

Complementary and Alternative Medicine Usage and Its Determinant Factors Among Diabetic Patients: An Iranian Case

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Abstract

Although modern treatments have achieved much progress in blood sugar control in recent decades, evidences indicate that complementary and alternative treatments are very common in diabetic patients. The present study aims to investigate application of complementary and traditional medicines among diabetic patients in Iran in 2016. This was a cross-sectional study done on 294 diabetic patients who were referred to the diabetes clinic and were chosen using convenient sampling. Data were gathered using a demographic characteristics form and a researcher-made questionnaire (for studying application and satisfaction of using some of the complementary and alternative medicines). A total of 88.4% of diabetic patients have used at least one complementary and alternative treatment in the past year. The most common treatment was medicinal plants, which were used by 84.9% of the participants. Sixty-nine percent of the patients were satisfied with using complementary and traditional treatments. This study showed that diabetic patients are very interested in using complementary and alternative medicine.

Keywords

diabetes, medicinal plants, cupping, pray

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Complementary and alternative medicine is a set of medicinal systems, health care, actions, and products that at the moment are considered as a part of common medicine.¹ Also, the National Center for Complementary and Alternative Medicine stated that complementary and alternative medicine is part of caring and treatment of people and it cannot be separated from common treatment. According to the definition of a medical expenditure panel survey, complementary and alternative medicine has been defined as a caring approach including acupuncture, especial diets, massage therapy, medicinal plants, biologic feedback, and relaxation techniques.²

Complementary and alternative medicine has been paid increasingly attention by people in different societies in recent decades.²⁻⁴ For example, studies show that complementary and alternative medicine use has increased in European countries in the past decade such that more than 98% of European citizens have used such treatments.¹ Also, it is estimated that nearly 23% of American adults have used some types of complementary and alternative medicine in their lives.^{1,2} In China, traditional medicine includes 40% of all therapeutic health services, and in Africa, 80% of people use traditional medicine to meet their therapeutic health requirements.⁵

People use traditional treatments due to complaints resulting from different diseases.⁶ Most people who use such treatments have chronic diseases because modern treatments have few or no effect on them.⁷ Nevertheless, several researches showed that complementary and alternative medicine has been mostly used for chronic diseases such as diabetes and cancer.²⁻⁷

Diabetes mellitus is a chronic and disabling disease with high mortality and considerable costs, and approximately 10.35% of

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people throughout the world are affected by this disease. The highest prevalence of diabetes is in the Eastern Mediterranean region (12.34%), and the lowest prevalence of diabetes is in the South East of Asia (8.5%). Iran is one of the Eastern Mediterranean countries, and the prevalence of diabetes is 9.9%.⁸ On the other hand, prevalence of diabetes is growing rapidly worldwide. For example, the global prevalence of type 2 diabetes was 2.8% in all ages in 2000, and it is estimated that its prevalence will reach 4.4% in 2030.³

Diabetes causes mortality and different disabilities and may lead to end-stage renal disease, amputation of terminal limbs, and blindness. Diabetes is the seventh leading cause of death in the United States.² Although modern treatments have achieved much progress in blood sugar control during recent decades, using traditional medicine is still the main footstone for caring for such patients.³ The primary treatment for type 2 diabetes is diet, doing exercise, and taking oral medications such as hypoglycemic drugs and insulin injection. There are several evidences suggesting that treatment of diabetes with the aforementioned medications can reduce blood sugar and the risk of diabetes progression but there are some limitations about available medications. For example, treatment with metformin is followed by many digestive-intestinal complications.⁶ Application of complementary medicine is considerably increasing because of following reasons: (a) side effects of medications and ineffectiveness of medications in some conditions and (b) traditional medicine matches with beliefs and values of people better than modern treatment.³ As a result, many diabetes patients prefer to use complementary and alternative medicine as an adjunct for diabetes treatment. Also, complementary and alternative medicine is used as a means to reduce usage of common medications due to their complications, and they can be bought without prescription.⁴ For example, medicinal plants are used in traditional medicine, and it is a popular treatment in complementary and alternative medicine for diabetes treatment and it plays a key role in the treatment of this disorder.³ Several researches suggest that medicinal plants can play an effective role in the treatment of such complex disease. Also, many studies conducted on the molecular effect of glucose reduction of medicinal plants showed that antidiabetic effects of medicinal plants included increase of insulin secretion, reduction of resistance against insulin, and reduction of levels of bad fats.⁶ However studies indicate that complementary and alternative medicines are less cost-effective and have less efficacy than modern treatments⁹ and that they are less invasive.^{10,11} In addition, they are not addictive and they are more available compared to other treatments.^{10,11} Other researchers indicated that advocates of complementary and alternative medicine hardly trusted modern treatment. In addition, a large number of people who use complementary and alternative medicine are those that are affected by chronic disease, acquired immunodeficiency syndrome, cancer, arthralgia, and epilepsy, and it can be followed that such people have chosen complementary and alternative medicine because modern treatment is unable to treat their diseases.¹² In a study done in Tehran on factors influencing the amount of traditional medicines used in diabetes patients, it was clear that dissatisfaction from common treatment and

physicians are among the most important reasons for using such medicine.¹³ On the other hand, the World Health Organization stated that 65% to 80% of people throughout the world require medicinal plants and complementary treatments due to unavailability of medications.⁶ Therefore, with regard to the extensive reception of different methods of complementary medicine, especially in patients with chronic disease, the present study aims to investigate the application of some of techniques of complementary and alternative medicine in diabetes patients who were referred to a diabetes clinic in Kerman in 2016.

Materials and Methods

Study Design and Setting

This was a cross-sectional study conducted in the Diabetes Clinic of Kerman. This is the only educational center that provides specialized and subspecialized care to diabetic outpatients in Kerman. Kerman is the largest city in the southeast of Iran, with a population of more than 722 000.

Sampling and Sample Size

Convenience sampling was used to select the participants. In order to estimate sample size, the following formula was used:

$$n = \frac{z^2 \times p(1 - p)}{d^2}$$

The amount of p and $1 - p$ was 0.5 in order to estimate the maximum sample size. The amount of d was $0.12p$. Based on this formula, the estimated sample size was 267. In addition, considering the probability of dropouts, 30 extra participants were added to the estimated sample size.

Instrument

In order to gather information, a 3-part questionnaire was used: (a) demographic data form (such as age, gender, marital status, educational degree, job, income, living place, having other chronic disease, duration of having diabetes, and prescribed diabetic medications); (b) a researcher-made questionnaire for studying types and usage of some complementary and alternative medicine methods, the reason and amount of using such methods, and consulting with doctor to use this methods; and (c) a researcher-made questionnaire for studying satisfaction from using complementary and alternative medicine. The second part of the questionnaire includes types of complementary medicines (medicinal plants, wet cupping [*Hijamat*], cupping [cupping therapy is an ancient form of alternative medicine in which a therapist puts special cups on the skin for a few minutes to create suction; then, the therapist removes the cup and uses a small scalpel to make light, tiny cuts on the skin, and then, he or she does a second suction to draw out a small quantity of blood, which is called wet cupping], massage, hydrotherapy, leech therapy, praying, *Nazr* [to make a spiritual vow], acupressure, acupuncture, and homeopathy) and the reason of using each of these methods. The amount of usage has been measured by yes or no answers, and if the answer was yes, we estimated, based on the patient's, the number of times each technique was used in the past year. Reasons of using complementary and alternative medicine includes the following: (a) just to reduce blood sugar and (b) not only for reducing blood sugar. In addition, amount of satisfaction was measured by using an 8-item scale about accessibility, harmlessness, ease of usage, relief

of problem, no interference with daily activities, no concern for interfering with other therapeutic methods, feeling well after using complementary and alternative medicine, and suggesting the method to others. This scale was scored on a 5-point Likert-type scale (4 = *very satisfied*, 3 = *satisfied*, 2 = *unsatisfied*, 1 = *very unsatisfied*, and 0 = *no idea*). Face and content validity and internal consistency of this scale were confirmed in a previous study, and internal consistency of the satisfaction scale was reported as 0.77.¹⁴

Data Collection and Analysis

In present study, the target population was all diabetes patients referring to the Diabetes Clinic in Kerman. People older than 18 years who were mentally and physically able to answer the questions were eligible to participate in the study. The questionnaires were given to participants in order to be completed in the form of self-report. In case the participant was illiterate, the questionnaire was completed by the researcher. Sampling was done from the beginning of April to late April 2016. Data were analyzed by SPSS version 19. Descriptive statistic (frequency distribution tables, percentage, mean, and standard deviation) was applied to describe the amount of usage and satisfaction from complementary and alternative medicine, and χ^2 tests and multivariate logistic regression analysis were used to determine the relation between socio-demographic characteristics and users of complementary and alternative medicine. Significance level of the *P* value was considered at .05.

Ethical Consideration

Kerman University of Medical Sciences approved this project. After approval, permission was provided to the management of the Diabetic Clinic. The researcher offered some oral information to the participants including the goals and objectives of the study, the confidentiality and anonymity of the data, and that they were free to withdraw from the study at any time. Verbal consent was taken individually.

Results

Sociodemographic Characteristics

In total, 294 participants were assessed. The mean age of the participants was 47.87 ± 11.89 years. More than 55% of the participants were women. The majority of patients were married (70.41%). Less than 15% were illiterate. A total of 45.2% were employed. Almost 64% of the participants had other chronic diseases (low back pain, rheumatism, anemia, migraine, high blood pressure, asthma, mental disorders, skin diseases, allergies, heart disease, hypothyroidism, and hyperthyroidism) except diabetes. The mean duration of having diabetes was 6.38 ± 4.76 years. Approximately 89% of participants had less than 10 years of chronic diabetes. The majority of the participants (53.4%) were prescribed both insulin and oral diabetic medications (Table 1). Six participants refused to participate in the study, so the dropout rate was 2%. Since the missing values were less than 1%, none of the filled-in questionnaires was dropped.

Findings

In total, 88.4% (*n* = 260) of the participants used at least one complementary and alternative medicine in the past year. Of

Table 1. Description of the Study Sample (*N* = 294).

Variables	Frequency ^a	Valid Percentage
Age (years)		
19-25	11	3.7
26-35	34	11.6
36-45	77	26.3
46-55	80	27.3
>55	91	31.1
Sex		
Male	130	44.2
Female	164	55.8
Marital status		
Single	87	29.59
Married	207	70.41
Education		
Illiterate	43	14.7
Under diploma	101	34.5
Diploma	62	21.2
Academic degree	87	29.7
Job		
Housewife	127	43.2
Unemployed	8	2.7
Employed	133	45.2
Pensioner	26	8.8
Family income per month (Toman ^b)		
<500 000	93	31.6
500 000-1 000 000	102	34.7
1 000 001-1 500 000	92	31.3
>1 500 000	7	2.4
Living place		
Inside Kerman city	239	81.3
Village	47	16
Other city around Kerman	8	2.7
Duration of having diabetes		
≥5 years	156	53.1
Between 5 and 10 years	104	35.4
<10 years	34	11.5
Prescribed diabetic medication		
No drug	6	2
Insulin	71	24.1
Diabetic tablets	60	20.4
Both insulin and tablets	157	53.4
Other chronic disease		
No	107	36.4
Yes	187	63.6

^aThe variables that have less than the total 294 frequencies are because of missing values.

^bIran currency (1 \$US is equal to 3450 toman).

those who had used complementary and alternative medicines, 84.9% (*n* = 248) used medicinal plants, 18% (*n* = 44) wet cupping, 13.3% (*n* = 39) praying, 9.3% (*n* = 27) *Nazr*, 2.7% (*n* = 8) massage, 1.4% (*n* = 4) leech therapy, 0.7% (*n* = 2) cupping, and 0.3% (*n* = 1) acupuncture. In addition, none of participants had ever used hydrotherapy, homeopathy, and acupressure. The frequency of using medicinal planets varied between 2 and 500 times (mean = 60.78, SD = 82.45) in past year. The frequency of using wet cupping, praying, *Nazr*, massage, leech therapy, cupping, and acupuncture in past year varied from 1 to 5, 100 to 2000, 5 to 500, 1 to 2, 1, 1 to 2, and

2 times, respectively. Eighty-eight percent (n = 219) used medicinal plants just to reduce his/her blood sugar. Only 31.8% (n = 14) used wet cupping just for reducing their blood sugar. Only 33.3% (n = 13) of those who used praying had used it just for reducing their blood sugar. Only 1 of 4 participants, who used leech therapy, had used it just for reducing their blood sugar. Most of those participants (81.5%, n = 22) who used *Nazr* had used it just for reducing their blood sugar. Those participants who used cupping and acupuncture had used them just for reducing their blood sugar. In addition, the participants had used massage for other reasons except diabetes.

Among those participants who used medicinal plants, wet cupping, cupping, massage, leech therapy, and acupuncture, 44.2% (n = 110), 50% (n = 22), 100% (n = 1), 25% (n = 2), 25% (n = 1), and 100% (n = 1) had consulted with their doctors about the usage of complementary and alternative medicines, respectively.

The most prevalent medicinal plants that were used by participants were Chamomile (39.52%, n = 98) and green tea (17.74%, n = 44). Other medicinal plants that used by participants were *Teucrium polium*, *Urtica*, *Medicago sativa*, *Alhagi*, *Cinnamomum zelanicum*, *Citrus aurantium*, *Ranunculus asiaticus*, *Thyme*, and *Salix*.

According to different aspects of satisfaction, 89.6% (n = 233) of the participants were satisfied with continuous access to the procedure, 85.4% (n = 222) were satisfied with ease of use, 83.5% (n = 217) were satisfied with safety of complementary and alternative medicines, 79.6% (n = 207) believed that using complementary and alternative medicines did not interfere with their daily activities, 68.8% (n = 179) were satisfied with the impact of complementary and alternative medicines on reduction of blood sugar, 76.9% (n = 200) did not have any concern on the interaction between complementary and alternative medicines and other therapies, 69.6% (n = 181) had good feeling after use of complementary and alternative medicines, and 70% (n = 182) recommended complementary and alternative medicines to others.

To check the association between being or not being user of complementary and alternative medicines and sociodemographic characteristics among diabetic patients, first univariate analysis was performed by applying the χ^2 test. Among all sociodemographic characteristics, there was a significant correlation between job, having other chronic disease, prescribed diabetic medications, and being or not being user of complementary and alternative medicines ($\chi^2 = 13.22$, $P = .004$; $\chi^2 = 10.69$, $P = .001$; and $\chi^2 = 26.38$, $P = .000$, respectively). We further included all significant variables in one model using multivariate logistic regression (Table 2). Based on the results, Adjusted odd ratio showed that the probability of not being user of complementary and alternative medicines in participants who were prescribed either insulin or antidiabetic tablets was 7.04 and 6.13 times more than those who were prescribed both insulin and antidiabetic tablets, respectively. Note that by adjusting the model, the relationships between job, having other chronic disease, and being or not being user of complementary and alternative medicines were not significant.

Table 2. Multifactor Logistic Regression Model for Not Being User of Complementary and Alternate Medicine Among Diabetic Patients.

Variables	Multifactor Logistic Regression		
	Odds Ratio	Confidence Interval	P
Job			
Housewife	2.43	0.29-20.57	.42
Unemployed	11.97	0.94-151.52	.055
Employed	2.11	0.25-17.87	.49
Pensioner	1	—	.15
Prescribed diabetic medication			
No drug	0.00	0.000	
Insulin	7.04	2.36-21.00	.000
Antidiabetic tablets	6.13	1.99-18.91	.002
Both insulin and tablets	1	—	.004
Other chronic disease			
No	1.78	0.79-3.97	.16
Yes	1		

Discussion

In present study, application of complementary and alternative medicines in diabetic patients was investigated. Complementary and alternative medicine was increasingly used in this study, and about 88% of diabetes patients have used at least one of the complementary and alternative treatments during recent years and this percentage was higher than that in Australia (23.6%),¹⁵ Turkey (41%),¹⁶ the United States (72.8%),¹⁷ and Thailand (47%).¹⁸ Different percentages can be affected by methodology. For example, in some studies, sampling was random and in others it was not random. Also, concerning disagreements in definition of complementary and alternative medicines in different studies,¹⁹ it is expected that no similar treatment is used in all studies resulting in variable prevalence of complementary and alternative medicine use in different studies.

Our results indicated that most of patients with diabetes (85%) have used medicinal plants. While studies done in Kashan city²⁰ and Shiraz city in Iran,²¹ India,²² Jordan,²³ Taiwan,²⁴ and Australia²⁵ showed that amount of consumption of medicinal plants in diabetes patients changed from 16.6% in Taiwan to 97.7% in Iran (Shiraz city). Based on the results, most patients have used medicinal plants in order to reduce their blood sugar. In the qualitative study done by Pumthong et al,²⁶ which is in agreement with present study, reduction of blood sugar was one of the reasons for using medicinal plants. Some evidences indicate that some medicinal plants such as cinnamon have a significant effect on reduction of HbA1c.²⁷ In this study, the most prevalent medicinal plant used by patients was chamomile, whereas in Jordan it was green tea,²³ in Kasahn cinnamon,²⁰ and in Sudan fenugreek²⁸ were the most common medicinal plants used by diabetes patients. Since easy access to some medicinal plants can play an important role for their use, prevalence of different medicinal plants in various regions can be explained. Also, application of some medicinal

plants in cooking may increase their usage. For example, cinnamon is one of medicinal plants that is sold in most retail shops and it is used as a spice.²⁰ Nevertheless, in present study, acupuncture had the lowest prevalence among patients with diabetes. Concerning that complementary and alternative treatments are not under coverage of insurance in Iran, it is expected that prevalence of this treatment is less than other complementary and alternative medicines treatments due to it being more expensive than other treatments. Most of the patients did not consult with their doctors before using complementary and alternative medicine. As seen in the results, frequency of some treatments is very low, and 100% frequency and consultation with the doctor do not suggest necessarily optimal status of consultation before using complementary and alternative medicine. For example, acupuncture was used only by one person and he/she consulted with the doctor before using this method, but less than 50% of the patients who used medicinal plants (as the most prevalent treatment) consulted with their doctors. It seems that such a result associates with low number of therapists specialized in complementary and alternative medicine compared to other medical specialties in Iran. Also, this result is not in agreement with the study done by Lui et al.²⁹

As mentioned in the results, complementary and alternative medicine treatments are significantly affected by factors such as job, having other chronic diseases, and type of prescribed medications. Since job can be a determinant of the income and influences indirectly the consumed product, such a significant relationship is expectable. Patients with chronic diseases and disorders tend to use complementary and alternative medicine to increase their good feeling and control their symptoms more than those that are not affected by other chronic diseases.¹⁹

There were some limitations in present study that should be considered. First, since the consumption of complementary and alternative medicine treatments has been studied at least within the past year, the number of application of each of treatments could have been influenced by recall bias. Second, the patients were asked if they consulted with their doctor before using complementary and alternative medicines and consultation with other members of the treatment team such as nurses was not considered. Therefore, self-prescription cannot be estimated exactly. Third, the sampling was not random; therefore, generalization should be done with caution.

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Author Contributions

AS designed the study, wrote the protocol and managed the literature searches, collected data, and wrote the first draft of the manuscript. MD performed the statistical analysis, provided advice for the study design, and helped in writing the manuscript. FG provided advice for the study design and helped in writing the manuscript. All authors read and approved the final draft of the manuscript.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Ethical Approval

The ethics committee of the Kerman University of Medical Sciences approved this project.

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