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Research Article

HERBALS USAGE AMONG TYPE 2 DIABETES PATIENTS AND ITS RELATION TO GLYCEMIC CONTROL

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Abstract

Introduction:

The World Health Organization (WHO) estimated that 80% of people worldwide use herbal medicines. Few studies showed that the herbal substances have significant hypoglycemic and metabolic benefits. The aim of our study is to estimate the prevalence of herbal usage among Type 2 Diabetes (T2D) patients and its relationship to glycemic control. **Methodology:** A cross-sectional study that was conducted at Prince Mansour military Hospital, Taif, Saudi Arabia during the period from March-December 2017. We included adult patients with T2D and excluded those with type 1 diabetes (T1DM) and women with gestational diabetes (GDM). We included herbal substances that commonly used in our local community. **Results:** A total of 666 patients with a mean age of 59.3±11.5 years were included in the study. The majority of patients were females and on combined insulin and oral agents. Almost 40.0% were using herbals before the diabetes diagnosis. About 21.55% of the patients use herbal substance for diabetes related complains. The most common herbal used was the honey and cinnamon followed by black seeds. The most common reasons for the herbal usage was friend advise. The herbal users were more likely to be male ($P=0.002$), older age at the diabetes diagnosis ($P=0.043$), and have higher level of education ($P=0.002$). **Conclusion:** Our study showed that the herbal users don't have better glycemic control when compared to the non-herbal users. Gender and education are significant factors for herbal usage. Honey was the most commonly used herbals and had the better average HbA1c compared to other herbal substances.

Keywords: Herbal substances, type 2 diabetes mellitus, honey.

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INTRODUCTION:

Herbal substances defined as a plant or plant part like seeds, berries, roots, leaves, bark, or flowers, used for its scent, flavor and medical purposes [1,2]. The history of using herbal substances is thought to be started as early as 3000 before Christ (BC) by Ancient Chinese and Egyptian papyrus. In 2000 anno domini (AD) the Europe took the herbal substances field into laboratories and did experimental trials about its effectiveness and sensitivities toward treatment [3]. Recently, the World Health Organization (WHO) estimated that 80% of people worldwide use herbal medicines and in Germany alone, about 600-700 plant-based medicines are available and 70% of German physicians prescribe it [4].

Type 2 diabetes mellitus (T2D) is a metabolic disease characterized by hyperglycemia resulting from relative insulin deficiency accompanied by resistance of insulin receptors in the cells. The latest studies show that the global prevalence of diabetes mellitus (DM) among adults has risen from 4.7% in 1980 to 8.5% in 2014 and estimated to be 422 million [5]. In Saudi Arabia the number is estimated to be 7 million living with DM and more than 3 million with pre-diabetes [6]. Healthy diet, regular physical activity, maintaining a normal body weight and avoiding tobacco use are ways to prevent or delay the onset of T2D [5].

The relationship between herbal substances and DM is still unclear, but there are some studies show that the herbal substances have significant hypoglycemic effect and metabolic benefits [7]. There is a study showed that using of alternative medicine increased from 33.8% in 1990 to 42.1% in 1997 [8]. In local study in Riyadh the result showed that 17.4% of the sample reported using some form of herbs and 73% of the herbs users did not inform their doctor regarding their use of herbs [9]. Another research found that the mass media (e.g. T.V., newspapers and radio) constituted a source of knowledge and attitude of herbs in 46.5% of the study group [10].

The aim of our study is to estimate the prevalence of using herbs among T2D and the relationship between herbs and glycemic control. Also, we will explore the most common herbs were used among T2D, the reasons of herbs usage, and the sources of the herbs.

METHODOLOGY:

Study Design:

A cross-sectional study among patients with T2D that has been done at Prince Mansour Hospital, Taif city, Saudi Arabia during the period from March to

December 2017.

Data collection methods:

Researchers interviewed the patients and collected data by pre-designed questionnaire to collect the following data: medical record number (MRN), personal information (age, gender, level of education, and marital status), diabetes related information, and herbal substances usage related information.

We included herbal substances that commonly used in our local community. Our research team ensure privacy and confidentiality to the patients to obtain accurate information regarding usage of herbal substances, as many patients find it embarrassing or feel uncomfortable to disclose such information to physicians. Vital signs, height and weight were measured in the same visit and Body Mass Index (BMI) was calculated. Recent laboratory data have been collected from the laboratory system using patients' MRN.

Inclusion criteria:

The participants met all these criteria to be involved in the study: patients with T2D who aged 18 years and older who had a routine follow up visit to the Diabetes Center. All participants who agree to participate were included.

Exclusion criteria:

The exclusion criteria were patients with type 1 diabetes (T1DM) and women with gestational diabetes (GDM).

Ethical considerations:

This study was approved by the Research Ethics Committee of Taif University. Consents were obtained from the patients to be involved in our study. The collected data were kept in confidentiality only between the research team and the patients' medical record numbers were replaced with ordinal numbers for further confidentiality.

Data analysis:

Statistical analysis was done using the statistical package for the social sciences program (SPSS 21). Descriptive analysis was done to detect prevalence, mean, and quantitative variables. Chi-square and t-test were used to assess the relation between herbal use and glycemic control as well as other variables.

RESULTS:

A total of 666 patients with the majority of them were females (Table 1). The mean age was 59.3±11.5 years, majority were married and received diabetes related education, and the mean BMI was in the obesity range. The most common co-morbid conditions were hyperlipidemia followed by hypertension. The most common diabetes related

complications were retinopathy followed by neuropathy. The majority of patients were on combined insulin and oral agents. Diabetes and endocrine specialist physicians provided the care for

75.1% of the patients. 40.0% were using herbals before the diabetes diagnosis. The laboratory parameters indicated poor glycemic control while the mean results of the lipid profile were at goal.

Table 1: Baseline characteristics of the whole cohort.

Baseline characteristics (N = 666)	
Mean age (years)	59.3+11.5
Mean age of diabetes diagnosis (years)	45.9+11.0
Male (%)	34.7
Smokers (%)	5.3
Married (%)	91.2
Bachelor's degree or higher (%)	7.1
Received any diabetes related education (%)	82.8
Mean BMI (Kg/m ²)	31.9+6.1
Mean pulse rate (bpm)	82.9+10.7
Mean systolic blood pressure (mmHg)	133.3+21.1
Mean diastolic blood pressure (mmHg)	75.9+10.9
Use of herbals before the diabetes diagnosis (%)	40.0
Chronic diseases	
Hypertension (%)	52.6
Hyperlipidemia (%)	62.4
Coronary artery disease (%)	7.7
Stroke (%)	1.8
Diabetes related complications	
Retinopathy (%)	49.8
Diabetic foot ulcer (%)	2.9
Neuropathy (%)	16.6
Treatment modalities	
Diet control (%)	1
Oral hypoglycemic agents (%)	42.7
Combined Insulin and oral agents (%)	56.3
Health care providers site	
Family Medicine clinic (%)	24.9
Diabetes Medicine clinic (%)	75.1
Use of herbals (%)	
Honey (%)	36.3
Black seeds (%)	22.8
Helteet (%)	2.3
Chinese Herbal (%)	0.2
Cinnamon (%)	33.2
Others (%)	2.0
Reason of Herbal usage	
Uncontrolled blood glucose (%)	7.4
Friend advise (%)	7.7
To experiment the impact of the herbal ingredients on the blood glucose (%)	2.3
Social media influence (%)	5.7
Positive aspects of Herbal usage	
Overall subjective positive result (%)	16.2
Subjective glycemic control optimization (%)	11.5
Reported weight loss (%)	1.7
Improve in the self-reported energy (%)	6.8
Source of the Herbals	
Malls or shops (%)	55.9

Internet (%)	43.5
TV channels (%)	0.3
Instagram (%)	0.3
Laboratory Data	
Mean FBG (mmol/L)	9.6+4.2
Mean HBA1c (%)	8.6+2.1
Mean HDL (mmol/L)	1.1+0.3
Mean LDL (mmol/L)	2.6+0.9
Mean total cholesterol(mmol/L)	4.6+1.3
Mean triglyceride (mmol/L)	1.7+1.0

Around 21.55% of the patients used herbal substance for diabetes related complains (Table 2). The most common herbal used was the honey and cinnamon followed by black seeds, and the least was Helteet and Chinese medicine. The most common reasons for the herbal usage were friend advise followed by the

uncontrolled blood glucose. The reported positive aspects of the herbal usage were the overall subjective positive result and the subjective glycemic control optimization. The primary source of the herbals was malls or shops followed by internet.

Table 2: Herbal substances related data for the users.

Use of herbals (%)	
Honey (%)	36.3
Black seeds (%)	22.8
Helteet (%)	2.3
Chinese Herbal (%)	0.2
Cinnamon (%)	33.2
Others (%)	2.0
Reason of Herbal usage	
Uncontrolled blood glucose (%)	7.4
Friend advise (%)	7.7
To experiment the impact of the herbal ingredients on the blood glucose (%)	2.3
Social media influence (%)	5.7
Positive aspects of Herbal usage	
Overall subjective positive result (%)	16.2
Subjective glycemic control optimization (%)	11.5
Reported weight loss (%)	1.7
Improve in the self-reported energy (%)	6.8
Source of the Herbals	
Malls or shops (%)	55.9
Internet (%)	43.5
TV channels (%)	0.3
Instagram (%)	0.3

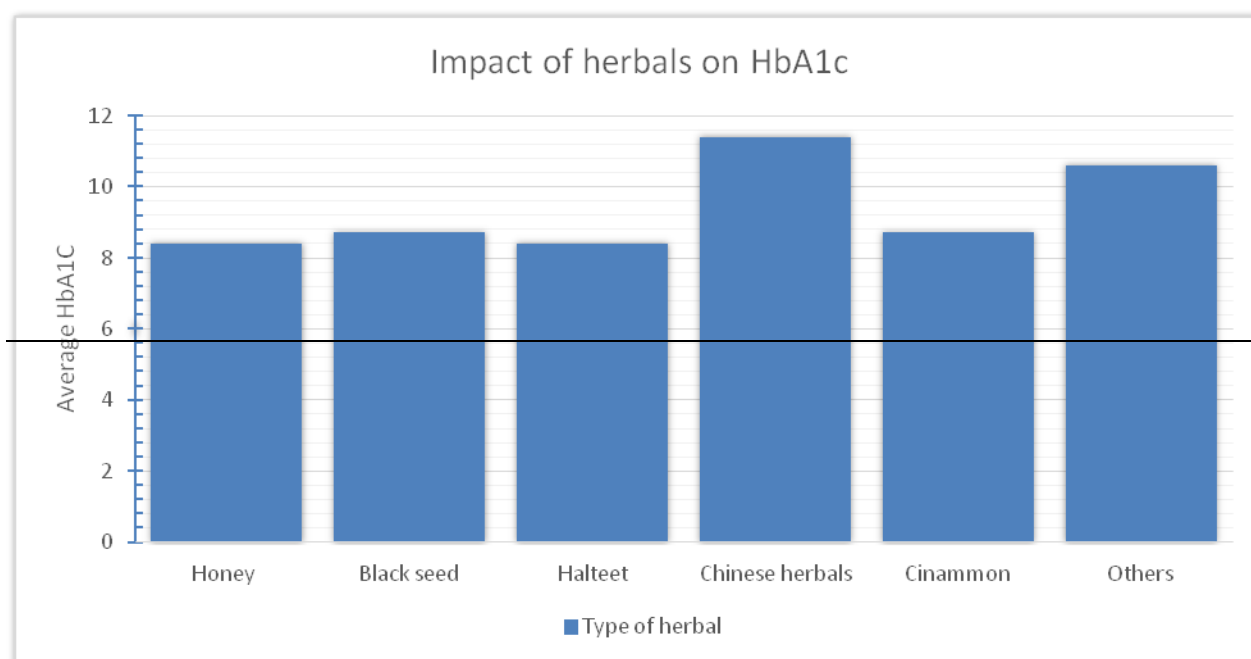
About 78.5% of the study group were not herbal users (Table 3). Compared to the non-herbal users, those who use herbal were more likely to report herbals usage before the diabetes diagnosis ($P=0.019$), more likely to be male ($P=0.002$), older age at the diabetes diagnosis ($P=0.043$) smokers ($P=0.292$), has higher level of education ($P=0.002$), and more likely to have neuropathy ($P=0.004$).

Except for hyperlipidemia, the herbal users were non-statistically significantly more likely to have co-morbid conditions. Herbal users have non-statistically significant worse glycemic parameters despite the observed no difference in the diabetes related education or treatment modalities between the groups.

Table 3: Patients characteristics based on the status of Herbal use.

Baseline characteristics	Herbal users	Non-users	P value
Number of participants (%)	21.5	78.5	n/a
Use of herbals before diagnosis of diabetes (%)	48.6	37.7	0.019
Mean age (years)	60.5+11.8	58.9+11.4	0.151
Mean age of diabetes diagnosis (years)	47.6+10.4	45.5+11.2	0.043
Male (%)	45.8	31.7	0.002
Smokers (%)	7.0	4.8	0.292
Married (%)	95.1	90.2	0.118
Illiterate (%)	43.0	59.0	0.002
Bachelor’s degree or higher (%)	7.7	6.9	
Received any diabetes related education (%)	79.6	83.7	0.254
Mean BMI (Kg/m²)	32.6+6.4	31.7+6.0	0.143
Mean pulse rate (bpm)	82.0+9.5	83.2+11.0	0.234
Mean systolic blood pressure (mmHg)	135.0+25.5	132.8+19.8	0.345
Mean diastolic blood pressure (mmHg)	76.4+12.0	75.8+10.6	0.567
Chronic diseases			
Hypertension (%)	53.5	52.3	0.797
Hyperlipidemia (%)	60.6	62.9	0.613
Coronary artery disease (%)	9.2	7.3	0.464
Stroke (%)	2.1	1.7	0.762
Diabetes complications			
Retinopathy (%)	45.8	51.0	0.273
Diabetic foot ulcer (%)	2.8	2.9	0.966
Neuropathy (%)	24.7	14.4	0.004
Treatment modalities			
Diet control (%)	0.0	1.0	0.277
Oral hypoglycemic agents (%)	48.6	41.2	
Combined Insulin and oral agents (%)	51.4	57.8	
Health care providers site			
Family Medicine clinic (%)	27.5	24.2	0.430
Diabetes Medicine clinic (%)	72.5	75.8	
Laboratory Data			
Mean FBG (mmol/L)	10.1+4.3	9.5+4.2	0.144
Mean HBA1c (%)	8.9+2.2	8.5+2.0	0.104
Mean HDL (mmol/L)	1.1+0.3	1.1+0.3	0.295
Mean LDL (mmol/L)	2.6+0.8	2.7+0.9	0.618
Mean total cholesterol (mmol/L)	4.5+1.2	4.6+1.3	0.348
Mean triglyceride (mmol/L)	1.7+1.0	1.7+1.0	0.774

The Chinese herbal has the worst average HbA1c, followed by both black seed and cinnamon, while the Halteet and honey have better average HbA1c (Fig 1).

Figure 1: Impact of Herbs on HbA1c.

A partial correlation adjusting for multiple variables showed a statistically significant positive correlation between use of honey and level of HbA1c, positive correlation but statistically non-significant between

use of Halteet and HbA1c level, and negative correlation but statistically non-significant between use of cinammon, Chinese herbal and HbA1c (Table 4).

Table 4. Partial correlation done adjusting for age, chronic Disease, level of education, sex, age of discovering diabetes, diabetes education and Smoking.

Type of herbs	HbA1c
Cinnamon	r -0.042
	P 0.321
Honey	r 0.089
	P 0.036
Black seeds	r -0.026
	P 0.542
Halteet	r 0.021
	P 0.624
Chinese herbal	r -0.053
	P 0.210

DISCUSSION:

In our study we found that mean age of diabetes diagnosis was 45.9+11.0 (years), the majority of them were males which is the same result which found in another study [10], while in another study [11,14], their result showed that the majority of T2D patients who use herbal substances were females. The most of our sample received diabetes education in our

facility. Most of our sample are non-users which may reflect a good patient's awareness from our educators about the unproven herbal substances' commercials. Our study showed that herbal users were more likely to have higher bachelor's degree which is not the same result found in another study^(10,16), we suggest that having higher level education degree doesn't mean knowing about the herbal substances and its

effectiveness very well. Also, the herbal users were more likely to be smokers which may reflect the poor lifestyle habits which may contributed to the herbal usage despite the higher education level [13].

We found that the T2D patients who use herbals were more likely to be seen at Family Medicines clinics and vice versa with diabetes center, this is may be due to that the excellent educational and awareness programs that were provided by the diabetes center staff. Also, our laboratory results showed that the non- herbal users have more controlled blood glucose panel compared to those who use herbal substances which is not the same result that found in another study [7]. This is likely due to the difference in the herbal substance that used. Among the diabetes patients who use the herbal substances, we found that the honey is the most common type of herbal substances are used, which is not the same result which found in another studies [9,11]. This is mainly because of the culture of our patients and the widely available honey products.

Our study showed that the reason to use herbal substances among T2D patient was friend advise which the same result found by another study [9,15]. The majority of T2D patient who use herbal substances mentioned that the herbal substances have an overall subjective positive result, and this is likely a placebo effects since the objective measures didn't correlate with that. Also, we found that the source of the herbal substances was malls and shops which is not the same result found by another study [10], and we suggest that we need better regulation rules in our malls and shops for selling herbal substances.

Our weakness includes single center and limited sample size while our strengths includes comprehensive clinical and biochemical data and assessing the most widely locally available herbal substance.

CONCLUSION:

Our study showed that the herbal users don't have better glycemic control when compared to the non-herbal users. We showed that the honey was the most common herbal substances were used in our sample. The reason behind using herbs was friends' advices and the source of the herbs was malls and shops because we do not have restricted rules in our malls and shops for selling herbal substances. We showed that the Chinese herbal has the worst average HbA1c, followed by both black seed and cinnamon, while the Halteet and honey have better average HbA1c.

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