61.9	272	64.8
No	116	34.5	32	38.1	148	35.2

mean systolic BP before khat-chewing was 112.0 mm Hg which rose to 130.5 mm Hg at the end of the chewing session, representing a mean rise of 30.5±6.0 mm Hg (range = 20–50 mm Hg). Mean diastolic BP also rose from 74.4 to 95.8 mm Hg after chewing and increase of 20.5±6.8 mm Hg (range = 10–40 mmHg). Out of the 336 male participants, 193 (57.4%) reported erectile problems.

Selected sociodemographic characteristics and behavioral correlates were tested for association with adverse effects of khat use. Use of other substances ($p < 0.001$), duration ($p = 0.040$), and frequency ($p = 0.020$) of khat use were significantly associated with adverse effects. The misuse potential of khat also

significantly varied across sex ($p = 0.060$), religion ($p = 0.002$), duration of khat habit ($p = 0.001$), cited reasons for khat use ($p = 0.007$), and place commonly used to chew khat ($p = 0.007$).

The adverse effects were significantly higher among individuals who used other substances (tobacco, coffee, tea) while chewing khat (AOR = 4.80; CI: 2.86–8.22) than those who used khat only with water. The likelihood of adverse effects was significantly higher in individuals who used khat daily (AOR = 2.50; CI: 1.10–5.73) than in occasional users. The odds of harmful influences of khat use were significantly lower in individuals who were chewing khat for < 1 year (AOR = 0.50; CI: 0.26–0.97) than in those who had the habit for more than 10 years [Table 6].

Table 5: Adverse effects on behavioral and physical health attributed to khat use (N = 420).

Characteristics	Participants, n	Percent, %
Whether the participant experienced adverse effects of khat use		
Yes	342	81.4
No	78	18.6
Whether the participant committed any illegal activity† associated with khat use		
Yes	54	12.9
No	366	87.1
Computed degree of khat abuse		
Low abuse	144	34.3
High abuse	275	65.5
Major adverse effects associated with khat use		
Physical	53	12.6
Social	187	44.5
Dependence	102	24.3
None	78	18.6

†Committed at least one of the following: theft, disturbing peace, disorderly behavior, and interpersonal conflict.

DISCUSSION

This study examined the adverse effects of chewing khat among users in the town of Hosanna. The vast majority (81.4%) experienced adverse effects. Being the first study to compute the adverse effects of khat use using constructs in different dimensions, there is a dearth of comparative data.

Our results suggest significant adverse effects on habitual and long-term khat users. The habit was more prevalent among our male participants, a finding consistent with reports on different populations in eastern Kenya.²³ The frequency distribution of marital status of our participants suggested a higher prevalence of khat use in those who were divorced and single, albeit lacking statistical significance. It is possible that khat use is associated with social, marital, and productivity issues. The majority of

Table 6: Regression analysis findings of factors associated with adverse effects of khat use.

Variables	Experiencing adverse effects		Adjusted OR (95% CI)	p-value
	Yes (%)	No (%)		
Sex				
Male	275 (81.8)	61 (18.2)	1.10 (0.62–2.05)	0.060
Female	67 (79.8)	17 (20.2)	1.00	
Use other substances*				
Yes	286 (87.7)	40 (12.3)	4.80 (2.86–8.22)	< 0.001 [†]
No	56 (59.6)	38 (40.4)	1.00	
Duration of khat use, year				
< 1	32 (80.0)	8 (20.0)	0.50 (0.26–0.97)	0.040 [†]
1–3	70 (75.3)	23 (24.7)	0.94 (0.37–2.40)	
4–10	171 (86.8)	26 (13.2)	1.18 (0.59–2.37)	
> 10	69 (76.7)	21 (23.3)	1.00	
Frequency of khat use				
Daily	237 (83.5)	47 (16.5)	2.50 (1.10–5.73)	0.020 [†]
Weekly	85 (80.2)	21 (19.8)	1.20 (0.70–2.20)	
Occasionally	20 (66.7)	10 (33.3)	1.00	

*tobacco, coffee, tea; [†]p < 0.050; 1: Reference; OR: odds ratio.

our subjects were well-educated and knew of the harms of the habit. However, the adverse effects experienced were not significantly affected by the user's educational level or knowledge.

A substantial proportion of our participants were in the habit of consuming other substances (tobacco, coffee, tea) while chewing khat. This finding is supported by a similar study in another Ethiopian town, Jimma, which reported cigarette smoking and alcohol use to be significantly associated with khat chewing.^{24,25} Taking of other substances (cigarettes, shisha, coffee, tea) with khat was significantly associated with harmful influences of khat use in the current study. There is no published data on the influence of the concomitant use of other substances with khat. These substances seem to facilitate increased consumption of khat, which in turn might increase khat's adverse effects. It is also possible that the co used substances by themselves contribute to the adverse effects.

This study also examined the influence of khat use on the nutritional status of participants. Participant responses and BMI data suggest that khat-use was negatively influencing their nutritional status, which is consistent with existing understanding.²⁶ We also identified that during the course of a khat-chewing session, the BP of the individual was likely to rise significantly, which also is consistent with other Ethiopian studies.¹⁵

The current study also identified khat use had adverse effects on the sexual and reproductive health of male subjects. Erectile problems, premature ejaculation, and failure to make penetrative sexual intercourse were the identified sexual problems associated with khat use.^{27,28} The self-reported findings from this study showed that 2.6% of participants experienced infertility. Previous studies have also shown similar findings.^{29,30} According to previous research, high-dose khat consumption may decrease sperm quality.^{29,30} While such a distressing outcome requires attention, the mechanisms by which khat may affect the male reproductive physiology have not been fully elucidated and warrant further study.

This study also tried to examine the misuse potential of khat. Unlike a previous report which attributed to khat only mild to moderate psychological dependence,³¹ the current study has detected a high potential of abuse. The contradicting opinions on the abuse potential of khat-use warrant further study. Furthermore, this study identified social influence, dependency, and physical harm as the priority harmful influences of khat use. This is consistent with other studies from the Horn of Africa and the Arabian Peninsula.⁷ Similarly, we identified that habitual khat-chewing worsened stroke and mental illness, which again is supported by previous studies.^{6,17}

The present study has limitations. One is related to the cross-sectional design of the study due to which the temporal relationships between predictor variables and the outcomes could not be established. Moreover, the sample was confined to a single population which limited the power of the study. In addition, since the data was taken from one group and collected at one point in time, the extent to which the problems could be attributed to khat use alone. We recommend an exhaustive longitudinal exploration of the factors associated with the adverse effects of khat chewing behavior among different segments of the Ethiopian population.

CONCLUSION

This study suggests that habitual khat-chewing has high abuse potential and causes adverse health effects, which contradicts some previous assumptions. The duration and frequency of khat-chewing and co use of other substances were the major predictors of the habit's adverse effects. Khat-use negatively influences nutrition intake, sexual and reproductive health, and BP. We also recommend a re-evaluation of khat's potential as a substance of abuse by global drug abuse policymakers including WHO.

Disclosure

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Appendix

Check boxes and or fill blank spaces with data that best describes you.

Part 1: Background characteristics			Part 2: Khat-use profile of participants		
1. Sex	Male	<input type="radio"/>	12. Parents use khat	Yes	<input type="radio"/>
	Female	<input type="radio"/>		No	<input type="radio"/>
2. Age	_____ (years old)		13. Who influenced you to start khat-use?	Family	<input type="radio"/>
3. Educational status	No formal education			Friends	<input type="radio"/>
	Primary	<input type="radio"/>		Unknown reason	<input type="radio"/>
	Secondary	<input type="radio"/>	Others _____		
	Higher	<input type="radio"/>			
4. Marital status	Single	<input type="radio"/>	14. How often do you use khat?	Daily	<input type="radio"/>
	Married	<input type="radio"/>		Weekly	<input type="radio"/>
	Divorced	<input type="radio"/>		Occasionally	<input type="radio"/>
	Widowed	<input type="radio"/>	15. Duration of khat-use	< 1 year	<input type="radio"/>
5. Religion	Orthodox	<input type="radio"/>		1-3 years	<input type="radio"/>
	Protestant	<input type="radio"/>		4-10 years	<input type="radio"/>
	Muslim	<input type="radio"/>		> 10 years	<input type="radio"/>
	Other _____		16. Reasons for Khat-use	Accademic	
6. Ethnicity	Hadiya	<input type="radio"/>		To do other work	
	Gurage	<input type="radio"/>		For enjoyment	
	Silte	<input type="radio"/>		For social purpose	
	Amhara	<input type="radio"/>		Any combination _____	
	Other _____		Other reason _____		
7. Monthly income	_____ Ethiopian Birr (ETB)		17. Do you know the harm of khat-use?	Yes	<input type="radio"/>
8. Employment status	No job	<input type="radio"/>		No	<input type="radio"/>
	Government	<input type="radio"/>	18. Where do you usually use khat ?	Public khat-chewing rooms	<input type="radio"/>
	Student	<input type="radio"/>		Hotels	<input type="radio"/>
	Daily laborer	<input type="radio"/>		Home	<input type="radio"/>
	Merchant	<input type="radio"/>		Elsewhere	<input type="radio"/>
	Commercial sex worker	<input type="radio"/>	19. Do you use other substances while chewing khat?	Yes	<input type="radio"/>
	Others _____			No	<input type="radio"/>
9. Grew up with and spent most of life with	Both parents	<input type="radio"/>		20. Smoke cigarette when chewing khat	Yes
	Mother only	<input type="radio"/>		No	<input type="radio"/>
	Father only	<input type="radio"/>	21. Drink coffee when chewing khat	Yes	<input type="radio"/>
	Siblings	<input type="radio"/>		No	<input type="radio"/>
	Sisters only	<input type="radio"/>	22. Take alcohol after khat	Yes	<input type="radio"/>
10. Educational status of parents	Others _____			No	<input type="radio"/>
	No formal education	<input type="radio"/>	Part 3: Harmful influences of khat-use		
	Primary education	<input type="radio"/>	23. Cost for khat-use (daily)	_____ ETB	
11. Parents or family monthly income	Higher education	<input type="radio"/>	24. Erectile problem of male sex organ after khat-use	Yes	<input type="radio"/>
	_____ ETB			No	<input type="radio"/>
				Not applicable	<input type="radio"/>

25. Problem of premature ejaculation	Yes No	<input type="radio"/> <input type="radio"/>
26. Problem with birth	Yes No	<input type="radio"/> <input type="radio"/>
27. Problem with pattern of feeding due to khat	Yes No	<input type="radio"/> <input type="radio"/>
28. Performed illegal activity due to khat-use	Yes No	<input type="radio"/> <input type="radio"/>
29. Plan to reduce or stop khat-use	Yes No	<input type="radio"/> <input type="radio"/>

Part 4: Physical measurements

30. Weight	_____ Kg
31. Height	_____ meters
32. Blood pressure (BP)	Diastolic BP
	Before khat-use
	DBP 1: _____ mmHg
	DBP 2: _____ mmHg
	After khat-use
	DBP 1: _____ mmHg DBP 2: _____ mmHg
Systolic BP	Before khat-use
	SBP 1: _____ mmHg
	SBP 2: _____ mmHg
	After khat-use
	SBP 1: _____ mmHg
	SBP 2: _____ mmHg

Part 5: Abuse potential of khat

33. Ever felt you should stop khat-use?	Yes No	<input type="radio"/> <input type="radio"/>
34. Do people irritate you for your khat-use?	Yes No	<input type="radio"/> <input type="radio"/>
35. Ever felt guilty about your khat-use?	Yes No	<input type="radio"/> <input type="radio"/>
36. Unable to perform activities without khat	Yes No	<input type="radio"/> <input type="radio"/>

Please rate the priority harmful influences of khat-use for you.

3 - Severe or the 1st rank

2 - Moderate 2nd rank

1 - Mild 3rd rank

Harmful influences of khat-use	1	2	3
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37. Physical harm to you (your organ damage, illness, tooth decay, gastritis...)

38. Social harm (harm to your family, conflicts, unemployment, social value ...)

39. Dependence (unable to perform activities in absence of khat, unable to stop khat-use...)