

Causative Factors in Using Medicinal Plants among Type 2 Diabetic Patients: A Qualitative Study

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Research

Keywords: Medicinal Plants, Herbal Medicines, Type 2 Diabetes, Qualitative Study

Posted Date: January 15th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-144261/v1>

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Abstract

Background: Type 2 diabetes is a global problem, and most of people suffering from it are faced with problems caused by it. The use of medicinal plants is increasing among type 2 diabetic patients. Reasons and factors leading to the use of these plants have not yet been fully known. Thus, the present study aims to identify experiences of patients who use medicinal plants to discover factors determining the use of them. The present qualitative study was conducted using a content analysis approach.

Methods: This qualitative study was conducted from April 2020 to May 2020 in Yazd City located in Central Iran. The data were collected by conducting in-depth unstructured interviews with 16 type 2 diabetic patients. Convenience sampling was used for selecting participants. In addition, data collection and analysis were conducted simultaneously. To extract categories and themes, the thematic analysis method was employed using MAXQDA 10. The COREQ (consolidated criteria for reporting qualitative research) checklist was employed to ensure the method of conducting the study.

Results: Data analysis showed that factors determining the use of medicinal plants fell into six categories. These categories included beliefs about medicinal plants, psychological factors, accessibility and economic barriers, patients' knowledge and awareness, pressure imposed by the society, and the role of family culture.

Conclusion: It is essential to promote patients' information and skills of the proper use of medicinal plants. For this purpose, it is recommended to provide proper counselling and referrals to specialists. Moreover, strengthening pharmaceutical infrastructures of drug storage and distribution in deprived areas could play a significant role in facilitating patient access to common drugs and preventing the use of medicinal plants.

Introduction

Diabetes is one of the most common chronic diseases in the world. This disease accounts for nearly 18% of causes of deaths of individuals aged over 25, kidney disease, new cases of blindness, and lower extremity amputation [1]. Nearly 422 million people (8.5%) suffer from diabetes worldwide. The prevalence of diabetes in adults in the member states of the World Health Organization of the Eastern Mediterranean (EMRO) is reported to be 13.7%. This is the highest prevalence among other WHO regions [2]. In Iran, the prevalence of diabetes in adults within the age range of 25-70 has been reported to be 11.9% (2011). However, it is estimated that by 2030, nearly 9.2 million Iranians will be suffering from diabetes [2]. From among different types of diabetes, type 2 diabetes is the most common one with which individuals are diagnosed. According to statistics, about 463 million people worldwide were diagnosed with diabetes in 2019, with most of whom having had type 2 diabetes (approximately 90%) [3]. Type 2 diabetes mellitus (DM2) is a chronic disease whose control requires regular use of hypoglycemic drugs, physical activity, and a healthy diet [4]. However, proper glucose control is difficult for many people suffering from diabetes because it requires changes to the behavior and the lifestyle [4, 5]. Moreover,

available conventional drugs have not yet been able to fully control this disease. Thus, some patients use medicinal plants to control their disease [6]. The use of conventional drugs has been reported in a group of patients as the main drugs for blood sugar control. In some other patients, medicinal plants have been reported to be used along with other conventional drugs [6, 7]. In the same vein, medicinal plants are used in Iran to control blood sugar in diabetics. For example, in a study conducted by Azizi Finney, the use of medicinal plants in diabetics was reported to be 54% [7]. The results of some other studies indicate that medication non-adherence and lack of blood sugar control are directly associated with the use of medicinal plants [8-10]. Accordingly, medication non-adherence, interruption or discontinuation of conventional drugs, and use of medicinal plants without consulting a specialist are likely to worsen symptoms and complications of diabetes [8]. Therefore, identifying causative factors in using medicinal plants could help healthcare workers manage this disease more effectively. Results of numerous studies indicate that social and cultural factors are effective in inadequate management of diabetes [11]. A qualitative study was conducted in Uganda to determine the main reasons for using medicinal plants in diabetes control; accordingly, shortage of common drugs, distance from treatment sites, low prices of medicinal plants, as well as advices from friends and traditional healers were enumerated as the main reasons [12]. Another study was conducted in Malaysia on the side effects of common diabetes control drugs; according to this study, following the experience of using medicinal plants by relatives and friends was the main reason for using them [13]. There are still many unknown factors related to the use of medicinal plants, yet few studies have been conducted (especially with a qualitative approach) in this regard in Iran. Thus, the present study aims to determine causative factors in using medicinal plants in patients with type 2 diabetes.

Method

Design

The present qualitative study is of a phenomenological type. In this study, a qualitative content analysis scheme (a conventional method) was utilized to analyze Iranian patients' experiences of type 2 diabetes mellitus in terms of the factors of adherence to medicinal plants.

Setting and study participants

The statistical population of this study included patients aged over 30 with type 2 diabetes, who had referred to the Diabetes Research and Treatment Center and received health services. Convenience sampling was used to select the participants of this study. Individuals of both genders (male and female) who had a history of using medicinal plants were selected for this study. Inclusion criteria of this study were having Iranian nationality, knowing the Persian language, being over 18 years old, suffering from type 2 diabetes, as well as being willing to participate in this study and conduct interviews. Exclusion criteria included not understanding time and place, suffering from severe physical and mental complications of diabetes, and not being adequately able to answer questions.

Data collection

Interviews with the patients and data collection were conducted from April 2020 to May 2020. In the present study, in-depth unstructured interviews were conducted for the purpose of data collection. To achieve the goals of the interview, the interviewers asked guiding questions designed by reviewing the texts and asking experts' views in this field. Next, to obtain more information and continue the interview, exploratory questions, such as "Can you explain more about this?", were asked. Besides, it was tired not to ask vague, complex, and ambiguous questions containing two questions in one question. In addition, negative questions were avoided as much as possible. Moreover, questions the respondents were not willing to answer were asked at the end of the interview.

Interviews with qualified T2DM patients continued until data saturation was achieved. At this point, the researcher concluded that the new information was the same as the previous information, with the continuation of which resulting in no new concept [18]. In the end, 16 people were interviewed face to face. Moreover, further efforts were made to provide diverse participants required for generating data diversity in terms of the age, economic status, and educational level. Interviews were conducted at the Diabetes Research and Treatment Center, upon obtaining informed consent from the participants. To conduct a quiet interview with no interferences from others, the interviewees were informed that the interviews would be conducted only in the presence of the interviewer and themselves, with no other individuals present.

The duration of each interview varied from 25 to 55 minutes. At the beginning of each interview, the objectives of the study were explained to the participants. Moreover, the participants' oral consent was obtained for recording the interviews. Field notes were taken for the purpose of data collection during the interviews to record non-verbal behaviors of the participants. Accordingly, the text of each interview was transcribed and typed in Microsoft Word.

Data analysis

Conventional qualitative content analysis was used for data analysis. The researchers read and analyzed the typed interviews several times and provided the long texts expressed by the participants in the form of small meaningful units (codes). Code extraction from texts of the interviews was conducted independently by two researchers. Next, the codes extracted by the researchers were summarized. Accordingly, some categories were defined for the significant units extracted by the researchers based on their internal consistency, with similar units placed in the same category. Next, themes were defined for the categories extracted from the related codes, and MAXQDA 10 was utilized for data analysis. When all data were encoded and the categories were agreed upon, each category was checked for saturation. The 32-item COREQ (consolidated criteria for reporting qualitative research) checklist was utilized to ensure the methodology of the study [14].

Data trustworthiness and integrity

To evaluate and improve scientific trustworthiness of the results, the proposed Lincoln and Guba's criteria were employed. These criteria included continuous involvement and comparison, participatory evaluation,

researcher triangulation, and data saturation [15]. To improve data transferability, detailed descriptions of the findings and categories were provided. Next, the data were reviewed by an external observer to ensure reliability of the study. To increase data validity, after reviewing the data and conducting the coding, the participants were provided with the results so that they could confirm them.

Ethical considerations

To meet ethical requirements of the study, written and oral informed consent was obtained from the participants; besides, the individuals were allowed to cancel and withdraw from the study whenever they wished. At the end of the session, a gift was awarded to the elderly to appreciate their participation. It is worth noting that the participants were satisfied with the location of the interviews.

Results

The majority of the patients in this study were females (62.5%). Moreover, 56.25% of the patients were in the age group of 40-60. Table 1 shows demographic characteristics of the participants. After analyzing the data, six main categories were identified; these categories included beliefs about medicinal plants, psychological factors, patients' knowledge and awareness, accessibility and economic barriers, pressure imposed by the society, and the role of family culture (Table 2).

4.1. Beliefs about medicinal plants

This category includes five subcategories of trust in medical effects of medicinal plants in terms of biochemical indicators, the feeling of peace and freshness following the use of medicinal plants, trust in low complications of medicinal plants, patient compatibility with medicinal plants, and trust in the need for undergoing complementary therapies.

4.1.1. Trust in medical effects of medicinal plants in terms of biochemical indicators

Most participants believed that taking medicinal plants controlled their biochemical parameters, such as two-hour blood glucose and HbA1c (Hemoglobin A1c) levels. One of the participants stated, "When I eat nettle, I feel that my blood glucose level decreases. Besides, I measured it by a glucometer, and my blood glucose level decreased" (a 60-year-old man). Another participant stated, "I used to brew fenugreek three times a day for 20 days. The test showed that my blood glucose level was around 120, which was very interesting to me" (a 30-year-old woman).

Moreover, most of the participants who regularly used medicinal plants believed that they felt more fresh and cheerful after taking herbal medicines. They stated that diabetes made them feel lethargic and bored. However, according to them, their physical and mental conditions improved after using medicinal plants, and they could do their daily activities more efficiently. One of the participants stated, "Diabetes makes one get bored. When I drink herbal tea, I feel better and feel that I can do my daily chores much better" (a 62-year-old man).

Many patients believed in low complications of medicinal plants and their compatibility with these plants compared to other conventional drugs. They believed that medicinal plants were made of natural substances, so they were less harmful to the body and more compatible with it than conventional medicines. Besides, the participants believed that medicinal plants along with common drugs supplemented each other well and were effective in controlling their disease. For example, one of the participants stated, "When I found out that drugs prescribed by my specialist failed to control my disease, I felt the need for using herbal medicines; accordingly, I believe that taking herbal medicines along with the main drugs is very effective" (a 64-year-old woman).

4.2. Psychological factors

Psychological problems arising from the use of medicinal plants by the participants were regarded as the main obstacle to the use of medicinal plants.

A number of the patients stated that they rarely used medicinal plants. Accordingly, they stated they had experienced anxiety and uneasiness after using medicinal plants. Thus, they were not interested in reusing them. One of the participants said, "When I use brewed nettles, I feel distressed". Moreover, some of the participants expressed fears of hypoglycemia following the use of medicinal plants. Another participant said, "When I use colocynth (bitter cucumbers), my blood sugar drops abruptly. This scares me so much and makes me feel so worried that I do not want to use it anymore" (a 52-year-old man).

4.3. Patients' knowledge and awareness

Patients' knowledge and awareness of the dose and preparation method of medicinal plants are among other causative factors in using them. Some of the participants stated that people using medicinal plants are required to be aware of their usage method and dose; according to them, the method used in preparing medicinal plants is highly effective in optimizing their effects. Thus, if there is no knowledge of the usage of medicinal plants, they will be harmful and likely to damage body organs. One of the participants stated, "If my wife does not prepare them for me, I will not use them on my own because I do not know how to brew them and how much of them to use" (a 46-year-old man).

4.4. Accessibility and economic barriers

Barriers to accessing common drugs and patients' low purchasing capability are the two subcategories under this category. One of the participants stated, "Due to the sanctions imposed on our country, insulin pens have become scarce. Thus, I cannot buy them easily and have to use fenugreek, nettle, and cinnamon instead of insulin" (a 61-year-old woman). Moreover, a number of the participants stated that an increase in the price of the main drugs was the main reason for using medicinal plants. Accordingly, one of them said, "Sir, I only have a pickup truck and cannot buy fruit because it is too expensive. Thus, sometimes even when I know my blood sugar level is high, I use brewed thymes or fenugreek instead of insulin pens" (a 59-year-old man).

Another patient said, "Since I have studied more about harms and problems of medicinal plants than other people, I use them more cautiously" (a 35-year-old woman).

4.5. Pressure imposed by the society

Most of the participants observed promotion of medicinal plants and the emphasis put on their usage by herbal therapists, family members, relatives, and other diabetics as a pressure on the side of the society to use medicinal plants. A number of the participants reported that advices from their family and friends were the most important factor in increasing their willingness to use medicinal plants. As to the accepting or rejecting of the use of these plants, some other participants referred to the significant role of traditional medicine practitioners and apothecaries, as well as advices from diabetic patients. "I was persuaded to use thyme following one of the patients' recommendations. He said he had already used it, and it had good effects on improving his illness," one of the participants stated.

However, a number of the participants stated that they would not use medicinal plants because their specialists did not find them useful. Accordingly, one of the patients said, "Many of my relatives ask me to use medicinal plants as well, but my doctor does not recognize these plants at all. Thus, I do not use them either" (a 45-year-old woman).

4.5. The role of family culture

Lifestyles and institutionalized family behaviors were reported to be effective causative factors in using medicinal plants by a number of the participants. They stated that some families believe in the effects of medicinal plants and use them for treatment purposes when they become sick. Thus, they do not find it necessary to visit a doctor. One of the participants said, "In our family, when someone gets sick, my mother prepares some herbal medicines, so no one goes to see a doctor. Besides, my mother controls her diabetes with the same plants. I am very interested in these medicinal plants because our family has been using them for a long time" (a 36-year-old woman).

Discussion

The present study was conducted to identify causative factors in the use of medicinal plants in patients with type 2 diabetes. According to the findings of this study, factors effective in the usage of medicinal plants were divided into six main categories. Trust in therapeutic effects of medicinal plants in terms of biochemical indicators was one of the causative factors in the usage of medicinal plants by patients with type 2 diabetes. This factor was mentioned by most of the participants. Trust in therapeutic effects of medicinal plants arises from experiences and experimentation. Thus, if the experience and evaluation of the usage of herbal medicines were positive for them, it would lead to the repeated use of them. However, a number of the patients had used these drugs intermittently due to the ineffectiveness of the plants in lowering their blood glucose. Thus, evaluations resulting from the experience of using medicinal plants could be considered one of the major reasons for their use, having been mentioned in other studies as well [16-18]. Thus, in educational programs designed for patients, it is possible to explain where positive

experiences resulting from usage of herbal medicines originate from, with sufficient reasons and documents. In addition, some of the patients believed that using herbs could make them feel more refreshed and relaxed. Moreover, as of the diagnosis time of the disease, patients suffer from several problems caused by treatment. These problems include hypoglycemia, dizziness, lethargy, weight loss, polydipsia, and polyuria, which affect their satisfaction with life and the quality of life. If patients fail to manage their disease, the problems and complications of the disease will create some problems for them. Therefore, to reduce the complications and problems, they look for more information. In addition, the belief that medicinal plants bring them a feeling of cheerfulness and freshness makes them want to use them [12, 19, 20]. In the study conducted by Bahal and Edwards (21), patients with heart disease believed that medicinal plants improved their quality of life and reduced limitations of common medications. Therefore, according to some studies, the use of medicinal plants along with common drugs has been observed in many patients [17, 22]. The participants of the present study believed that medicinal plants had fewer complications and were more compatible with the body. According to the results of other qualitative and quantitative studies, one of the main reasons for using medicinal plants in diabetic patients is the trust in the safety of medicinal plants, being consistent with the findings of other studies [23-26].

According to a number of the participants, psychological factors, including anxiety and uneasiness arising from the use of medicinal plants, were the main causative factors in discontinuing their usage. Medicinal plants, like common medicines, have their own side effects. Therefore, unscientific use of them could lead to severe complications, including gastrointestinal, liver, and neurological problems [27]. Thus, having adequate knowledge of drugs seems to be really necessary. In this regard, a number of the patients stated that the use of medicinal plants, like other common drugs, requires profound knowledge and awareness. According to them, the method of preparation and the dose required are of great significance. Therefore, a number of the participants did not use herbal plants because they lacked the skill required for preparing and using them. To improve the information of those patients referring to medical centers, by evaluating the dose of their consumption or non-consumption of medicinal plants, it is possible to make them more informed about medicinal plants. Besides, by giving proper advice and referring the patients to a traditional medicine specialist, an important step could be taken in promoting knowledge of patients suffering from type 2 diabetes.

Based on the results of the present study, a number of the patients reported that the main reasons for using medicinal plants more than conventional ones were their lack of access to common drugs and financial inability to purchase them. In the qualitative study conducted by Dehdari et al, the patients stated that high costs of common drugs led to their less consumption, which was consistent with the results of the present study [28]. Given the financial limitations and sanctions imposed on Iran, the patients are facing a drug shortage. Other studies also indicate that patients living in remote areas deprived of health facilities use more medicinal plants than conventional ones [15]. In other studies, according to the participants, the low price of medicinal plants (compared to conventional drugs) was an important reason for their use. In fact, this finding was in line with the results of the present study [12, 29]. Thus, the health system must have some priorities. These priorities include localization of the production

cycle of drugs for type 2 diabetic patients and proper management of their distribution, especially in remote and deprived areas.

In this study, the role of the family, friends, other patients, and traditional physicians in increasing willingness to use medicinal plants was evident. Findings of the study conducted by Rutebemberwa on diabetic patients were in line with those of the present one. The aforementioned study reported the significant role of individuals and influential groups of the society in increasing patients' willingness to use medicinal plants [12]. Patients usually accept the advice of those people important to them. Acting based on a piece of advice is considered important, owing to the probable healing resulting from taking the advice as well as the reduced symptoms of the disease. Moreover, patients follow the advice of other patients with diabetes, which results from having similar experiences and symptoms of the disease. The results of other studies also confirm the role of the society in increasing willingness to use medicinal plants [12]. In addition, knowledge and information are expected to be transferred through a cascade process rather than an intermediate interpersonal mechanism. This affects health-seeking behaviors of individuals, which should be considered a fundamental issue. Another causative factor in using medicinal plants was the role of family culture, which was considered important by some of the participants. Families adhering to beliefs and customs care more about traditional foods and medicines as well as self-medication than others [15, 27, 30]. This is especially evident in countries where family ties and tribal customs are highly valued. Since Yazd is a city with strong family ties and cultural beliefs, this issue was of high significance among patients with type 2 diabetes.

Conclusion

The results of the present study showed that the experience and positive effects of using medicinal plants in patients with type 2 diabetes led to the continued use of medicinal plants in these patients. On the other hand, the belief that medicinal plants create a feeling of cheerfulness and freshness in patients increases the tendency to use medicinal plants among them. Anxiety and uneasiness were the psychological factors hindering the use of medicinal plants, as reported by a number of the participants. Therefore, it is highly essential to increase the patients' information of the way of using medicinal plants properly. Thus, giving appropriate advice and seeking help from specialists are highly recommended. Strengthening pharmaceutical infrastructures for drug storage and equitable distribution could play an important role in controlling the disease. Moreover, the participants reported that the role of their family, friends, other patients, and doctors was effective in using medicinal plants. In addition, they acknowledged the role of cultural factors and family customs in using medicinal plants.

Abbreviations

T2DM: Type Two Diabetes Mellitus

Declarations

Funding

Shahid sadoughi university funded small costs such as printing.

Ethics approval and consent to participate

This study was approved by the Ethics Committee of Shahid Sadoughi University of Medical Sciences, Yazd, under ethical code IR.SSU.REC.1398.233.

Acknowledgements

We wish to thank the health experts who designed proper planning for interviewing patients and all the patients and participants for cooperating in this project.

Conflict of interest

The authors declare that they have no competing interests.

Authorscontributions

MFA and AK recruited participants. MFA and AS made substantial contributions to the conception and design of the study. AS and FZ analysed and interpreted interview data. NN ,MFA,ASand AS drafted the manuscript. AS and MFA were the supervisor of the study and provided the final article.

Availability of data and materials:

Not applicable

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Tables

Table 1: The participants' demographic details	
Variable	
N(%)	Gender
(37.5)6	Male
(62.5)10	Female
Age group	
(25)4	20-40
(56.25)7	40-60
(31.25)3	60<
Time since diagnosis	
(31.25)5	1-5
(50)7	5-10
(18.75)3	10-15
Complications of diabetes(Macrovascular)	
(18.75)3	Yes
(81.25)13	No
Complications of diabetes(Microvascular)	
12(75)	Yes
4(25)	No

Table 2. Codes, subclasses, and classes of causative factors in using medicinal plants in patients with type 2 diabetes

Categories	Subcategories	Code
Beliefs about herbal medicines	Trust in therapeutic effects of medicinal plants in terms of biochemical indicators	Believing in the lowering of blood sugar by consuming nettle
		Believing in the lowering of blood sugar by consuming thymes and fenugreek
		Believing in the failure of three extracts to lower blood pressure
	Feelings of freshness and cheerfulness after the use of medicinal plants	Believing in sedative effects of medicinal plants
Believing in physical and mental cheerfulness and freshness while using medicinal plants		
Trust in fewer complications and patient compatibility with medicinal plants		Believing in naturalness of medicinal plants compared to conventional medicines
		Believing in greater body compatibility with medicinal plants
		Lack of harms of medicinal plants for the body
Belief in the need for complementary therapies		Using herbs as a supplement for prescribed drugs to supplement the treatment and recovery process
		Being disappointed at achieving full recovery by using prescribed drugs
Psychological factors	Patients' fear, anxiety, and discomfort	Anxiety caused by taking herbal medicines
		Fears of side effects of herbal medicines
		Concerns about ineffectiveness of prescribed drugs
		Fears and anxiety caused by severe hypoglycemia following the use of common drugs
Patients' knowledge and awareness	Use of medicinal plants under the influence of other patients' knowledge	Awareness of using too much of medicinal plants
		Awareness of the possibility of liver poisoning resulting from misuse of medicinal plants
		Familiarity with digestive problems caused by the use of medicinal plants

		Awareness of the body's tolerance to herbal medicines
Accessibility and economic barriers	Access barriers to common drugs	Low access to insulin at pharmacies and the impossibility of providing it Lack of easy access to blood sugar-lowering pills
	Patients' low purchasing power	High costs of drugs prescribed by doctors Patients' unsuitable economic status
Pressure imposed by the society	Encouragements and advice from relatives and friends to take herbal medicines	Using medicinal plants as advised by friends Using medicinal plants as advised and encouraged by the family
	Advice and encouragements from therapists to use herbal medicines	Prescribing medicinal plants by traditional apothecaries and therapists Recommending the use of medicinal plants by traditional doctors Not receiving advice from specialists on using medicinal plants
	Advice from diabetic patients to use herbal medicines	Promoting therapeutic effects of medicinal plants by diabetic patients Recommending medicinal plants to other patients suffering from diabetes
The role of family culture	The lifestyle and institutionalized behaviors in the family	Institutionalizing self-medication with traditional medicines in the family Using medicinal plants as a diet style in the family