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RESEARCH ARTICLE

Behavioural Patterns of Khat Chewing and their Impact on Hypertension: A Descriptive Cross-Sectional Study in Mogadishu, Somalia

Kassim Hagi Hossain[1], Md Biplob Hossain[2], Abdirahim Ahmed[3], Abdullahi Tukade[4], Afrin Haque[5], Chomel Mahbub[6], Md. Ashiqur Rahman[7], Sadia Islam[8*]

[1] *Dr. Kassim Hagi Hossain, Senior Pathologist, NOVA Diagnostic and Research, Mogadishu Somalia, doctorqaasim@gmail.com*

[2] *Md. Biplob Hossain, Molecular Specialist, NOVA Diagnostic and Research, Mogadishu, Somalia, biplobali17@gmail.com*

[3] *Dr. Abdirahim Ahmed, Medical Director, NOVA Diagnostic and Research, Mogadishu, Somalia, abdirahim@nova.com*

[4] *Abdullahi Tukade, Head of Training and Research, NOVA Diagnostic and Research, Mogadishu, Somalia, shabeeldhaka1@gmail.com*

[5] *Afrin Haque, Scientific Officer, BIHS General Hospital, Dhaka, Bangladesh, afrinhaque95@gmail.com,*

[6] *Chomel Mahbub, Scientific Officer, BIHS General Hospital, Dhaka, Bangladesh, chomel60@gmail.com*

[7] *Md. Ashiqur Rahman, Quality Manager, Novus Clinical Research Services Limited, Dhaka, Bangladesh, ararashiqur@gmail.com*

[8] *Sadia Islam, Scientific Officer, Bangladesh Specialized Hospital PLC, Dhaka, Bangladesh, sadia.buhs.6700@gmail.com*

***Corresponding author:** Sadia Islam, sadia.buhs.6700@gmail.com

ABSTRACT

Background: Catha edulis, commonly known as khat, is prominent for its stimulating effects and is widely chewed in regions such as eastern and western Africa, the Middle East, and the Arabian Peninsula. Although some perceive khat to have certain benefits, its consumption has been linked to various negative health effects. The aim of this study was to investigate the rate of hypertension among khat users and assess how demographic factors, smoking, and patterns of khat consumption contribute to the risk of developing hypertension. **Methods:** A descriptive cross-sectional study was carried out in Mogadishu, Somalia, between August 2018 and June 2019, involving 192 participants. The study population included individuals aged between 20 and 70 years who had the habit of khat chewing. Blood pressure measurements were taken following standard protocols. A structured questionnaire was used for data collection. Data were analysed using SPSS software with statistical significance defined as $p<0.05$ for all analyses. **Result:** The mean (±SD) age of the participants was 39.19±11.79 years. The average systolic blood pressure was 131.65 mmHg, while the diastolic pressure was 81.48 mmHg. Both systolic and diastolic pressures were found to be significantly elevated (p=0.000). Notably, 82.8% of participants were smokers, among them diastolic blood pressure was significantly higher (p=0.030). **Conclusion:** A significant proportion of participants showed elevated systolic and

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diastolic blood pressure, with the majority of smokers being hypertensive. Public awareness campaigns and healthcare interventions are essential to address the rising risks of hypertension and associated cardiovascular complications in these communities.

Keywords: Khat chewing; Hypertension; Systolic blood pressure; Diastolic pressure; Prevalence

1. Introduction

Khat, scientifically known as 'Catha edulis', is a green shrub from the *Celastraceae* family, predominantly chewed for its stimulating effects. Its consumption is rooted in the tradition of several regions, including eastern and western Africa, the Middle East, and the Arabian Peninsula[1]. Approximately, around 10 million people worldwide regularly consume it[2]. The vital phytochemicals in khat found are the alkaloids cathinone and cathine, which has structural similarity with amphetamines. These alkaloids, mainly cathinone, stimulate the central and sympathetic nervous system by increasing dopamine release and inhibiting its reuptake, resulting in elevated alertness, euphoria, and energy[3]. Despite its widespread use, khat is underscored as an abusive substance by the World Health Organization (WHO), highlighting the concern about its influence on public health[3].

Khat chewing practices are commonly seen in countries like Somalia, where it has been used widely in social gatherings, including weddings and cultural festivities, to foster social interaction. Lately, its consumption has spread to young individuals, especially students, who find consuming khat boost energy, enhance communication skills, and improve their cognitive performance during exams[4]. Additionally, labours in physically demanding jobs chew khat to endure persisting working hours, as they believe it enhances stamina and reduces fatigue[5].

Despite their referred advantage of khat, its consumption has been negatively associated with several health effects, particularly in the vulnerable populations. The WHO underscores students, and those from lower socioeconomic backgrounds as being at increased risk for negative health outcomes linked to khat consumption[6]. Khat chewing has been directly associated with cardiovascular issues, including elevated blood pressure, arrhythmias, and an increased risk of myocardial infarction[7]. Gastrointestinal problems such as constipation and ulcers are also frequently reported, along with adverse mental health. Chronic khat users were found with higher rates of depression, anxiety, and psychosis, with some studies linking khat use to post-traumatic stress disorder (PTSD) [8] [9].

The age group who are widely affected by khat use are individuals between 18 and 35 years, with a rising trend observed in university students. While some studies suggest khat may offer temporary improvements in cognitive performance, these alleged benefits are outweighed by the long-term social and health risks[10] [11] [12]. Moreover, khat consumption is often found associated with other harmful activities, such as smoking cigarettes and alcohol abuse, augmenting the negative effects on overall health[13].

While khat holds significant traditional value in Somalia and other regions, its consumption poses substantial adversity to social, mental, and physical well-being. The stimulant effects of khat may provide short-term mental relief, but the long-term consequences, particularly on cardiovascular and mental health, demand a closer examination. Given the circumstances, this study aimed to determine the behavioral patterns of Khat chewing and their impact on hypertension in the population of Mogadishu, Somalia, contributing to a broader understanding of khat's public health impact.

2. Materials and methods

This descriptive cross-sectional study was conducted in Mogadishu, Somalia, over a period from August 2018 to June 2019. A total of 192 participants were recruited. The study population included individuals aged between 20 and 70 years who had the habit of khat chewing. Eligible participants provided socio-demographic information through structured interviews. Participant confidentiality was strictly maintained throughout the study. An informed consent was obtained prior to participation. Participants were asked questions about the duration of their khat chewing habit (in years), their average daily consumption, frequency of chewing, and the amount of money spent on khat each week. Additionally, other lifestyle factor such as smoking was also assessed to account for confounding variables.

Blood pressure measurements were taken following standard protocols to determine the hypertension status of each participant. Participants were classified as hypertensive based on their blood pressure readings (systolic >120 mmHg, diastolic >80 mmHg) or if they were previously diagnosed with hypertension and on medication. The blood pressure status was sub-classified into five categories; Normal BP (Systolic ≤120 mmHg, Diastolic ≤80 mmHg), Elevated Blood Pressure (Systolic 120-129 mmHg, Diastolic <80 mmHg), Hypertension Stage 1 (Systolic 130-139 mmHg, Diastolic 80-89 mmHg), Hypertension Stage 2 (Systolic ≥140 mmHg, Diastolic ≥90 mmHg), Hypertensive Crisis (Systolic >180 mmHg, Diastolic >120 mmHg).

Data were analysed using SPSS software. A Student's unpaired "t" test was used to compare continuous variables, while chi-square tests were employed to examine categorical variables. Statistical significance was set at $p<0.05$ for all ana

3. Results

3.1. Characteristics of the participants

The study included 192 participants, with a higher proportion of males than females (84.3% and 15.6%, respectively). The mean age was 39.19 ± 11.79 years, with most participants (38.5%) in the 30-39 age group. In terms of body mass index (BMI), 44.4% of participants had a normal weight, while 9.3% were classified as obese. Educational levels varied, with 32.4% of participants lacking formal education. Additionally, 31.7% of participants were unemployed, while the rest worked in various sectors (**Table 1**).

3.2. Prevalence of khat chewing

The prevalence of khat consumption showed that, among male participants 21.6% had been chewing for over 21 years; while in female participants 30.0% have chewed for that long. In terms of daily consumption, the highest intake is more than three bundles per day was observed, among male with 35.8% and among female 30%. Additionally, chewing frequency and the amount of money spent on khat were also recorded (**Table 2**).

3.3. Factors associated with khat chewing

Among the 159 smokers, 87.2% of the hypertensive individuals were male, while 12.8% were female (**Table 3**). Regarding overall blood pressure levels, only 14.6% of participants had normal BP, while the majority presented with various stages of hypertension. Specifically, 33.9% exhibited elevated BP, and 29.2% were classified with stage 2 hypertension (**Figure 2**).

Table 1. Characteristics of the subjects.

Variable	Number (%)
Gender	
Male	162 (84.3)
Female	30 (15.6)
Age (yrs)	
20-29	43 (22.3)
30-39	74 (38.5)
40-49	39 (20.6)
50-59	17 (8.8)
≥60	19 (9.8)
BMI Index (Kg/m^2)	
Under weight	45 (23.4)
Normal weight	85 (44.4)
Overweight	44 (22.9)
Obese	18 (9.3)
Level educational	
Cannot read or write	20 (10.4)
Read & write only	62 (32.4)
Primary	47 (24.4)
Secondary	43 (22.4)
College and above	20 (10.4)
Occupation	
Government	58 (30.2)
Private job	46 (23.9)
Business	27 (14.2)
Unemployed	61 (31.7)

Table 2. Khat consumption overview of the participants.

Khat chewing pattern (n=192)	Male (%)	Female (%)
Duration of chewing		
1-5 yrs	38 (23.5)	5 (16.7)
6-10 yrs	62 (38.3)	6 (20.0)
11-15 yrs	22 (13.6)	8 (26.7)
16-20 yrs	5 (3.1)	2 (6.7)
≥21 yrs	35 (21.6)	9 (30.0)
Consumption per day		
A few leaves	24 (14.8)	4 (13.3)
1 bundle	36 (22.2)	7 (23.3)
2 bundles	15 (9.3)	5 (16.7)
3 bundles	29 (17.9)	5 (16.7)

Khat chewing pattern (n=192)	**Male (%)**	**Female (%)**
>3 bundles	58 (35.8)	9 (30.0)
Chewing frequency		
Daily	30 (18.5)	3 (10.0)
Weekly	91 (56.2)	17 (56.7)
Monthly	21 (13.0)	6 (20.0)
Yearly	20 (12.3)	4 (13.3)
Dollars Spent on khat (weekly)		
≤ 15 $	44 (27.2)	10 (33.3)
16-30 $	44 (27.2)	7 (23.3)
31-45 $	30 (18.5)	6 (20.0)
46-60 $	38 (23.5)	5 (16.7)
≥ 61 $	6 (3.7)	2 (6.7)

Table 2. (*Continued*)

Table 3. Distribution of the participants based on hypertension in relation to smoking status.

	Hypertensive		**Non-Hypertensive**	
	Male (%)	**Female (%)**	**Male (%)**	**Female (%)**
Smoker (n=159)	116 (87.2)	17 (12.8)	23 (88.5)	3 (11.5)
Non-smoker (n=33)	21 (67.7)	10 (32.3)	2 (100.0)	-

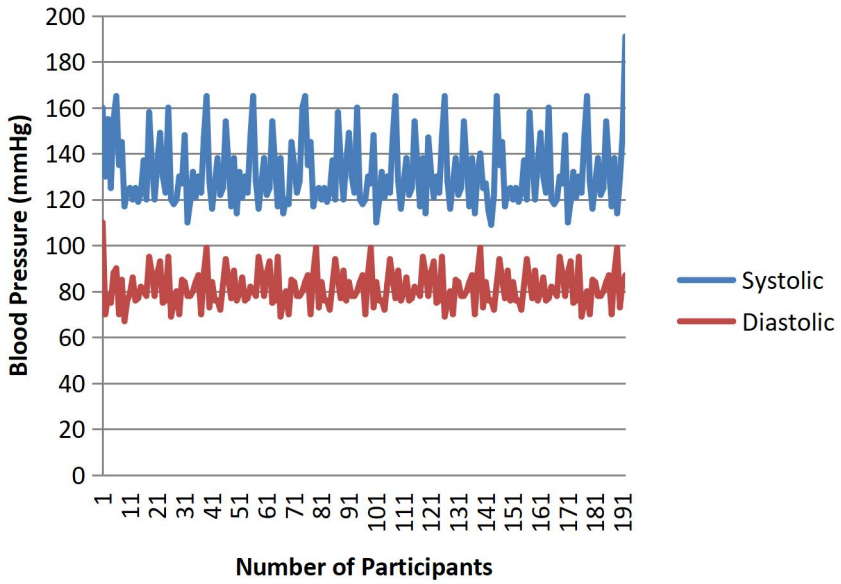

Figure 1. Distribution of the systolic and diastolic blood pressure of the participants.

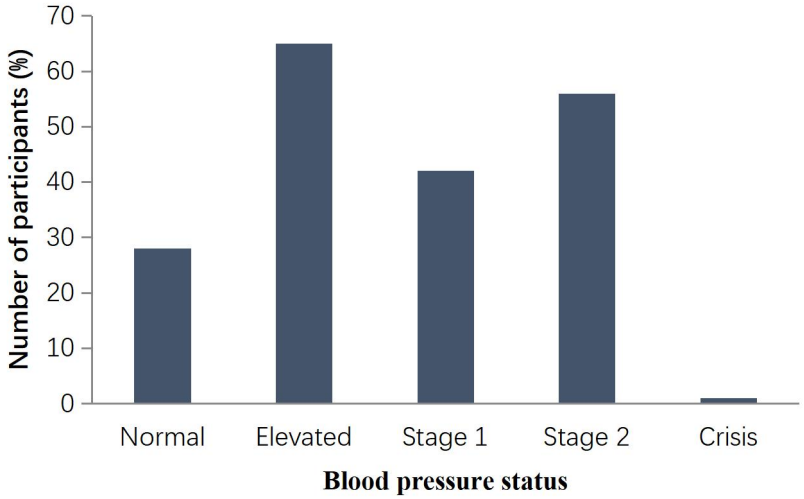

Figure 2. Distribution of study participants according to the blood pressure status.

4. Discussion

Khat is deeply ingrained in the social and cultural fabric of many East African countries, particularly in Somalia. Despite its cultural significance, the growing awareness of khat's health risks has sparked debates about public health impact. The present study was aimed to explore the prevalence of hypertension among khat users and examine how demographic factors, smoking, and khat consumption patterns may contribute to hypertension risk.

A total of 192 participants were recruited for the study, of which 84.3% were male and 15.6% were female. The majority of participants (60.8%) were between 20 and 39 years, suggesting that most individuals begin chewing khat in early adulthood. This finding is consistent with a study by Mahfouz et al[14], which added that peer influence plays a significant role in risky behaviors, as individuals often seek acceptance and connection within their social groups. Furthermore, another study by Reda, A.A et al[15]. found that, in cultures where khat chewing is common, children and adolescents are sometimes encouraged by parents and other community members. Another important factor that needs to be addressed in the current study, 31.7% of the participants was unemployed (**Table 1**). A study also reported that, unemployment and poverty play a crucial role in high consumption rate of khat as individuals seek temporary relief from stress and insecurity[16].

While 57.2% of participants had some level of education, 32.4% had no formal education. Though this alone may not be a direct indicator, a lack of awareness could be a contributing factor to the elevated rates of khat chewing observed in this population[17]. The distribution of khat chewing frequency revealed that, weekly 56.2% of the male and 56.7% of the female chew khat. Additionally, financial factor plays a significant role in khat consumption, as income level influences the likelihood of chewing. A meta-analysis conducted by Ayano G et al[18]. found that individuals with financial independence tend to spend more on khat compared to those who are financially dependent. In the present study, around 10.4% participants spend more than 60 USD per week (**Table 2**).

As aforementioned, the study was primarily aimed to determine the association between khat consumption and hypertension. The mean systolic pressure of the chewers was 131.65 mm/Hg, while diastolic pressure was 81.48mm/Hg. The systolic and diastolic blood pressure of the participants is

demonstrated in **Figure 1**. Blood pressure (BP) level was categorized into five distinct levels. Among them, only 14.6% had a normal BP, while the majority demonstrated with varying stages of hypertension. Particularly, 33.9% exhibited elevated BP, and 29.2% were found with stage 2 hypertension (Fig. 2). Additionally, the systolic and diastolic blood pressure of the participants was found significantly high (p=0.000). These findings are consistent with previous studies which also found association of khat consumption and risk of hypertension[19] [20]. Hypertension is a risk factor for cardiovascular complications, including increased risk of cardiac events. The active chemical, cathionine, is crucially associated with increased systolic pressure, resulting in elevated cardiovascular disease[21]. Hence, it underscores the critical need for early detection and management in populations engaging in khat chewing.

In this study, 82.8% of participants were smokers, indicating a correlation between incidence of chewing khat and smoking (**Table 3**). This aligns with several other studies that have reported a high prevalence of smoking among khat users[17] [22] [23]. However, no statistical significance was found (p=0.127), which may be due to the disproportionate ratio of smoker vs non-smoker among the participants. While looking into the blood pressure status, 83.6% smokers were hypertensive. Notably, the diastolic blood pressure was significantly elevated among the smokers (p=0.030). Nicotine present in cigarette has an adverse effect in the heart and blood vessels by inducing vasoconstriction[24]. The synergetic effect of both khat and smoking elevate the blood pressure and heart rate, thereby amplifying the risk of hypertension, underlining the necessity for targeted initiatives to reduce smoking and khat consumption in these populations.

5. Conclusion

This study underscores a significant association between khat chewing and elevated blood pressure. A notable percentage of participants exhibited a high prevalence of elevated systolic and diastolic blood pressure, with the majority of smokers presenting with hypertension. Given the compounded health risks posed by the combination of khat use and smoking, public health efforts are essential. Targeted public awareness campaigns and healthcare interventions are crucial for mitigating the growing risks of hypertension and related cardiovascular complications in these communities.

Conflict of interest

The authors declare no conflict of interest.

References

1. Mahfouz, M.S., Rahim, B.E.E., Solan, Y.M., Makeen, A.M. and Alsanosy, R.M., 2015. Khat chewing habits in the population of the Jazan region, Saudi Arabia: prevalence and associated factors. PloS one, 10(8), p.e0134545.
2. Nigussie, K., Negash, A., Sertsu, A., Mulugeta, A., Tamire, A., Kassa, O., Abdeta, T. and Dereje, J., 2023. Khat chewing and associated factors among public secondary school students in Harar town, Eastern Ethiopia: a multicenter cross-sectional study. Frontiers in Psychiatry, 14, p.1198851.
3. Toennes, S.W., Harder, S., Schramm, M., Niess, C. and Kauert, G.F., 2003. Pharmacokinetics of cathinone, cathine and norephedrine after the chewing of khat leaves. British journal of clinical pharmacology, 56(1), pp.125-130.
4. Odenwald, M., Hinkel, H., Schauer, E., Neuner, F., Schauer, M., Elbert, T.R. and Rockstroh, B., 2007. The consumption of khat and other drugs in Somali combatants: a cross-sectional study. PLoS medicine, 4(12), p.e341.

5. Gebissa, E., 2010. Khat in the Horn of Africa: Historical perspectives and current trends. Journal of ethnopharmacology, 132(3), pp.607-614.
6. https://www.emro.who.int/emhj-volume-23-2017/volume-23-issue-3/khat-use-and-related-addiction-mental-health-and-physical-disorders-the-need-to-address-a-growing-risk.html
7. Hassan, N.A., Gunaid, A.A., El-Khally, F.M. and Murray-Lyon, I.M., 2002. The effect of chewing Khat leaves on human mood. Neurosciences Journal, 7(3), pp.184-187.
8. Odenwald, M. and Al'Absi, M., 2017. Khat use and related addiction, mental health and physical disorders: the need to address a growing risk. Eastern Mediterranean Health Journal, 23(3).
9. Astatkie, A., Demissie, M., Berhane, Y. and Worku, A., 2015. Prevalence of and factors associated with regular khat chewing among university students in Ethiopia. Substance abuse and rehabilitation, pp.41-50.
10. Gebrehanna, E., Berhane, Y. and Worku, A., 2014. Khat chewing among Ethiopian University Students-a growing concern. BMC public health, 14, pp.1-7.
11. Gebiresilus, A.G., Gebresilus, B.G., Yizengaw, S.S., Sewasew, D.T. and Mengesha, T.Z., 2014. Khat use prevalence, causes and its effect on mental health, Bahir-Dar, north west Ethiopia. European Scientific Journal, 10(23).
12. Kebede, Y., 2002. Cigarette smoking and Khat chewing among college students in North West Ethiopia. Ethiopian Journal of Health Development, 16(1), pp.9-17.
13. Islam S, AshiqurRahman M, AnamChowdhury S, Rahaman S. A review: Serum Lipid Profile Status in Cardiovascular Disease. Molecular Mechanism Research. 2023 Dec 13;1(1):135-.
14. Alsanosy, R.M., Mahfouz, M.S. and Gaffar, A.M., 2013. Khat chewing habit among school students of Jazan region, Saudi Arabia. Plos one, 8(6), p.e65504.
15. Astatkie, A., Demissie, M., Berhane, Y. and Worku, A., 2015. Prevalence of and factors associated with regular khat chewing among university students in Ethiopia. Substance abuse and rehabilitation, pp.41-50.
16. Gelaw, Y. and Haile-Amlak, A., 2004. Khat chewing and its socio-demographic correlates among the staff of Jimma University. Ethiopian Journal of Health Development, 18(3), pp.179-184.
17. Mahfouz, M.S., Rahim, B.E.E., Solan, Y.M., Makeen, A.M. and Alsanosy, R.M., 2015. Khat chewing habits in the population of the Jazan region, Saudi Arabia: prevalence and associated factors. PloS one, 10(8), p.e0134545.
18. Reda, A.A., Moges, A., Biadgilign, S. and Wondmagegn, B.Y., 2012. Prevalence and determinants of khat (Catha edulis) chewing among high school students in eastern Ethiopia: a cross-sectional study. PLoS one, 7(3), p.e33946.
19. Ayano G, Yohannis K, Abraha M. Epidemiology of khat (Catha edulis) consumption among university students: a meta-analysis. BMC Public Health. 2019;19(1):150. doi: 10.1186/s12889-019-6495-9
20. Mains, D., Hadley, C. and Tessema, F., 2013. Chewing over the future: khat consumption, anxiety, depression, and time among young men in Jimma, Ethiopia. Culture, Medicine, and Psychiatry, 37, pp.111-130.
21. Gumaih, H.S., 2017. The Effect of Khat Chewing on Blood Pressure and the Correlation between Body Mass Index and Blood Pressure among Yemeni People in Sana'a City. Al-Razi University Journal for Medical Sciences, 1(1).
22. Geta, T.G., Woldeamanuel, G.G., Hailemariam, B.Z. and Bedada, D.T., 2019. Association of chronic khat chewing with blood pressure and predictors of hypertension among adults in Gurage Zone, Southern Ethiopia: a comparative study. Integrated blood pressure control, pp.33-42.
23. Chong, Z.X., Alshagga, M., Saed, K.A. and Kassim, S., 2017. Impact of khat (catha edulis) chewing/use on heart rate and blood pressure: a critical review. Malaysian Journal of Public Health Medicine, 17(3), pp.76-85.
24. Hanna, S.T., 2006. Nicotine effect on cardiovascular system and ion channels. Journal of cardiovascular pharmacology, 47(3), pp.348-358.