

## Khat abusing: Effect of Educational Program about Khat Abusing on Self-Care Adherence for Diabetic Patients in Sana'a, Yemen Republic

Nabeel M. Bhzeh<sup>1</sup>, Mimi M. Mekawy<sup>2</sup>, Yahya Abdul-Malek Al-Ezzy<sup>3</sup>

1. Medical-Surgical Nursing, Faculty of Medicine & health sciences, Thamar University, Yemen

2. Medical-Surgical Nursing, Faculty of Nursing, Assiut University, Egypt.

3. Professor of General Internal Medicine, Faculty of medicine, Sana'a University, Egypt.

### Abstract

Yemeni diabetic patients believe that khat chewing helps to lower their blood glucose. Different studies suggested that substance use especially khat chewing in diabetic patients is associated with poor adherence to treatment and outcomes, resulting in mortality and morbidity. Health professionals require greater awareness of khat use and related health problems. **The aim** of the study was to explore the effect of educational program about khat abusing on Self-Care Adherence for diabetic patients in Sana'a, Yemen Republic. **Subjects and Methods:** The total number of selected adults diabetic patients abusing khat both male and female attending to educational program in outpatient diabetic center of Al Thawra Modern General Hospital at Sana'a, Yemen Republic from September 2014 until the end of July 2015 were 116. **Tools:** Patient Assessment Questionnaire, Adherence to Self-care scale and Severity of Dependence Scale-Khat were utilized for data collection. **Results:** There was a strong improvement in Self-Care Adherence  $p < 0.001^{**}$  and there was negative statistically significant correlation between self-care adherence level and Severity of Dependence Scale-khat score (Pearson coefficient  $r = -.251^*$ ,  $p < 0.012$ ). **Conclusion:** there was improvement of Self-Care Adherence for less addicted and there was negative relation between the level of khat abusing dependence and self-care adherence.

**Key word:** Khat, Diabetic Patients, Abusing & Self-Care Adherence.

### Introduction

Khat refers to the leaves and shoots of the plant chewed to provide mild stimulant effects (Ujváry, 2014) The chewing sessions usually lasts for 2 to 4 hours. Smoking tobacco, cigarettes, and drinking cola, weak black tea or just cold water greatly enhance the pleasure of chewing. Some have the habit of using sugared menthol or pieces of sugar or even cardamom to improve the bitter test of khat. It is predominantly consumed in a social setting (Bongard, Khalil & Habori, 2011) Khat chewing causes many health problems like sexual disturbances, sexual violence, hypertension, urinary and digestive system disturbances, periodontitis, liver injury, psychiatric problems, and ophthalmological problems. Various complex factors lies behind the use of khat. Frustration, poverty and/or dislocation make people susceptible to khat abuse (Basker, 2013) El-Sayed & Amin, 2012 found that insulin levels in diabetic chewers were significantly lower than those of diabetic's non-chewers. Khat chewing increases cortisol and resistin levels while decreasing insulin secretion and sensitivity.

Diabetes is a chronic illness that requires ongoing medical treatment and persistent patient self-care education to prevent acute complications and to reduce the risk of long-term complications (American Diabetes Association, 2010) A suitable self-care requires clear, relevant information and instructions from the health care professionals.

Therefore educating the patient is one of the most important assignments for the nurse, which means the nurse has a great responsibility for a well-functioning self-care (Svartholm & Nylander, 2010).

Health care-givers require greater awareness of khat use and related health problems. Health promotion activities are required to increase understanding of the potential risks of regular khat use, to promote harm-reduction strategies, and to increase awareness of services available for those experiencing harm (Douglas et al., 2011) In recent years, the education on self-care may play a pivotal role in rectify beliefs about health and so improve glycemic control, Commitment with drug and health foods (Smalls et al., 2015) Engagement in diabetes self-management education results in a statistically significant decrease in Hemoglobin Glycated (Hb A1c) levels (Chrvala et al., 2015).

### Significance of the study

Yemeni diabetic patients chew the khat as much as other people believing that chewing khat decrease sugar level (Bongard, Khalil & Habori, 2011) The behavior of abusing khat accompanied by health hazards and social habits injurious to health, such as smoking and the purchase of khat costs a lot of money needed by the patient to buy the necessary drugs and balanced nutrients. Because there are no previous studies about the effect of education program about khat abusing on self-care adherence of

diabetes patients so researcher will conduct this study to explore the effect of educational program about khat abusing on self-care adherence for diabetic patients in Sana'a, Yemen Republic.

### The aim of the study

The aim of the study was to explore the effect of educational program for khat stopping and Self-Care Adherence of diabetic patients in Sana'a, Yemen Republic.

### Research hypothesis

To fulfill the aim of study, the following research hypotheses were formulated:

1. The self-care adherence post educational program about khat abusing would be higher than pre educational program.
2. There would be relation between the level of khat abusing dependence and self-care adherence of diabetic patients.

### Patients & Methods

**Research design:** Quasi-experimental pre post-test design was used in this study.

**Setting:** The study was conducted in Outpatient Diabetic Center of Al Thawra Modern General Hospital at Sana'a, Yemen Republic.

**Sample:** The number of responding adult's diabetic patients abusing khat both male and female was 116.

#### Tools:

**Tool I: "Patient Assessment Questionnaire":** it was designed by the researcher based on current, local and international literature. This tool included the following parts:

**Part 1:** Patients sociodemographic data

**Part 2:** Aspects of khat chewing Questionnaire

This part was developed by **Kassim, et al., (2010)** Including questions about type and amount of khat per day, age starting to take khat, duration and the time of khat chewing, the reasons of khat chewing, khat chewing during illness, the desire to leave the khat, attempt to leave khat, the possibility of leaving chewing khat, advice to leave khat and anywhere the patient receive advice to leave khat.

Scoring system: compare the percentage of previous its item before and after educational program.

**Tool II:** Adherence to self-care scale

This scale was developed by **Abolfotouh et al., (2011)**

**Scoring system:** Adherence to self-care composed of 5 items that covered adherence to different domains of self-management during the previous month was used. These domains were adherence to medication, a diabetic diet, glucose monitoring, foot-care and exercise. Each item was scored on a 3-point scale (never, sometimes, and always) with 1, 2, and 3 points assigned, respectively. A total score for

adherence was obtained by summing the scores of these 5 items. The maximum total sum was 15 points and then the percentage total score was calculated and categorized as follows: "poor" (<50%), "fair" (50%–75%), and "good" (>75%) adherence to self-management (**Abolfotouh et al., 2011**).

**Tool III: "Severity of Dependence Scale (SDS)-Khat-Gossop et al., (1995)** Including five items that measure dependence over the last 12 months. This scale was mainly developed to measure psychological dependence upon different drugs.

**Scoring system:** The instrument was translated into the Arabic language. It consists of five items that measure dependence over the last 12 months. It uses "Never, Sometimes, Often, Always" for four items and "Not difficult, Quite difficult, very difficult, Impossible" for one item. Scores for each item range from 0-3 and the total score ranges from 0-15.

#### Pilot study

A pilot study had taken place on the 21th to 28th of September 2014. A pilot study carried out on 20 (10%) diabetic to test clarity and feasibility of the tools and the stability reliability of Arabic version of tools that were investigated by test-retest reliability.

**Educational Program:** It was prepared by researcher in the light of recent literature; the content of the program include the following: definition, types, signs, symptoms, complications of diabetes and self-care that included importance of compliance with medication, diet, foot care, importance of exercise, the nature of khat, the health problems of khat, insecticides and poisons used for treatment khat, effect of khat on teeth and mouth, effect of khat on gastrointestinal tract, urinary system, reproductive system, cardiovascular system, nervous system and effect of khat on economy of country and family. The program also includes information showing that khat increases the risks and complications in other systems for diabetic patients and methods for stopping khat.

#### Ethical considerations

Patients' respect, privacy and information confidentiality was protected using a numbered code on all the questionnaires. No names or identifying information was gathered on the questionnaires. The researcher maintained all questionnaires in a locked and secure file. The data was statically analyzed with Statistical Package for Social Sciences statistical software, version 16, using only the numeric identification code to identify patients. After finishing data analysis, all of the administered questionnaires were destroyed.

#### Method

The study was executed on four phases:

**Preparatory phase (1<sup>st</sup>. Phase):**

1. Preparation and validation of tools for data collection and program were done during this phase.
2. A pilot study had taken place.
3. A systematic search in hospital records were done to estimate the sample size for this current study.
4. Educational program about khat abusing was prepared in light of recent literature.

**Implementation Phase (2<sup>nd</sup>. phase)**

1. Permission was obtained from administration of hospital through written letter from Faculty of Nursing, Assiut University.
2. After the completion of answering the
3. questionnaire, participants were assigned a code number and the data were kept in a secure locker place.
4. The educational program was composed of three sessions. Program was implemented for 10-15th diabetic patients abusing khat per week; the duration of each session was 40 minutes. The study was conducted over a period of 11 months beginning at September 2014 until the end of July 2015. The framework for the sessions was based on a multicomponent framework, including education and mutual support. Several teaching methods were used in the teaching settings,
5. including group discussion and motivated them to comply with the contents of the educational program.

**The first session:** Patients were subjected to the first session of education message after taking baseline assessment. The researcher in the form of group discussion delivered a spoken message. It included

general knowledge about khat abusing general problems. Then the patient was given the printed pictured education papers and asked to attendant of the next educational sessions.

**The second session:** In the second education session, patients were reminded rapidly by the 1st session contents then they were given information about diabetes, self-care and khat health problems.

**The third session:** In the third educational session, patients were reminded rapidly by the 2nd session contents then they would be given information about the important and how to quit khat abusing.

**Follow up and evaluation phase (3<sup>rd</sup>. phase):** Immediately and after three and six months from implementation of the educational program, reassessment of diabetic patients was done. Each patient was subjected to the post-test questionnaire (the same as pretest).

**Statistical analysis**

The Statistical Package for Social Sciences (SPSS) software (Version 16) was used for analysis. The categorical data such as gender, duration of disease, and level of education are presented as frequency and percentage. Paired sample t test was used to compare the pre and post means of its elements. Independent samples t test was used to compare the means of its elements between Stop-khat chewing and Non Stop-khat chewing. Statistical significance was accepted at the 95% confidence level ( $p < 0.05$ ). The Pearson Chi-square test was used to compare the categorical data.

**Limitations of the study**

Patients who were escaped from follow-up constitute limitation of present study.

**Results****Table (1): Sociodemographic data (n=116).**

Categories	n	%
<b>Age:</b>		
▪ 18-<30	23	19.8
▪ 30-50	54	46.6
▪ >50-65	39	33.6
M±SD	51.84±14.11	
<b>Gender:</b>		
▪ Male	90	77.6
▪ Female	26	22.4
<b>Marital Status:</b>		
▪ Single	4	3.4
▪ Married	108	93.1
▪ Divorce	2	1.7
▪ Wowed	2	1.7

Categories	n	%
<b>Education</b>		
▪ Illiterate	25	21.6
▪ Read and write	44	37.9
▪ Primary	5	4.3
▪ preparatory	8	6.9
▪ Secondary	11	9.5
▪ Bachelor	22	19
▪ High Education	1	0.9
<b>Occupation:</b>		
▪ Worker	25	21.6
▪ Employee	31	26.7
▪ Farmer	16	13.8
▪ Trader	3	2.6
▪ H Unworked	24	20.7
▪ house wife	17	14.7
<b>Duration of Disease:</b>		
▪ <9	81	69.8
▪ 9-16	25	21.6
▪ >16	10	8.6
M±SD	7.16±7.85	
<b>Family history:</b>		
▪ Yes	59	50.9
▪ No	57	49.1
<b>Health assurance:</b>		
▪ Yes	2	1.7
▪ No	114	98.3
<b>Reason of khat abusing:</b>		
▪ Habit	29	25
▪ Decreasing blood sugar	29	25
▪ Social interaction	11	9.5
▪ Help pass time	8	6.9
▪ Help concentration	2	1.7
▪ Dependence	36	31.9
<b>Past attempts to stop khat abusing:</b>		
▪ Yes	85	73.3
▪ No	31	26.7
<b>Easiness of stopping khat abusing:</b>		
▪ Yes	76	65.5
▪ No	40	34.5
<b>Chewing khat even ill:</b>		
▪ Yes	13	11.2
▪ No	103	88.8
<b>Device of khat stopping:</b>		
▪ Yes	65	56
▪ No	51	44
<b>The site of advice about khat stopping:</b>		
▪ Hospital	53	77.9
▪ School	2	2.9
▪ The mosque	0	0
▪ Family	0	0
▪ Television	10	19.2

DPsAK= diabetic patients abusing khat & M±SD = mean ± standard deviation.

**Table (2): Comparison of khat abusing behaviors for diabetic patients abusing khat (DPsAK) before and after educational program (n=116).**

Categories	Pre		Post		P value
	n	%	n	%	
<b>Khat abusing:</b>					0.001**
▪ Nonstop-khat abusing	116	100	80	69	
▪ Stop-khat abusing	0	0	36	31	
<b>Number of abusing days per week:</b>					0.056
▪ 2 days or less	3	2.6	7	8.8	
▪ 3-7 days	113	97.4	73	91.2	
M±SD	6.21±1.56		4.16±3.21		0.002**
<b>Quantity of khat chewed per session:</b>					0.687
▪ Up to 1 bag (500 gm)	87	75	62	77.5	
▪ 1.25 bag and more	29	25	18	22.5	
M±SD	1.17±0.68		0.95±2.37		0.339
<b>Hours of Khat chewing per session:</b>					0.001**
▪ Up to 5 H	80	69	56	70	
▪ More than 5 H	36	31	24	30	
M±SD	4.72±2.09		2.97±2.72		0.001**
<b>Willing to stop khat abusing:</b>					0.373
▪ Yes	97	83.6	62	77.5	
▪ No	19	16.4	18	22.5	
<b>Smoking during khat abusing:</b>					0.634
▪ Yes	34	29.3	26	32.5	
▪ No	82	70.7	54	67.5	

M±SD = mean ± standard deviation. Chi square was used, significant difference  $P < 0.05$ , Paired samples T test was used, significant difference  $P < 0.05$ . \* = significant, \*\* = high significant.

**Table (3): Comparison of self-care adherence level for diabetic patients abusing khat (DPsAK) before and after educational program (n=116).**

Categories	Pre		Post		P value
	n	%	n	%	
<b>Adherence to self-care</b>					0.00**
▪ Poor	11	9.5	0	0	
▪ Fair	36	31	15	12.9	
▪ Good	69	59.5	101	87.1	

Paired samples T test was used, significant difference =  $P < 0.05$ . \* = significant, \*\* = high significant.

**Table (4): Adherence to self-care domains between pre and post educational program about khat abusing for diabetic patients abusing khat (DPsAK) (n=116)**

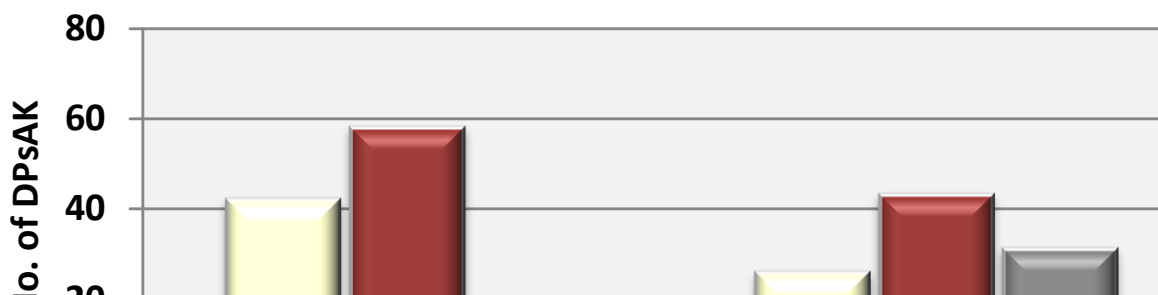
Self-care domains:	Pre M±SD	Post M±SD	P value
▪ Exercise	2.10±0.93	2.64±0.74	0.001**
▪ Foot care	2.34±0.91	2.91±0.42	0.001**
▪ Diet	2.36±0.85	2.77±0.58	0.001**
▪ Glucose monitoring	2.47±0.81	2.78±0.56	0.00**
▪ Drugs	2.63±0.72	2.87±0.43	0.001
<b>Total M±SD 2572</b>	<b>79.37±17.27</b>	<b>93.05±10.67</b>	<b>0.001**</b>

M±SD = mean ± standard deviation. Paired samples T test was used, significant difference =  $P < 0.05$ . \* = significant, \*\* = high significant.

**Table (5): Relation between self-care adherence and Severity of Dependence Scale on khat (SDS-khat) score level (n=116).**

variables	Dependence Scale (SDS-khat) score r	P value
Self-care adherence level	-.251	0.012*

SDS-khat = Severity of Dependence Scale on khat. Pearson coefficient r test was used, significant difference  $P < 0.05$ . \*= significant, \*\*= high significant.

**Figure (1): Comparison number (n=116) of dependent diabetic patients abusing khat (DPsAK) between pre and post educational program.**

**Table (1):** Frequency distribution of socio demographic characteristics of DPsAK showed that, most of subjects were male (77%, n=116), with a mean of  $51.84 \pm 14.11$  years. The majority of the DPsAK (93.1%) were married. The read and write (37.9%) was the highest proportion among the educational status of DPsAK. The 26.7% of the DPsAK were employee. More than a half, of the DPsAK (52.6%) was at semi enough level of economy status. The 69.8% of DPsAK reported being diagnosed with diabetes less than 9 years with  $M \pm SD$  ( $7.16 \pm 7.85$ ) of duration of disease. Nearly a half of DPsAK (50.9%) had family history and the majority of them (98.3%) had no health assurance.

Many reasons were reported for khat chewing, most reason was dependence (31.9%), then, habit or decreasing blood sugar (25%). 73.3% of DPsAK tried to stop khat chewing. The most of the DPsAK (65.5%) reported that stop-khat abusing not difficult. The majority of the DPsAK (88.8%) did not chew khat if they were ill and bedridden. More than a half of DPsAK (56%) had received advice about khat and its effects, most of them (77.9%) had received advice in hospital.

**Table (2):** This table explains that there was high significant difference between khat abusing before and after educational program ( $P < 0.001$ ) specifically 36 of DPsAK (31%) stopped khat abusing after educational program. The mean number of days per week spent in khat chewing was  $6.21 \pm 1.56$  pre educational program compared to  $4.16 \pm 3.21$  days for post educational program. Moreover, there was high significant difference of the means and standard deviation of abusing days per

week ( $P < 0.002$ ) but no statically significant difference between those spent two days or less and three to seven days ( $P < 0.056$ ).

The mean length of khat chewing session was estimated as  $4.72 \pm 2.09$  vs.  $2.97 \pm 2.72$  hours pre-post educational program and there was high significant difference ( $p < 0.001$ ). There was significant different between DPsAK who reported stay up to 5 hours and more than 5 hours (69% vs. 70%) ( $p < 0.001$ ).

**Table (3):** This table demonstrates a statistically significant difference between the percentage of self-care adherence level (poor, faire and god) for DPsAK pre and post educational program ( $P < 0.001$ ).

**Table (4):** This table demonstrates that, There was high significant difference between the overall mean of self-care adherence pre and post educational program ( $79.37 \pm 17.27$  vs.  $93.05 \pm 10.67$ ) ( $p < 0.001$ ).

**Table (5)** States that negative statistically significant correlation between self-care adherence level and Severity of Dependence Scale (SDS-khat) score ( $P < 0.012$ ).

**Figure (1):** Illustrate that no significant difference between the number of dependent DPsAK between pre and post educational program ( $P = 0.506$ ).

## Discussion

The current study is probably the first study to assess the effect of educational program about khat abusing on self-care adherence for diabetic patients in Yemen Republic. The program activities in this study incorporated increasing the self-care adherence. In addition, the results from this study indicated that it is negative relation between the level of khat abusing



dependence and self-care adherence of diabetic patients.

In this study, the majority of patients were males. The majority of the DPAsK were married. About quarter of DPAsK was employee and others were worker, unworked and farmers. More than a half, of the DPAsK was at semi enough level of economy status and at low levels of education (illiterate and only write and read). These findings are in agreement with the earlier results (Al-Abed et al., 2014, Milaat et al., 2007) who reported that khat chewing was associated with male gender, adult age, workers and farmers. They found the majority of the DPAsK were male also found the majority of khat chewers identified were married. Also previous studies reported that Yemeni khat chewers have low socioeconomic status, higher unemployment rates and had lower levels of education, with their majority living in deprived areas with diminished levels of social interaction (Sheikh et al., 2014).

In this study, the majority of patients had no health insurance because of economic conditions and poverty, where most of the peoples of the world are currently looking at how to improve the quality of health insurance (Shurtz, Brzezinski & Frumkin, 2016)

In current study found the mean age of DPAsK is fifty two years old. These results are lower than what is found in other studies outside Yemen. One study in Egypt reported that a mean age of Egyptian diabetic patients was fifty seven years ( $SD \pm 10.47$ ) (Assaad-Khalil et al., 2015). Other study in American reported that a mean age of American diabetic participant was seventy five years (Naccashian, 2009). Considering Yemeni populations tend to develop diabetes at earlier ages than other population, it may be as result of the effect of khat on diabetes. This findings supported by several studies worked in Yemen Gunaid et al., (1997) stressed that diabetes mellitus in Yemen, especially NIDDM, is characterized by an earlier age at onset. Also Al-sharafi & Gunaid (2015) found that the mean age at diagnosis of diabetes mellitus among the khat chewer group was less than non-khat chewer group. In addition to El-Hadrani and Al Hoot showed an association between the habit of Khat chewing and the development of non-insulin dependent diabetes mellitus and suggests that this might be attributed to the adverse health effects of pesticides residues on the Khat chewers (Hadrani & Hoot, 2000).

Concerning family history of diabetes, our findings in Sana'a city found that fifty one percent of family history was lower than sixty three percent that reported from Mukalla city (Babelgaith et al., 2015). Also our findings was lower than that reported from Egypt (fifty eight percent) (Elaziz et al., 2014),

Saudi Arabia (fifty seven percent) (Al Hayek et al., 2014), Qatar (sixty seven percent) (Mutlu et al., 2014), Iran (sixty five percent) (Taghdisi et al., 2012), Hong Kong (sixty two percent) (Yin et al., 2016) and United State of America (seventy four percent) but higher than those reported from Transkei region of South Africa (twenty seven percent) (Erasmus et al., 2001). It may be the result of the influence of stimulant khat, which makes diabetes patients do not seek medical care.

Many reasons were reported for khat chewing, most reason was dependence (thirty two percent), then, habit or decreasing blood sugar (twenty five percent). This study is congruent with several studies. Gashaw & Getachew (2014) & Corkery et al., (2011) reported that frequent khat chewing was associated with khat dependence. Also Widmann et al., (2014) found that seventy two percent fulfill the cut-off criterion for psychological dependence based on the sum score of the SDS but WHO concluded in 2006 that scheduling was not required: "The Committee reviewed the data on khat and determined that the potential for abuse and dependence is low (WHO Expert Committee on Drug Dependence (ECDD), 2006) Regarding to khat chewing as habit, in a previous, related study by Numan (2012) have estimated that seventy percent of the males and thirty five of the females users could be classified as habitual chewers in Yemen.

Regarding to our finding about the belief of khat decreasing blood sugar, Saif-Ali et al., (2003) stressed that the general belief among Yemeni diabetic khat chewers is that khat chewing helps to lower their blood glucose. Also Al-Sharafi & Gunaid (2015) found that more than half of diabetic patients thought that khat was beneficial, only twelve percent thought that it was harmful, and thirty one percent said that they did not know.

Many diabetics believe that khat chewing reduced blood sugar, although many studies have proved no effect of khat chewing on blood sugar (Dallak et al., 2010).

The findings of current study demonstrated that there was high significant difference between khat abusing before and after educational program specifically thirty one percent of DPAsK stopped khat abusing after educational program. The mean number of days per week spent in khat chewing decreased after educational program. Moreover, there was high significant difference of the number of abusing days per week but no difference significant between who spent two days or fewer and three to seven days.

In addition to the mean length of khat chewing session decreased after educational program and there was high significant difference. There was significant

different between DP<sub>s</sub>AK who reported stay up to 5 hours and more than 5 hours.

Similar results were found for interventions that focused on enhancing khat behavioral change, as well as khat and diabetic knowledge levels. **Alsanusy & El-Setouhy (2013)** found that a comprehensive community development program (CCDP) would be useful to reduce khat chewing behavior in this community. This study was consistent with a previous study by **Alsanusy & El-Setouhy (2013)**, they found that negative consequences of khat use were seen in economic, health, familial, and sexual function of their lives. After quitting khat use, patients saw improvements in all of these areas.

The findings of current study were congruent with several studies which found that khat chewing in diabetic patients is associated with poor adherence to treatment and outcomes, resulting in mortality and morbidity (**Tizazu et al., 2012**).

Khat chewing adds additional toxic effects to type 2 diabetics by increasing cortisol and resistin levels while decreasing insulin secretion and sensitivity (**El-Sayed & Amin, 2012**) Oral administration of catha edulis extract does not exert a hypoglycemic effect in normal, glucose-loaded in diabetic rats (**Dallak et al., 2010**) Khat chewing by patients with type 2 diabetes in Yemen is likely associated with poor glycemic control (**Al-sharafi & Gunaid, 2015**).

Results of the study showed positive outcomes in the percentage of good adherence to self-care and improvement in total self-care adherence level and all items of self-care adherence after educational program.

This finding is congruent with several studies which found that risk preference is associated with adherence to self-care behaviors (**Simon-Tuval et al., 2016**) Because the educational program worked on changing the misconception that khat is a treatment for diabetes and thus the patients committed to drugs, self-monitoring investigations of glucose, diet and exercise.

Results of the study demonstrated that there was negative relation between the level of khat abusing dependence and self-care adherence. Similar results were found for Alcohol dependence is inversely associated with adherence to cardiovascular self-care behaviors (**Stacey et al., 2015**).

This study similar to the study carried out in Jazan region, southwest of Saudi Arabia by **El-Setouhy et al., (2016)**, they found that more than half of khat chewers showed psychological dependency. Those having longer khat sessions ( $\geq 6$  hours) were more liable for dependency. Physical and psychological symptoms were more prevalent among khat dependent chewers. Other study carried out on UK-resident male adult Yemeni khat chewers by **Kassim,**

**Islam & Croucher (2010)**, they found more than half of khat chewers showed psychological dependency.

The current study found that there was no significant difference between the number of dependent DP<sub>s</sub>AK pre and post educational program. This means that most of stop-khat abusers and self-care adherence DP<sub>s</sub>AK were non-dependence.

### Conclusion

Based on the result of present study, it can be concluded that there was improvement of Self-Care Adherence for less addicted and there was negative relation between the level of khat abusing dependence and self-care adherence.

### Recommendations

Based on the finding of this study, following recommendations were made:

- Since education is considered to be one of the main organs of health and nursing care, and part of a patient's rights, a greater significance of khat abusing hazards should be attached to any self-care educational program for diabetic patients where dining the khat .
- The educational program about khat abusing should be incorporated with diabetes self-management training program and a short course in this program should be developed for the nurses and nurse practitioners who work at diabetic clinics. It should focus on the hazards of khat and the concept of self-management to promote behavior changes, as well as specific skilled behaviors.
- Further research should replicate the study in a larger sample of poorly controlled diabetes patients. Randomly selected patients from several geographical areas of Yemen are needed to broaden the generalizability of the study. This study followed up for only a short period of time (six months) and this may have been insufficient to examine the effects of the educational program
- about khat abusing on diabetic complications. Longer follow-up studies are needed.
- Diabetic patients, who more dependent on khat, should undergo to addict management program.

### References

1. **Abolfotouh, M., Kamal, M., El-Bourgy, M., & Mohamed, S., (2011):** Quality of life and glycemic control in adolescents with type 1 diabetes and the impact of an education intervention. *International Journal of General Medicine*, 20(4), 141–152.



2. **Al Hayek, A., Robert, A., Al Saeed, A., Alzaid, A., & Al Sabaan, F., (2014):** Factors Associated with Health-Related Quality of Life among Saudi Patients with Type 2 Diabetes Mellitus: A Cross-Sectional Survey. *Diabetes Metab Journal*, 38(3), 220-229.
3. **Al-Abed, A., Sutan, R., Al-dubai, S., & Aljunid, S., (2014):** Family Context and Khat Chewing among Adult Yemeni Women : A Cross-Sectional Study. *BioMed Research International*, 2014, 9–11.
4. **Alsanusy, R., & El-Setouhy, M., (2013):** Why would khat chewers quit? An in-depth, qualitative study on Saudi Khat quitters. *Substance Abuse : Official Publication of the Association for Medical Education and Research in Substance Abuse*, 34(4), 389–95.
5. **Al-sharafi, B., & Gunaid, A., (2015):** Effect of Habitual Khat Chewing on Glycemic Control, Body Mass Index, and Age at Diagnosis of Diabetes in Patients with Type 2 Diabetes Mellitus in Yemen. *Clinical Medicine Insights: Endocrinology and Diabetes*, 8(1), 47–53.
6. **American Diabetes Association. (2010):** Standards of Medical Care in Diabetes--2010. *Diabetes Care*, 33(1), 11–61.
7. **Assaad-Khalil, S., Zaki, A., Rehim, A., Megallaa, M., Gaber, N., Gamal, H., & Rohoma, K., (2015):** Prevalence of diabetic foot disorders and related risk factors among Egyptian subjects with diabetes. *Primary Care Diabetes*, 9(4), 297–303.
8. **Babelgaith, S., Baidi, Al-Arifi, Alfadly, & Wajid. (2015):** Effect of health care professional continuing education program on diabetic patients outcomes in Mukalla City, Yemen. *Tropical Journal of Pharmaceutical Research*, 14(2), 30.
9. **Basker, G. V. (2013).** A Review on Hazards of Khat Chewing. *International Journal of Pharmacy and Pharmaceutical Sciences*, 5(3), 74–77.
10. **Bongard, S., Khalil, S., & Habori, A., (2011):** Khat Use and Trait Anger: Effects on Affect Regulation during an Acute. *European Addiction Research*, 17, 285–291.
11. **Chrvala, C., Sherr, D., & Lipman, R., (2015):** Diabetes self-management education for adults with type 2 diabetes mellitus: A systematic review of the effect on glycemic control. *Patient Education and Counseling*, 99(6), 926-43.
12. **Corkery, J., Schifano, F., Oyefeso, A., Ghodse, A., Thomy, T., Naidoo, V., & Button, J., (2011):** “Bundle of fun” or “bunch of problems”? Case series of khat-related deaths in the UK. *Drugs-Education Prevention and Policy*, 18(6), 408–425.
13. **Dallak, M., Bin-jaliah, I., Al-khateeb, M., Nwoye, L., Shatoor, A., Soliman, H., & Al-hashem, F., (2010):** In vivo acute effects of orally administered hydro-ethanol extract of. *Saudi Medical Journal*, 966(5), 627–633.
14. **Douglas, H., Boyle, M., & Lintzeris, N., (2011):** The health impacts of khat: A qualitative study among Somali-Australians. *Medical Journal of Australia*, 195(11), 666–669.
15. **Elaziz, K., Nour-eldin, F., & Momen, M., (2014):** Assessment of Health related Quality of life among diabetics patients in Al Gharbia Governorate, Egypt using COOP / WONCA charts. *The Egyptian Journal of Community Medicine*, 32(3), 47–58.
16. **El-Sayed, M., & Amin, K., (2012):** Effect of *Catha edulis* on insulin , resistin and cortisol levels in type-2 diabetics and nondiabetics. *Cortisol Levels In Type-2 Diabetics And Non-. American Journal of Biochemistry and Biotechnology*, 8(3), 157–163.
17. **El-Setouhy, M., Alsanusy, R., Alsharqi, A., & Ismail, A., (2016):** Khat dependency and psychophysical symptoms among chewers in Jazan Region, Kingdom of Saudi Arabia. *BioMed Research International*, 2016, 1–6.
18. **Erasmus, R., Blanco Blanco, E., Okesina, A., Mesa Arana, J., Gqweta, Z., & Matsha, T., (2001):** Importance of family history in type 2 black South African diabetic patients. *Postgraduate Medical Journal*, 77(907), 323–5.
19. **Gashaw, A., & Getachew, T., (2014):** The Chemistry of Khat and Adverse Effect of Khat Chewing. *American Scientific Research Journal for Engineering, Technology, and Sciences (ASRJETS)*, 9(1), 35–46.
20. **Gunaid, A., El Khally, F., Hassan, N., & Mukhtar, E., (1997):** Demographic and clinical features of diabetes mellitus in 1095 Yemeni patients. *Annals of Saudi Medicine*, 17(4), 402–409.
21. **Gossop M., Darke S., Griffiths P., Hando J., Powis B., Hall W., (1995).** The Severity of Dependence Scale (SDS): psychometric properties of the SDS in English and Australian samples of heroin, cocaine and amphetamine users. *Addiction* 90(5): 607-14.
22. **Hadrani, A., & Hoot, M., (2000):** An Association between Khat and Diabetes. *Egyptian Journal of Surgery*, 19(1), 1–4.
23. **Kassim, S., Islam, S., & Croucher, R., (2010):** Validity and reliability of a Severity of Dependence Scale for khat (SDS-khat). *Journal of Ethnopharmacology*, 132(3), 570–577.
24. **Milaat, W., Bani, I., Aqeely, H., Makeen, A., Salih, M., & Alnaggar, M., (2007):** Jazan Health

- Needs Assessment: A Key informant approach Jazan Health Needs Assessment: A Key informant approach. *Journal of Public Health Medicine*, 6(3), 105-110.
25. **Mutlu, F., Bener, A., Eliyan, A., Delghan, H., Nofal, E., Shalabi, L., & Wadi1, N., (2014):** Projection of Diabetes Burden through 2025 and Contributing Risk Factors of Changing Disease Prevalence: An Emerging Public Health Problem. *Journal of Diabetes & Metabolism*, 05(02), 1-7
  26. **Naccashian, Z., (2009):** The Impact of Diabetes Self-Management Education on Glucose Management in Ethnic Armenians with Type 2 Diabetes (Doctorate thesis), School of Nursing, Azusa Pacific University. ProQuest (3401155).
  27. **Numan, N., (2012):** The green leaf: Khat. *World Journal of Medical Sciences*, 7(4), 210-223.
  28. **Saif-Ali, R., Al-Qirbi, A., Al-Geiry, A., & AL-Habori, M., (2003):** Effect of *Catha edulis* on plasma glucose and C-peptide in both type 2 diabetics and non-diabetics. *Journal of Ethnopharmacology*, 86(1), 45-49.
  29. **Stacey E., Rittmueller, Madeleine S., Frey, Emily C., Williams, Haili Sun, Chris L., Bryson & Katharine A., Bradley (2015):** Association Between Alcohol Use and Cardiovascular Self-Care Behaviors Among Male Hypertensive Veterans Affairs Outpatients: A Cross-Sectional Study, *Substance Abuse*, 36:1, 6-12.
  30. **Sheikh, K., El-Setouhy, M., Yagoub, U., Alsanosy, R., & Ahmed, Z., (2014):** Khat chewing and health related quality of life: cross-sectional study in Jazan region, Kingdom of Saudi Arabia. *Health and Quality of Life Outcomes*, 12(1), 44.
  31. **Shurtz, I., Brzezinski, A., & Frumkin, A., (2016):** The impact of financing of screening tests on utilization and outcomes: The case of amniocentesis. *Journal of Health Economics*, 48, 61-73.
  32. **Simon-Tuval, T., Shmueli, A., & Harman-Boehm, I., (2016):** Adherence to Self-Care Behaviors among Patients with Type 2 Diabetes The Role of Risk Preferences. *The journal of International Society for Pharmacoeconomics and outcomes research*, 19(6), 844-851
  33. **Smalls, B., Gregory, C., Zoller, J., & Egede, L., (2015):** Direct and indirect effects of neighborhood factors and self-care on glycemic control in adults with type 2 diabetes. *Journal of Diabetes and Its Complications*, 29(2), 186-91.
  34. **Svartholm, S., & Nylander, E., (2010):** Self-care activities of patients with Diabetes Mellitus Type 2 in Ho Chi Minh City (Doctorate thesis), Department of Public Health and Caring sciences, University of UPPSALA. Uppsala University Publications (126200).
  35. **Taghdisi, M., Borhani, M., Solhi, M., Afkari, M., & Hosseini, F., (2012):** The effect of an education program utilising PRECEDE model on the Quality of Life in patients with type 2 diabetes. *Health Education Journal*, 71(2), 229-238.
  36. **Tizazu, A., Hussien, Y., Mebratu, S., & Agalu, A., (2012):** Substance Use Among Diabetic Patients in Dessie Referral Hospital , Northeast Ethiopia Abstract : Research Desk, 1(1), 40-46.
  37. **Ujváry, I., (2014):** Psychoactive natural products : overview of recent developments. *Ann Ist Super Sanità*, 50(1), 12-27.
  38. **WHO Expert Committee on Drug Dependence (ECDD). (2006).** Assessment of khat (*Catha edulis* Forsk) Retrieved from [http://www.who.int/medicines/areas/quality\\_safety/4.4KhatCritReview.pdf](http://www.who.int/medicines/areas/quality_safety/4.4KhatCritReview.pdf).
  39. **Widmann, M., Warsame, A., Mikulica, J., von Beust, J., Isse, M., Ndetei, D., Odenwald, M., (2014):** Khat Use, PTSD and Psychotic Symptoms among Somali Refugees in Nairobi - A Pilot Study. *Frontiers in Public Health*, 2(6), 71.
  40. **Yin, J., Yeung, R., Luk, A., Tutino, G., Zhang, Y., Kong, A., Chan, J., (2016):** Gender, diabetes education, and psychosocial factors are associated with persistent poor glycemic control in patients with type 2 diabetes in the Joint Asia Diabetes Evaluation (JADE) program. *Journal of Diabetes*, 8(1), 109-119.