

Herbal Use and Perceptions among Patients with Type 2 Diabetes Mellitus in Kuwait

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Abstract

Herbal medicine has become a popular treatment among patients with chronic diseases worldwide. Many patients with diabetes mellitus use herbal medicine without consulting their health professionals. The aim of this study was to assess the prevalence, pattern of use, and perceptions in type 2 diabetes patients using herbal medicine. It was conducted between 1st January 2019 and end of June 2019 diabetes clinic in Farwaniya Hospital in Kuwait. In this cross sectional quantitative study, 350 patients were asked to complete questionnaire administered by nurses. The study found that 30.6% of sample used herbal medicine—women more than men. Black cumin (habba soda) *i.e.* *Nigella sativa* was the most common herb used by diabetic patients. The study revealed that 70% of herbal medicine users had poor glycemic control (HbA_{1c} ≥ 7%). Diabetic complications were greater in herbal users than in those receiving conventional therapy. The study also showed that 95.3% of herbal medicine users did not inform their treating doctors. Our conclusion was that herbal medicine users needed to increase their awareness and education about the risks and complications of herbal medicine.

Keywords

Herbal Medicine, Complimentary Medicine-Type 2 Diabetes Mellitus, Perceptions, Kuwait

1. Introduction

The World Health Organization (WHO) defines complementary medicine as a diverse health practice, which included the use of herbal medicines, mineral-based medicines and animal parts which are used singly or in combination to diagnose or prevent or treat illness and to maintain well-being [1].

Type 2 diabetes mellitus is highly prevalent in Gulf countries, and prevalence of diabetes mellitus in Kuwait is 21.1% [2]. It is well known that diabetes mellitus is associated with significant morbidity and mortality, from various microvascular complications such as retinopathy, nephropathy and neuropathy and as well as macrovascular complications such as ischemic heart disease, stroke and peripheral vascular disease [3].

Complementary and Alternative Medicine (CAM) is widely used throughout the world especially by patients with chronic diseases such as type 2 diabetes mellitus. In the United States, the Centers for Disease Control and Prevention report that 40% of adults and 10% of children have used complementary treatment [4]. Australian data, published in 2007 have suggested that 64% of the people had used one or more modes of CAM in the previous 12 months [5]. The proportion of patients using CAM over one year was 23% in Denmark and 49% in France [6]. In Gulf countries such as Saudi Arabia, 30% of patients with diabetes mellitus had used herbal medicine to treat their condition [7]. It is widely believed that some herbal remedies provide symptomatic relief and help in the prevention of complication from diabetes mellitus. Some are proven to help in regenerating pancreatic beta cells in overcoming insulin resistance and in improving glycemic control in diabetic patients [3].

The chronic nature of diabetes mellitus and its complications motivate patients to use alternative medicine to treat their condition [8]. Patients decide to use complementary medicine for a variety of reasons including dissatisfaction with conventional treatment, the side effects of prescribed drugs and high costs of the drugs and most drugs have side effects and high costs of such drugs [9] [10]. In some cases these traditional methods of treatment coincide with patients' values, or spiritual and religious and beliefs regarding the nature and the meaning of illness and death [11] [12].

2. Aim of the Study

This study aimed to investigate the prevalence of type 2 diabetes patients using herbal or alternative medicine use Kuwait among type 2 diabetes mellitus patients. This investigation aimed to provide essential evidence to guide individuals and decision makers.

3. Patients and Methods

This is a cross-sectional quantitative study that assessed the prevalence, and type of herbal medicine used to treat type 2 diabetes and was conducted between January 2019 and end of June 2019 in the diabetes clinic at Farwaniya Hospital Kuwait.

4. Study Population

Sample size and recruitment strategies.

The sample size was calculated according to the equation used in cross-sectional

studies and surveys.

$$\text{Sample size } n = \frac{z_1 - \alpha^2 / P^{(1-P)}}{d^2}$$

where n = number to be sampled

$Z^2 = (1.96)^2$ for 95% confidence

P = "best guess" for prevalence

d = Absolute *i.e.* (Maximum tolerable error for the prevalence estimate)

Sample size in this study assumes a 35% prevalence of herbal medicine use of herbal medicine in people with type 2 diabetes mellitus is 350 patients.

Patients were selected by systematic random sampling Data were collected face-to-face by the diabetes consultant at the clinic using a 24-item questionnaire adapted and modified from previously validated studies on herbal medicine use. The structured questionnaire was composed of socio-demographic variables and questions about management of diabetes mellitus to capture knowledge, attitudes and beliefs.

5. Inclusion and Exclusion Criteria

Participants were male and female patients aged 18 or over who had been diagnosed with type 2 diabetes at least a year ago, and had HbA1c of more than 6.5%, fasting blood glucose of ≥ 123 mg/dl and post-prandial blood sugar of ≥ 200 mg/dl recorded on 2 occasions. Participants were selected providing they were conventional medications which was described by the diabetes doctor (drugs or insulin or mixed) for diabetes, had good cognitive functions and successfully completed the interview process. Exclusion criteria included patients not diagnosed with diabetes mellitus before their clinic visit, those who had not received oral anti-diabetic drugs or insulin, and patients experiencing difficulties in understanding the questions.

Ethical approval number 00769 MOH was obtained from the Ethics Committee of the Ministry of Health in Kuwait. Informed verbal and written consent was also obtained from all participants.

6. Statistical Analysis

The collected data were coded, entered and analyzed using SPSS software version 23. Data were presented as frequencies and percentages, means and standard deviations. The Chi-square test was used to show the significance of association between different variables and the use of herbal medicine. A P-value of less than 0.05 was considered significant.

7. Results

7.1. Socio-Demographic Data

A total of 350 patients with type 2 diabetes were included in this study. 30.7% reported using herbal medicine in their therapy regimen (107 NIDDM). Half of

these patients were aged 40 - 59 and about 31.6% of them were aged over 59 years (**Table 1**).

Women used herbal remedies more than men (56.1% compared to 43.9%) with significant statistical difference between patients using and not using herbal remedies (P-value 0.001). 51.4% of herbal medicine users had 12 years or more of education. 74.8% were Kuwaiti nationals. There was no significant statistical difference regarding educational level between users and non-users of remedies (P-value ≥ 0.05). (**Table 1**) Patients with an average monthly income of between 500 and 1000 Kuwaiti dinars were split into 46.7% herbal medicine users and 33.7% non-users. There was significant statistical difference between users and non-users of herbal medicine (P-value 0.00001) (**Table 1**). A family history of

Table 1. Socio-demographic characteristics of herbal users and non-herbal users.

	Using herbal remedies	Not using herbal remedies	X ²	P-value
Age (years)	N = 107	N = 243	5.187	0.075
<40	20 (18.7)	43 (17.7)		
40 - 59	54 (50.5)	95 (39.1)		
>59	33 (30.8)	105 (43.2)		
Sex				
Male	47 (43.9)	150 (61.7)	9.576	0.001
Female	60 (56.1)	93 (38.3)		
Education				
Illiterate	22 (20.6)	51 (21.0)	0.283	0.868
<12 years of education	30 (28.0)	70 (28.8)		
≥ 12 years of education	55 (51.4)	122 (50.2)		
Nationality			2.989	0.838
Kuwaiti	80 (74.8)	201 (82.7)		
Non-Kuwaiti	27 (25.2)	42 (17.3)		
Monthly Income				
<500 KD	25 (23.4)	60 (24.7)	34.518	<0.00001
500 - 1000 KD	50 (46.7)	82 (33.7)		
≥ 1000 KD	32 (29.9)	101 (41.6)		
Occupation				
Employed	70 (65.4)	150 (61.7)	0.938	0.626
Unemployed	10 (9.3)	20 (8.2)		
Retired	27 (25.2)	73 (30.1)		
Marital status				
Married	90 (84.1)	220 (90.5)	2.866	0.090
Unmarried	17 (15.9)	23 (9.5)		

diabetes mellitus was recorded for 58% of diabetic patients who used herbal medicine compared to 53.4% of diabetic patients who were not using herbal medicine. There was no significant statistical difference between the two groups (P-value = 0.441) (**Table 2**). Most herbal users and non-users had had diabetes mellitus for more than five years (60.7% and 58.4% respectively). Follow-up of glycemic status was not regular for 70% of diabetic patients using herbal medicine compared to 34.2% for non-users. There was significant statistical difference between the two groups (P-value < 0.00001).

7.2. Types of Herbal Remedies Used

In regard to the most popular herbs, 17 diabetic patients were using a mixture of herbal remedies prepared by a herbalist (15.9%), followed by 15 patients using *Black cumin* (*Habba soda* or *Nigella sativa*). 12 patients used Cinnamon (*Darcien* or *Cinnamomum zeylanicum* Blume). 11 used garlic, 10 used Fenugreek (*Trigonella foenumgraecum*) and 10 were using Bitter apple (*Citrullus colocynthis*). Seven patients used onion and five used *Aloe vera* (**Table 3**).

7.3. Diabetes Mellitus Control and Compliance and Diabetes Complications

Glycemic status was not controlled for 71% of herb users compared to 40% of non-users, so that diabetic complications were more common for herb users (71.1%) compared to 17% for non-users. However, there was significant statistical difference between the two groups (P value < 0.00001) (**Table 4**).

Table 2. History of diabetes, duration and continuity of care in patients.

Variable	Using herbs No = 107	Not using No = 243	X ²	P-Value
Family history of diabetes	No %	No %		
Yes	62 (58)	130 (53.4)	0.593	0.441
No	45 (42)	113 (46.5)		
Duration of diabetes				
<5 years	42 (39.3)	101 (41.6)	0.166	0.684
5+ years	65 (60.7)	142 (58.4)		
Continuity of care				
Follow-up always in the same clinic	40 (37.4)	97 (40.0)	0.199	0.656
Follow-up in different centers	67 (62.6)	146 (60.0)		
Regularity of follow-up				
Regular	32 (30.0)	160 (65.8)	53.519	<0.00001
Not regular	75 (70.0)	83 (34.2)		
Number of annual follow up visits				
<6 per year	61 (57.0)	70(28.8)	25.228	<0.00001
6+ per year	46 (43.0)	173(71.2)		

Table 3. Herbal medicine used to treat diabetes mellitus.

English name	Local name	Latin name	Using remedy No = 107	%
Fenugreek	Helbah	<i>Trigonella foenum-graecum</i>	10	9.3
Black cumin	Habba Soda	<i>Nigella sativa</i> L	15	14.1
Cinnamon	Darcein	<i>Cinamonum zeylanicum</i> Blume	12	11.2
Bitter apple	HanThal	<i>Citrullus colocynthis</i>	10	9.3
White lupine	Termes	<i>Lupinus albus</i>	6	5.6
Garlic	Thum	<i>Allium sativum</i>	11	10.3
Onion	Basal	<i>Allium cepa</i>	7	6.5
Aloe vera	Sabr	<i>Aloe vera</i> L.	5	4.7
Worm wood	Sheeh	<i>Artemisia judaica</i>	5	4.7
Herbal mix Prepared by Herbalist			17	15.9
More than one type	-	-	9	8.4

Table 4. Diabetes mellitus control, complications and compliance.

Variable	Using herbs	Not using	X ²	P-Value
	No = 107 No %	No = 243 No %		
Glycaemic control				
Controlled HbA1c < 7%	31 29	145 60	28.01	<0.00001
Not-controlled HbA1c ≥ 7%	76 71	98 40	40	
Type of treatment				
On diet only	3 2.8	8 3.3	0.255	0.968
Oral tablets	80 74.8	183 75.3		
Insulin	5 4.7	13 5.3		
Mixed	19 17.7	39 16.1		
Regularity of treatment				
On diet only	3 2.8	5 2.1	16.938	0.0002
Regular medical treatment	10 9.3	73 30.0		
Irregular medical treatment	94 87.9	165 67.9		
Complications of DM				
Absent	31 28.9	202 83.1	93.723	<0.00001
Present	76 71.1	41 16.9		

The majority of diabetic patients in both groups were using oral tablets to control their metabolic state (74.8% in herbal users and 75.3% in non herbal users).

ers respectively) followed by mixed oral tablets and insulin in 17.7% in herbal users compared to 16.1 in non herbal users followed by insulin and diet therapy with no significant statistical difference between herbal and non herbal users (p value = 0.968) (Table 4).

The majority of herbal users used their conventional treatment on an irregular basis 94 patients while 73 diabetic patients of non herbal users were using their drugs of their treatment regularly and there was significant statistical difference between both groups (P value \leq 0.0002) (Table 4).

Diabetes complications as nephropathy, retinopathy and neuropathy and hypertension were more prevalent in herbal users as these complications were observed in 76% of herbal users compared to 41% in non herbal users with significant statistical association between both groups (P value \leq 0.00001) (Table 4).

7.4. Patterns, Attitudes and Perceptions

Most of the herbal medicine users 69.2 % of them got most of their information about herbal medicines from friends. 14% got information from family members and 12% from TV, radio or the internet. 4.7% reported choosing their herbal medicines based on their own knowledge (Table 5). 46.4% of the herbal medicine users reported using herbal medicine to support their treatment of diabetes by conventional treatment, 9% reported a loss of confidence with prescribed drugs used to manage their condition. 9.3% reported using herbs to avoid diabetic complications. 65.4% of herbal medicine users said they had not experienced side-effects from using it. 30 patients (28%) said they had experienced side effects.

Table 5. Perceptions and attitudes of use of herbal medicine.

	No	%
<u>Source of information</u>		
Self option	5	4.7
Friends	74	69.2
Family	15	14.0
Media	13	12.1
<u>Indications for use</u>		
Supportive	50	46.7
Loss of confidence with drug	31	29.0
To avoid complications	10	9.3
More than one cause	16	15.0
<u>Side effects of herbal medicine</u>		
Yes	30	28.0
No	70	65.4
Not sure	7	6.5

Continued**Use alongside with conventional treatment**

Yes	64	59.8
No	35	32.7
Sometimes	8	7.5

Frequency of use

Daily	42	39.3
Weekly	50	46.7
Other	15	14.0

Satisfaction

Yes	80	74.8
No	20	18.7
Note sure	7	6.5

Informing the clinic doctor

Yes	5	4.7
No	102	95.3

60% were using herbal remedies along side with drugs or insulin and 32.7% were using herbal remedies as a single treatment mode for their diabetes. Eight patients were using herbal remedies infrequently (**Table 5**).

Most herbal medicine users (74.8%) were satisfied with the use of herbal medicine and 20% were not satisfied. Seven patients 6.5% were unsure about side effects of herbs. 95.3% of herbal medicine users had not informed their hospital doctors (**Table 5**).

8. Discussion

The use of herbal therapy is a common practice in chronic diseases both in developed and developing countries [13] [14] [15] [16]. This use may be attributed to the long-term suffering of patients or to the failure of medical treatment to bring rapid and long-lasting relief and control of these diseases, also people believe that herbal medicine is more natural than modern drugs [17].

Herbal medicine is frequently used by patients with diabetes mellitus to help them manage this chronic disease [18].

The use of herbs in treatment of diabetes is attributed to several mechanisms of action like in Fenugreek the hypoglycemic effect may be mediated through stimulating insulin synthesis and/or secretion from the beta pancreatic cells of langerhans. Prolonged administration of the same dose of the active principle for 30 days to the severely diabetic rabbits lowered fasting blood glucose significantly, but could elevate the fasting serum insulin level to a much lower extent, which suggests an extra-pancreatic mode of action for the active principle. The effect may also be by increasing the sensitivity of tissues to available insulin. The

hypoglycemic effect was observed to be slow but sustained, without any risk of developing severe hypoglycemia [19]. *Nigella sativa* are used as seeds or crude oil in treatment of diabetes mellitus as it exhibits remarkable ability to increase insulin sensitivity and induce proliferation of beta cells of pancreas in diabetic rats [20]. In human, it was reported that NS use after 30 days of use is associated with improvement in fasting and post prandial glucose levels [21].

For Cinnamon that is a herb used widely in Arabic countries. Among the components of cinnamon, cinnamaldehyde significantly and dose-dependently decreases the plasma glucose concentration of streptozotocin-induced diabetic rats [22].

Regarding the mechanism underlying these effects, it was reported that cinnamon extracts promote the transportation of glucose by glucose transporter 4 in brown adipose tissue and muscles. Clinical research studies support the positive effects of cinnamon on both types 1 and 2 diabetes mellitus [23] [24] [25]. The effect of *Citrullus colocynthis* hydraulic extract (Bitter apple) on rats, which had diabetes induced by streptozocin and normoglycemic rats was evaluated in a research, the results showed the alleviated blood glucose level of diabetic rats using a specific dose of the extract. However, the extract had no significant impact on blood glucose level in normoglycemic rats [26]. The literature review revealed that 50 patients with type 2 diabetes were evaluated for two months in a clinical trial. In this research, two groups of intervention (n = 25) and control (n = 25) received 100 mg capsules of *C. colocynthis* extract and placebo three times daily, respectively. According to the results, a significant reduction was observed in the level of fasting blood sugar and HbA1c of the subjects in the intervention group [27].

A number of studies have focused on the ability of onion and garlic to ameliorate diabetes, with many of them reporting both hypoglycemic and hypolipidemic effects in animal models of chemically induced non insulin-dependent diabetes [28] [29]. However, the effects of ripe onion juice on hypoglycemic activity and on anti-diabetic activity have not been evaluated.

We found that 30.6% of diabetic patients in our study used herbal medicine. This finding is consistent with the study of Al Saeedi *et al.*, 2003 [7] in Saudi Arabia, where the prevalence of the use of herbal medicine among patients with diabetes was 30.1% of the studied sample.

The study by Alami *et al.* [30] in Morocco revealed that the prevalence of use of herbal medicine in diabetic patients was high (54.8%). In Gulf countries such as Saudi Arabia, a 2002 study by Al-Rowais *et al.* [17] reported that 17.4% of 300 diabetic patients were using herbal medicine. In 2008, a Kuwait study by Awad *et al.* [31] reported that only 13% of the diabetic patients (104 diabetic patients) were using herbal medicine. Our study revealed that half of the diabetic patients using herbal medicine were aged between 40 and 59 years, and 30% were 59 or over. This finding coincides with the studies of Al-Rowais [17] and Al-Saeedi *et al.* 2003 [7].

We found that employment status and level of education did not have statistical significance associated with the use of herbs. This result is not consistent with the findings of other studies. As one example, study of Kumar *et al.* [32] found that in an Indian survey, a higher level of education and socio-economic status were significant positive correlates with use of herbal medicine in India.

A significant relationship was observed in many studies between a higher prevalence of use of herbal medicine and higher ages, female gender, higher education, longer duration of diabetes and high rates of diabetes complications [8]. All these factors are consistent in our results with the exception of educational level. In this regard, our results are consistent with the 2013 Malaysian study by Ching *et al.* [15], where the educational level of the diabetic patients had no significant association with herbal medicine use in diabetic patients.

In our study, 71% of diabetic patients using herbs had poor glycemic control and the frequency of complications was higher than for patients on conventional treatment. This may be attributed to the fact that, most of herbal users did not use herbs on daily basis and in an irregular way and may be some times as monotherapy without using ant diabetic drugs described by the treating doctor also herbal users have a higher degree of regularity in follow-ups for their glycemic status in primary health care centers and outpatient clinics in Kuwait. Most herbal medicine users (95%) did not inform their consultants about their use of herbs for managing their diabetes mellitus. This finding coincides with the results of Khalaf *et al.* [13] and Argaez-Lopez *et al.* [33]. This may be attributed to limited time during a clinic visit, to inadequate doctor-patient communication during consultations or to a fear of a negative attitude from doctors. Clinicians may also fail to ask patients about the use of herbal medicine.

9. Conclusions

This study assessed patients' use perspectives and practices regarding the use of herbal medicine in the management of diabetes. About one-third of diabetic patients have reported such use. Most of the herbal medicines were plant products that were affordable and widely available locally. Although herbal medicines have potential benefits, they also have potential adverse effects. There is currently limited knowledge of the physiological effects of most herbal medicines that were widely used, so it is not possible to assess whether these medicines were beneficial, harmful, or both. In view of this, the findings reveal a need for further research to identify the bioactive compounds present in these medicinal plants and to determine their efficacy at a physiological level.

Patient education is a cornerstone item in improving the knowledge of diabetic patients about the benefits and side effects of these herbs and how to use these herbs and safe dose and should be used with diabetes conventional therapy and not used alone and used in regular basis, and also we need the pharmaceutical agencies to do more studies about the activity and side effects of these herbs in their future research.

Limitations of the Study

The limitation of this study, may be small sample size as if large sample size is large and including multi centers in Kuwait, we were able to estimate the actual prevalence of the herbal use in Kuwait, and this will be done in my future research, also we did not stress on the major side effects of these herbs as many patients may deny the presence of these side effects as they are afraid to tell their treating doctors about their use of herbs and did not report about side effects of these herbs.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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