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EFFECT OF CHEWING KHAT ON NUTRITIONAL STATUS AMONG FEMALE STUDENTS AT UNDERGRADUATE LEVEL, IN SANA'A, YEMEN

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ABSTRACT

Background: Khat is an herb grown in large areas and chewed by many citizens .Khat has various physiological and metabolic effects associated with decreased appetite and body weight. **Aim:** The aim of the study is to determine the extent to which nutritional status affected by Chewing Khat among female students at Al-Yemenia University, Sana'a, Yemen. **Method:** The study was conducted on 331 female students, aged from 15 to 30 years at Al-Yemenia University, using questionnaires, such as demographic data, lifestyle, habits associated with Chewing Khat as well as body mass index and fat percentage to know the extent of the effect of Chewing Khat on nutritional status. **Result:** The total number of participants who Chewed Khat was about 57%, so that the age group was 15-20, 21-25, 26-30 equal to 38- 56.1-5.9%, respectively. One of the most prominent habits associated with chewing Khat was smoking, as it was 50%. It was also noted that Khat causes sleep disturbances by 70.5% and effect on appetite by 71%. **Conclusion:** There was no significant difference in the body mass index between Khat Chewers, and non-chewers, but Khat Chewers have some negative habits that affect the nutritional status as it pushes them to use smoking and a lot of soft drinks and affects appetite as well as causes sleep disturbances, health problems, and this in turn negatively affects the nutritional status.

KEYWORDS: Khat, Female Students, Body mass index, Nutritional assessment.

INTRODUCTION

Khat is a shrub-like plant that grows and is consumed mostly in east Africa and the Arabian Peninsula including Ethiopia where it is consumed traditionally for socialization and during spiritual rituals. it often consumed by chewing fresh leaves in a group and in moderation.it has spread outside the region by migrant populations. Khat leaves has an amphetamine-like effect when chewed and is believed to have a potential to be addictive.[1-2] In some European countries, Khat is classified as an illicit substance.[3]

Excessive use of Khat in linked with several health problems, Mental health problems are prominent, leading to cognitive impairment learning difficulties.[4]

Khat use is associated with impaired working memory and cognitive flexibility and behavioral changes. Other health-related problems such as dental health problems. Influence of Chewing Khat on periodontal tissues and oral hygiene status among Yemenis. cardiac abnormalities.[5,6]

Khat is currently recognized as one of the substances that are of concern in Ethiopian Universities.[7] In other countries, Chewing Khat among college students ranges from 19% in Saudia Arabia 54% in Yemen.[8]

Chewing Khat is very common in Yemen. Khat (catha edulis) leaves are commonly chewed by a large proportion of the population in yamen and east Africa.[8,9] It has a mild stimulant effect user chew this stimulant habitually for its euphoric effects and as a recreational drug that also improves performance.[9]

Many people Chew Khat daily, mostly in the afternoon and evening periods. chemical analysis confirms that the fresh leaves contain a number of compounds, including phenylalkylamine compounds (alkaloids) such as nor-pseudoephedrine (cathine) and alpha-amino-propiophenone (cathinone), the latter being structurally related and pharmacologically similar to amphetamine.[10]

As, Khat (Catha edulis forsk) the psychostimulant herbal plant, is produced abundantly in east Africa and the habit of Chewing Khat leaves among certain populations of Ethiopia dates back centuries.[11] Khat contains the active chemicals cathinone and cathine, which have a structural and functional resemblance to amphetamine and share many pharmacologic features in common.[12]

Chewing Khat and its impact on elevated plasma leptin, esterified fatty acid production and resulting lipodystrophy, which leads to further problems on the cardiovascular system, urinary system, gastrointestinal tract, spermatogenesis, and impotence and loss of appetite have been summarized in previous studies.[13] Khat is mainly grown in Ethiopia, Kenya, Yemen, Somalia, Sudan, South Africa, and Madagascar. traditionally, there are strong beliefs among Khat chewers that Khat has health benefits for treatment of diabetes mellitus and that it has anti-obesity effects due to the suppression of appetite. nevertheless, there is agreement on its central effect.[14]

Previous studies used weight measurement to assess the effect of Chewing Khat on the body.[9] However, data on the effect of Khat on the different constituents of body mass i.e., body composition are lacking. Body composition is a term used to describe the different constituents that make up a human's body weight. According to elemental, chemical, anatomical, or fluid components, body composition investigation involves subdividing body weight into two or more compartments.[15]

There are several different methods used to identify body composition, such as body mass index, skin folds and bio electrical impedance analyses. Even though there are studies which show prevalence of Chewing Khat, economical effect and health effect of Chewing Khat has and recommendations on the improving of negative effect of Chewing Khat by many researchers; there are limitation of studies related to nutritional status assessment specially using anthropometries and associated factors.

The present study will incorporate the anthropometry measurement values to add information about effect of Chewing Khat on nutritional status Khat Chewers.[16]

Nutritional Assessment

It is the systematic process of collecting and interpreting information in order to make decisions about the nature and cause of nutrition related health issues that affect an individual.[17]

Body Mass Index

It is a convenient rule of thumb used to broadly categorize a person as underweight, normal weight, overweight, or obese based on tissue mass) muscle, fat, and bone (and height. Major

adult BMI classifications are underweighted under18.5kg/m^2, normal weight 18.5 to 24.9, overweight 25 to 29.9, and obese 30 or more.[18]

Reasons for Chewing Khat

Chewing Khat is both a social and a culture-based activity. Khat is a stimulant, and it is used to improve performance, stay alert and to increase work capacity.[19] The phytochemical constituents of Khat are alkaloids, flavonoids, tannins, and sterols. These constituents vary in concentration based on the time and ground of harvesting.[20]

Behaviors Associated with the Ritual of Chewing Khat

Chewing Khat usually takes place in groups in a social setting. Only a minority frequently chew alone. A session may last for several hours. During this time chewers drink copious amounts of non-alcoholic fluids such as cola, tea, and cold water. In a Chewing Khat session, initially there is an atmosphere of cheerfulness, optimism, and a general sense of well-being. After about 2 hours, tension, emotional instability, and irritability begin to appear, later leading to feelings of low mood and sluggish-ness. Chewers tend to leave the session feeling depleted.[21]

The physical adverse effects of Khat for Cardiovascular system include tachycardia, arrhythmias, palpitations, hypertension, vasoconstriction, ischemia, infarction, pulmonary oedema, and cerebral hemorrhage.[22] For Gastrointestinal system, dry mouth, polydipsia, dental caries, periodontal disease, chronic gastritis, gastric ulcer, and constipation.[23]

For Genitourinary system, spermatorrhoea, impotence, libido change, and urinary retention complicated by diuresis due to increased fluid intake. For central nervous system, dizziness, impaired concentration, insomnia, headaches, migraine, mydriases, conjunctival congestion, impaired motor coordination, fine tremor, and stereotypical behavior.[19]

Psychological Sequelae of Chewing Khat

Chewers can be seen to show a range of experiences, from minor reactions to the development of a psychotic illness. Minor reactions include over-talkativeness, overactivity, insomnia, anxiety, irritability, agitation, and aggression. Broadly, the main psychiatric manifestations linked to the use of Khat are a short-lived schizophreniform psychotic illness, mania and, more rarely, depression.[24,25]

Khat and Cigarettes, Alcohol, and Illicit Drugs

A Home office survey[25] noted that 60% of Somali Khat Chewers in London also smoked cigarettes; 75% of these were men, smoking 5–45 cigarettes per day. Only a minority used any other drugs and the most common was cannabis, used by 6% of the sample.

Now a day's nearly 90% of adult male Chew Khat for between three to four hours daily and, 50% or more, females have taken up the habit. It has been estimated that 73% of women in Yemen frequently Chew Khat. Notably 15- 20% of children below the age of are also daily consumers. Apart from the various health issues caused ,the impact of Khat cultivation on the national economy is huge. For instance, almost half a household's income goes towards paying for the Khat requirement of the head of the family who often chew it for four to five hours a day. This negatively affects their working hours and the family income.[27]

The aim of this study was to determine the prevalence of factors motivating to Chewing Khat and effect of Chewing Khat on body mass index and eating habits.

METHODS

Research Questions

1) What is the prevalence rate of Khat abuse among female students?
2) What is the effect of Khat on the body mass and eat habits?

Sample Limits

A cross-sectional study at the female students at Al-Yemenia University, Sana'a City, Yemen. A required sample was allocated in proportion to its size, so that 330 female students were identified from 1722 female students. The participants in the study were selected using a random sampling.

RESEARCH METHODOLOGY

Descriptive Study Method

Research Tools

Questionnaires, the emerton sensitive device to measure some physical indicators and statistical software.

RESULTS AND DISCUSSION

As shown in Table 1 the number of participants who Chewed Khat was 187 (57%) and non-chewed participants 143 (43%). of the total Khat-users, 187 (57%) and 71 (38%) of them

were categorized in the class of age 15-20, 105 (56.1%) of age 21-25 and 11 (5.9%) aged 26-30 years old sequentially.

As the faculty of participants were concerned of the total female students Khat Chewer, 89 (47.6%), 26 (13.9%), 36 (19.3%), and 36 (19.3%) for faculty of medical health sciences, faculty of engineering-computer sciences, faculty of commerce-economics and faculty of literature respectively. For participant father education level of Chewing Khat, 110 (58.8%), 54 (28.9%), 13 (7%), 3 (1.6%) and 7 (3.7%) for colleges, secondary, primary school, primary and illiterates respectively.

While the education mother level of participant Chewing Khat, 47 (25.1%), 54 (28.9%), 37 (19.8%), 18 (9.6%) and 31 (16.6%) for colleges, secondary, primary school, primary and illiterates respectively. For residency of participant Chewing Khat, 18 (9.6%) and 169 (90.4%) for rural and urban respectively.

Table 1: Demographic Information of The Study Individuals in Terms of Number of Participants, Age, Educational Level of the Parents and Place of Residence.

Variable		Khat Chewing n=187		Non Khat Chewing n= 143		Total n= 330	
		N	%	N	%	N	%
Age	15-20	71	38	50	35	121	36.7
	21-25	105	56.1	89	62.2	194	58.8
	26-30	11	5.9	4	2.8	15	4.5
Faculty	Faculty of Health Sci.	89	47.6	64	44.8	153	46.4
	Faculty of Eng. & Comp. Sci	26	13.9	35	24.5	61	18.5
	Faculty of Commerce & Econ.	36	19.3	28	19.6	64	19.4
	Faculty of Literature	36	19.3	16	11.2	52	15.8
Education Level of Father	College	110	58.8	84	58.7	194	58.8
	Secondary	54	28.9	33	23.1	87	26.4
	Primary sch	13	7	13	9.1	26	7.9
	Primary	3	1.6	6	4.2	9	2.7
	Illiterate	7	3.7	0.7	4.9	14	4.2
Education Level of Mother	College	47	25.1	32	22.4	79	23.9
	Secondary	54	28.9	57	39.9	111	33.6
	Primary sch	37	19.8	17	11.9	54	16.4
	Primary	18	9.6	22	15.4	40	12.1
	Illiterate	31	16.6	15	10.5	46	13.9
Residence	Rural	18	9.6	6	4.2	24	7.3
	Urban	169	90.4	137	95.8	309	92.7

As shown in Table 2, Auxiliary effects of Chewing Khat for participant, 103 (55.1%), 9 (4.8%), 46 (24.6%), 9 (2.7%), 15 (4.8%) and 5 (8.0%) for entertainment, work, study, entertainment/study, entertainment/work and others respectively. Means more than half of the female participants, about 55.1 %were paid for the purpose of entertainment, as it has become a prevalent phenomenon in gatherings. About 24.6% chew Khat during studies, especially during exams, because they believe that Khat increases the absorptive capacity for learning. Others also use it in order to increase activity.

Table 2: Auxiliary Effects of Chewing Khat Motivation to khat Chewing.

The Motivation to khat Chewing	N	%
Entertainment	103	55.1
Work	9	4.8
Study	46	24.6
Entertainment/Study	9	2.7
Entertainment/Work	15	4.8
Others	5	8.0
Total	**187**	**100**

As show in Table 3 about 38% of the Khat Chews were influenced by friends, 28 %were influenced by the family, and about 19 %were encouraged by both family and friends.

Table 3: Motives and Reasons for Chewing Khat.

Khat Chewer with People	N	%
Friends	71	38.0
Family	54	28.9
Alone	21	11.2
Friend and Family	36	19.3
Other	05	2.7
Total	**187**	**100**

As shown in Table 4 one of the most prominent habits associated with Chewing Khat is smoking 50%, water drinking 27.3% and followed by soft drink 18.7%.

Table 4: Habits Associated with Chewing Khat.

Addition to Khat	N	%
Smoke	94	50.3
Water	51	27.3
Soft Drinks	35	18.7
Coffee or Tea	07	3.7
Total	**187**	**100**

As illustrated in Table 5 no difference was noticed in the dietary pattern of the participants. Most of the participants eat three meals, drank about a liter of water per day and eat three meals of meat per week. It was also noted that the Chewers of Khat eat vegetables and dairy products less than the non-chewers. Finally, most of the participants they exercise once a week.

Table 5: Results of The Dietary Pattern of The Study Participants.

Variables		khat Chewing n = 187		Non-Khat Chewing n = 143	
		N	%	N	%
How Many meals do you eat per day?	1	05		04	2.8
	2	34	2.7	24	16.8
	3	107	18.2	81	56.6
	4	32	57.2	31	21.7
	more	09	17.1	03	2.1
How much water do you drink per day?	1	83	4.8	67	46.9
	2	65	44.4	47	32.9
	3	24	34.8	14	9.8
	4	09	12.8	09	6.3
	more	06	4.8	06	4.2
How many animal products do you eat the per day?	1	38	3.2	27	18.7
	2	37	20.3	34	23.8
	3	43	19.8	35	24.5
	4	17	23.0	18	12.6
	more	52	9.1	29	20.3
How many vegetables do you eat per week?	1	44	27.8	20	14.0
	2	35	23.5	25	17.5
	3	31	18.7	25	17.5
	4	23	16.6	22	15.4
	more	54	12.3	51	35.7
How many fruits do you eat per week?	1	45	28.9	35	24.5
	2	43	24.1	37	25.9
	3	49	23.0	27	18.9
	4	17	26.2	14	9.8
	more	33	9.1	30	21.0
How many milk products do you drink per week?	1	38	17.6	34	23.8
	2	45	20.3	27	18.9
	3	36	24.1	30	21.0
	4	26	19.3	13	9.1
	more	42	13.9	39	27.3
How many times do you do sport per week?	1	68	22.5	53	37.1
	2	24	36.4	26	18.2
	3	18	12.8	11	7.7
	4	10	9.6	07	4.9
	more	67	5.3	46	32.2
How many sweets do	1	87	35.8	58	40.6

you eat per day?	2	51	46.5	28	19.6
	3	24	27.3	33	23.1
	4	09	12.8	08	5.6
	More	16	4.8	16	11.2

As shown in Table 6 the underweight of Khat Chewer to the nonchewer were 22.5% to 24.5%, respectively, the ratio of overweight to non- chewer 17.1% to 6.3%, respectively, and for obese 8.6% to 4.2%.

Table 6: Results of BMI for Chewing and Non-Chewing Khat.

BMI	Khat Chewing				Total		x^2	P
	Yes		No					
	N	%	N	%	N	%		
Under Weight	42	22.5	40	28.2	82	24.9	12.1	0.007
Normal Weight	97	51.9	87	61.3	184	55.9		
Over Weight	32	17.1	09	6.3	41	12.5		
Obese	16	8.6	06	4.2	22	6.7		
Total	**187**	**56.8**	**142**	**43.2**	**329**	**100.0**		

As shown in Table 7 it was noted that the Chews of good fat Khat are 18.8 compared to the non- chews 16.2 the posts with high fat Chewing to the non- expression are 26.5.

Table 7: Result of Fat for Khat and Non–Chewing Khat.

Fat Percentage	Khat Chewing				Total		x^2	P
	Yes		No					
	N	%	N	%	N	%		
Good	33	18.8	22	16.2	55	17.6	6.3	0.09
Acceptable	38	21.6	45	33.1	83	26.6		
Increase	46	26.1	36	26.5	82	26.3		
Very High	59	33.5	33	24.3	92	29.5		
Total	**176**	**56.4**	**136**	**43.6**	**312**	**100.0**		

As shewn in Table 8, it noted that, the abnormalities for Khat Chewer to no-chewer, 18.2 % to 11.9%, 41.7% to 36.6, 15.0% to 8.4% and 19.3% to16.1% for skin, hair, eyes, and nails respectively.

Table 8: Clinical Examination Results.

Variables		Khat Chewing n = 187		Non Khat Chewing n = 143		Total n = 330	
		N	%	N	%	N	%
Skin	**Normal**	153	81.8	126	88.1	279	84.5
	Abnormal	34	18.2	17	11.9	51	15.1
Hear	**Normal**	109	58.3	91	63.6	200	60.6

	Abnormal	78	41.7	52	36.4	130	39.4
Eyes	**Normal**	159	85.0	131	91.6	290	87.9
	Abnormal	28	15.0	12	8.4	40	12.1
Nails	**Normal**	151	80.7	120	83.9	271	82.1
	Abnormal	36	19.3	23	16.1	59	17.9

As illustrated in Table 9, Khat Chewer to non-khat chewer 55.1 to 51.9, 154.4 to 155.4, 22.4 to 21.1 and 31.4 to 30.5, for variable weight, length, body mass index and fat, respectively. These indicate that, no significant difference in the body mass index between Khat Chewers and non-khat chewers.

Table 9: Results of Physical Examination.

Variables	**Khat Chewing n = 187**	**Non Khat Chewing n = 143**
	Mean ± SD	**Mean ± SD**
Weight	55.1±16.2	51.9±11.3
Length	154.4±19.4	155.4±14.3
BMI	22.4±5.5	21.1±4.0
Fat	31.4±9.6	30.5±8.2

The prevalence of Khat use were 57.0% which are a higher than prevalence of other studies done in Ethiopia among the general population of Jimma town (37.8%)[28] and Butajira[29], also higher than another similar study done in Yemen 40.7%.[30]

The current study showed similar results with the results of a study conducted in North-west Ethiopia about appetite.[31]

Khat was usually chewed in prolonged sessions, producing mild psycho-stimulant effects such as increased energy, reduce fatigue, increase performance, increase alertness and wakeful.[32-33] The current study also Khat is used during work to increase activity or during study to increase the ability to focus.

According to the study report on age-related factors influencing the occurrence of under nutrition in northeastern Ethiopia using community-based cross-sectional study in Harbu Town, Northeastern Ethiopia in 2013; prevalence of under nutrition was 21.1% among adults this is lower to the current study finding, which is (24,9%) of the total participants are identified to be underweight. This could be because of different study area and different study population.[34]

According to a review by 2013 on hazards of Chewing Khat found that as Khat cause loss appetite and malnutrition.[35] Other study by 2013 on Chewing Khat practice and its perceived health effects among communities of Dera Woreda, Amhara region, Ethiopia by using community-based cross-sectional both quantitative and qualitative study design was found loss of appetite is among the adverse effect of Chewing Khat which were similar with the current study finding.[35]

The common effect had been observed due to the similar side effect of Khat had independently on the nutritional status.

Both underweight and overweight are public nutritional status problems of both Khat Chewers and non-Khat Chewers in which Khat users are mostly affected to be underweight. Chewing Khat pattern, meal pattern and chipsy including amount of fluid intake per session are among the factors that affect the nutritional status of the Khat Chewers.

To prevent or decrease the risk of nutritional status problem of the Khat Chewers minimizing amount of Khat per session, shorting of Chewing Khat year length, increasing amount of fluid intake to more than eight glasses per session, increasing the frequency of meal to more than twice per day, using minimal amount of chipsy, increasing the chance of animal and animal product meals obtaining based on the nutritionist advices are among the core points to mitigate the nutritional status problems of the Khat Chewers.

CONCLUSION

There was no significant difference in the body mass index between Khat Chewers, and non-chewers, but Khat Chewers have some negative habits that affect the nutritional status as it pushes them to use smoking and a lot of soft drinks and thus affects appetite as well as causes sleep disturbances and a number of health problems, and this in turn negatively affects the nutritional status.

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