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USAGE ASSESSMENT OF COMPLEMENTARY AND ALTERNATIVE MEDICINE IN SAUDI DIABETIC PATIENTS

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ABSTRACT: Complementary and alternative medicines (CAMs), particularly herbal medicines (HMs), are popular with diabetic patients and are often used alongside conventional treatments. In such cases, patients usually do not advise their doctor or any other healthcare professional, so inappropriate use and potential interactions between CAM therapies and conventional treatments are serious concerns. This study attempted to identify the main factors affecting CAM decision-making by studying the association between CAM use and patient characteristics, including age, gender, diagnosis, reasons for using, time of starting, and sources of HM products. It was aimed to shed light on patients' experiences and perceptions of CAM use, particularly HMs, to identify any perceived benefit or harm. Cross-sectional questionnaire surveys, including open-ended and closed-ended questions, which were administered to eligible participants. The results revealed that approximately 34% of the 98 patients participating in the study used CAM. The most prevalent age group of participants was 51-60 years old (39.8%). The most used HMs were the olive leaf (21.2%), green tea (21.2%), cinnamon (21.2%), black seeds (15.2%), and fenugreek (15.2%). Herbal shops (69.7%) were the most popular place for obtaining herbal medicines and dietary supplements. Based on the patients' perceptions, 73% of CAM users experienced benefits during their CAM use, and no patient experienced any harm. Further explorations are needed to confirm our findings and identify any more associations between CAM use and diabetic patient characteristics. One thing appears to be certain: HMs use is increasing, and diabetics will continue to take them. Therefore, we need to provide them with sensible advice about their effects, including their use in combination with conventional drugs.

INTRODUCTION: Diabetes mellitus (DM) is a metabolic disorder that is considered a major cause of morbidity and mortality worldwide. The World Health Organization (WHO) estimates that 8.5% (422 million) of the world's population had diabetes in 2014, and the WHO Eastern Mediterranean Region has the highest prevalence (13.7%) [1].

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Saudi Arabia is ranked seventh in the world for diabetes [2] with, according to the WHO, about 20% of the Saudi population living with the disorder [3].

Despite progress in diabetic treatment, studies have consistently shown that many diabetic patients access a wide range of complementary and alternative therapies in addition to their conventional treatment [4-6]. Patients' reasons for using CAM vary depending on factors such as age, gender, culture, historical significance, and medicine regulation. They also vary between countries [7]. The increasing incidence of chronic, degenerative, and age-related disorders, such as cardiovascular disease, cancer, and diabetes, is also important as some patients believe that CAM is

more likely to help them manage such diseases than conventional medicine [8]. In addition, some CAM users believe the many active ingredients in herbal and nutritional products may produce synergistic effects and fewer adverse reactions than the single active chemicals used in conventional medicine [9].

The WHO has reported that 70-80% of Asian and African populations have used some form of CAM. The highest reported rates of CAM use in Asia were in Japan (76%), South Korea (75%), and Malaysia (56%) [10]. The 2007 National Health Interview Survey (NHIS) found that approximately 38% of Americans use CAM. Further, over 100 million Europeans are estimated to be CAM users, with the prevalence varying from 41% in Spain to 70% in Canada and 82% in Australia [8].

In the diabetic population, a review of the literature suggests the prevalence of CAM use among diabetic patients ranges from 17% to 78% [11]. It is reported that patients with diabetes are 1.6 times more likely to use CAM than non-diabetics for several reasons [12]. The most widely CAM treatments are dietary supplements, herbal medicines, spiritual healing, and relaxation techniques [11, 13].

In the Kingdom of Saudi Arabia, CAM is usually practiced based on religious beliefs; therefore, some CAM forms are common as a part of prophetic medicine. These include Holy Quran therapy, cupping therapy (Hijama), and certain food and herbs such as honey, black seed, and myrrh [14-17]. A cross-sectional study was conducted on Saudi diabetic patients attending the outpatient clinics of four major hospitals to determine the prevalence of herb use among diabetics and which herbs are used.

This study revealed that 17.4% of the participants reported using some form of herb. Approximately 73% of herb users did not inform their doctor concerning their herb use [18]. Another study indicated that 313 out of 1039 patients actually used traditional medicines to treat their diabetes, and over 55% of them strongly believed in the benefits of black seeds for its connection to religion [19].

In general, little is known about the experiences and expectations of diabetic patients who use CAM, although it is evident that these will influence their normal lives and routine activities. Many patients have complained of the failure of conventional medicine to ease these problems and have thus sought additional CAM treatment [20-21]. A study conducted in the UK revealed that patients had high expectations of CAM to alleviate disease symptoms, provide a holistic approach to treatment, improve quality of life, reduce the risk of conventional treatments, and that they wished for more CAM therapies to be available in the National Health Service (NHS) [20].

Studies show that patients use CAM treatments enthusiastically and, in some cases, truly believe in their benefits despite a lack of evidence. Therefore, it is essential to understand their perceptions and appreciate their experiences to support them when choosing appropriate CAM treatments and avoid any harm as a result of their lack of knowledge or erroneous notions about such treatments.

This study was aimed, therefore, at investigating the factors influencing CAM decision-making by examining associations between CAM use and characteristics such as age, gender, stated reasons for using CAM, seeking advice from their doctors, sources of information about CAM, and sources of products taken. It then looked at patients' experiences and perceptions of CAM use to identify any perceived benefit or harm.

METHODS: Semi-structured questionnaire survey comprising of open-ended and closed-ended questions were administered to eligible participants being treated for diabetes at the Medical Services Centre at Imam Mohammad Ibn Saud Islamic University (IMSIU), Riyadh, Kingdom of Saudi Arabia.

All items in the questionnaire were formulated with special consideration of previously published papers and to be consistent with the circumstances of the target participants. The open-ended and closed-ended questions allowed the respondents to provide the researcher with important issues they experienced with CAM. The questionnaire contained three main sections, as follows:

Section One: questions about patients: age, gender, diabetic diagnosis, and CAM use.

Section Two: questions about CAM practices and products, sources of information, sources from where patients obtained their CAM products and reasons for using CAM.

Section Three: uestions about patients' perceived experiences from their CAM use. Diabetic patients were included in the study based on the following inclusion criteria: aged above 18 years, currently receiving treatment for a diabetic diagnosis, and able to understand the questionnaire. Patients were excluded from the study if they were less than 18 years of age or were incapable of understanding or completing the questionnaire. Interviews were conducted over the study period (May- July2018).

The eligible patients were interviewed by trained medical students (year 4 and year 3) from the College of Medicine at IMSIU, using semi-structured questionnaires. The students had been carefully trained on questionnaire administration and interviewing skills. Interviews were conducted while patients were waiting at their doctors' clinics or at the pharmacy for their prescriptions. The interviewers clearly explained the purpose of the study to the participants and ensured they were free to withdraw from the interview at any time and without giving reasons. This did not affect the standard of care the participant received. Moreover, participants were assured that any information they provided would strictly remain confidential and would only be used for research purposes. If the patient decided to participate in the study, they were asked to sign a consent form.

Data collected from the questionnaires were entered into SPSS V.20 to provide descriptive statistics for patients' characteristics. A chi-square test was used to investigate the association between CAM users and other characteristics. Statistically significant results were considered when $p < 0.05$.

Ethical approval was obtained from the IRB committee of the College of Medicine at Imam Mohammed Ibn Saud Islamic University (IMSIU) (Ref.: 00105/5/2016). For other required local ethical approval, procedures were followed as necessary.

RESULTS: Ninety-eight diabetic patients participated in the study. The majority was type II diabetic patients (82; 83.7%) while 16 (16.3%) was type I diabetic patients. The most prevalent age group of participants was 51-60 years old (39, 39.8%), followed by the 41-50 age group (30, 30.6%). Most of the participants were male (95; 96.9%), and only three participants were female (3; 3.1%). Of all participants, 65 (66.3%) did not use CAM while 33 (33.7%) used six different CAM types. Chi-square tests were used to determine if there were any significant differences between CAM users according to these characteristics. The results showed no significant differences in CAM usage between age groups, gender, or diabetes type as *P* values were 0.955, 0.989, and 0.822, respectively. **Table 1** presents the general characteristics of participating patients including age, gender, diabetes type, and CAM usage.

TABLE 1: GENERAL CHARACTERISTICS OF PARTICIPANTS

Characteristics	Total	CAM users	Non-CAM users	Chi-square
Age				
Above 60	18 (18.4%)	6 (6.1%)	12 (12.2%)	(*P* value: 0.955)
51-60	39 (39.8%)	13 (13.3%)	26 (26.5%)	
41-50	30 (30.6%)	11(11.2%)	19 (19.3%)	
40 and below	11 (11.2%)	3 (3.1%)	8 (8.2%)	
Gender				
Male	95 (96.9%)	32 (32.6%)	63 (64.3%)	(*P* value: 0.989)
Female	3 (3.1%)	1 (1%)	2 (2.1%)	
Diabetes type				
Type 1	16 (16.3%)	5 (5.1%)	11 (11.2%)	(*P* value: 0.822)
Type 2	82 (83.7%)	28 (28.6%)	54 (55.1%)	
Types of CAM				
Herbal medicine	33 (100%)			
Holy Qur'an	6 (18.2%)			
Hot water	4 (12.1)			
Dietary supplements	3 (9.1%)			
Cupping therapy	3 (9.1%)			
Goat milk	1(3.0%)			

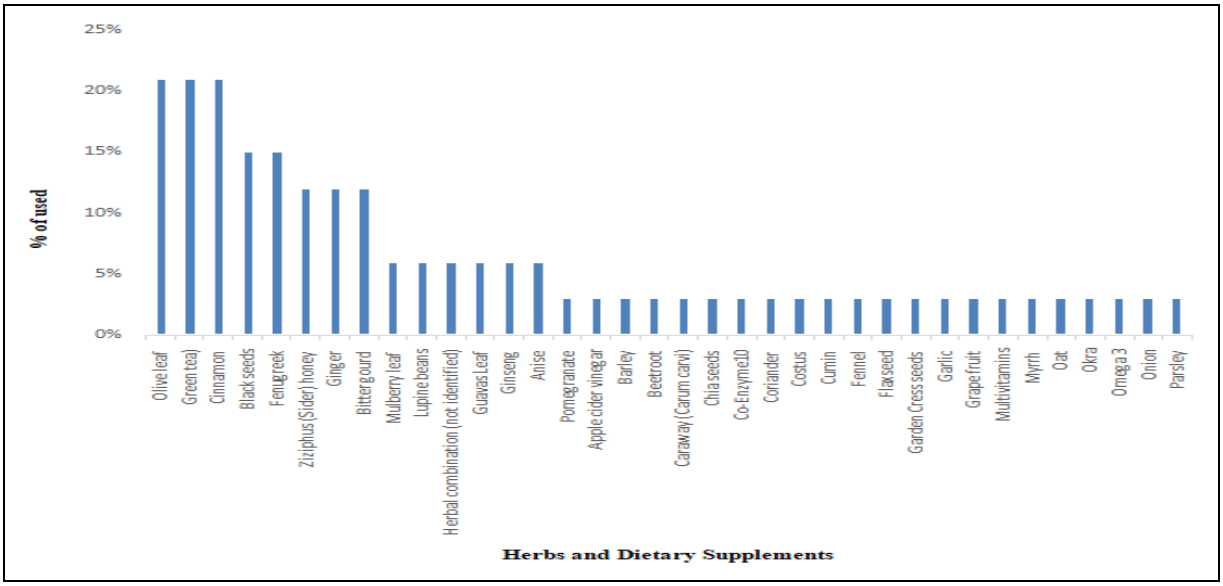

FIG. 1: HERBAL MEDICINES AND DIETARY SUPPLEMENTS USED BY SAUDI DIABETIC PATIENTS

All CAM users reported that they tried HMs. Thirty-six different herbal medicines and dietary supplements were used. The range of the use of HMs was from 1 to 7. Ten patients (30.3%) reported using one HM. Another ten patients (30.3%) reported using two HMs. Seven patients (21.2%) reported using three HMs. Six patients (18.2%) reported using four HMs. Two patients (6.1%) reported using six HMs and one patient (3%) reported using seven HMs. The concurrent use of CAM and conventional medicine drugs were reported by 30 patients (90.9%). The most used HMs are the olive leaf (21.2%), green tea (21.2%), and cinnamon (21.2%) followed by black seeds (15.2%), fenugreek (15.2%), and multivitamins (15.2%). Sidr honey (12.1%), ginger (12.1%), and bitter gourd (12.1%) were the next most commonly used HMs. **Fig. 1** mentions all herbs and dietary supplements used by patients.

Based on the patients' perceptions, 24 (73%) CAM users experienced benefits during their CAM use while 8 (24%) did not experience any benefits or harm. Interestingly, no patient experienced any harm during their CAM use. Twenty-one (64%) patients did not consult their physicians before they used their CAM therapies, while 16 (49%) reported that there is a need for medical advice before CAM use. **Table 2** presents patients' attitudes and perceptions about CAM use.

Herbal shops were the most popular place for obtaining herbal medicines and dietary supplements (69.7%). Only about 18% of users obtained theirs from supermarkets. Two patients obtained their herbs and dietary supplements from pharmacies. One patient ordered their herbal medicines or dietary supplements from websites, and only one patient made their own herbal medicine.

TABLE 2: ATTITUDES AND PERCEPTIONS OF CAM USERS

Attitudes and perceptions	Number of CAM users (%)
Associated Benefits/Harms with HDIs use	
Benefits	24 (73%)
No Harm/ No benefit	8 (24%)
Harms	0
Not sure	1 (3%)
Consultation before use	
Yes	11 (33%)
No	21 (64%)
Not sure	1 (3%)
Need for doctor advice	
Yes	16 (49%)
No	12 (36%)
Not sure	5 (15%)
Source of Herbs and supplements	
Herbal shop	23 (69.7%)
Supermarket	6 (18.1%)
Pharmacy	2 (6.1%)
Online	1 (3%)
Make my own	1 (3%)
Other sources	0

DISCUSSION: There remains a lack of knowledge and information about the prevalence of CAM use by diabetic patients, their general characteristics, factors motivating use, and their attitudes towards different types of CAM. About 34% of this study's participants reported using CAM, whereas 66.3%

reported they did not. This was surprising, as CAM use is known to be common among diabetic patients [11-12]. However, this might be attributable to the fact that many patients conceal their CAM use from their doctors [22,] and this study was conducted in a conventional medical setting.

Socio-demographic and psychosocial factors, as well as the physical situation of the patient and their personal beliefs, can affect CAM decision-making [23]. Patients in Saudi Arabia believe in spiritual and religious therapies, such as cupping therapy (Hijama) and some herbs and foods [24]. These are reflected in the study's findings. It has also been argued that Western people have fewer beliefs in spiritual and religious therapies compared to Asian and African cultures, and this may explain why these therapies are uncommon in Europe [25].

The prevalence of CAM use, particularly HMs, among diabetics, was consistent with other previous studies performed in Saudi Arabia. Al-Rowais *et al*., reported the prevalence of herbal use among diabetics in Saudi Arabia was 17.4% [21]. Other studies reported 30.1% and 25.8% [26, 27,] while Kamel *et al*., reported 64% [28]. All CAM users in this study had tried herbal medicines and dietary supplements. Of those who reported HM use, 26 (78.8%) had tried between 2-7 different types of herbs and dietary supplements, indicating that diabetic patients are enthusiastic HM users.

This study showed that taking herbal medicines was the most popular form of CAM use, as it was used by all participants, whilst three (9.1%) used dietary supplements. However, it should be noted that there is inconsistent use of terminology and definitions of dietary supplements and herbal medicines and they are not always differentiated; thus there will be some overlap of the two categories, which will affect the precise estimation of the prevalence of herbal medicines and dietary supplements among diabetic patients. A single medicinal plant may be defined as a food, a functional food, a dietary supplement, or herbal medicine depending on the policies and regulations applied in each country.

The incidence and frequency of use of specific HMs used by diabetic patients remain unclear. The most used herbs in this study were the olive leaf (7, 21%), green tea (7, 21%), cinnamon (7, 21%), black seed (5, 15%), fenugreek (5, 15%), and ginger (4, 12%). Other studies reported a different prevalence of herbal medicines and dietary supplements used by diabetics.

In Iraq, Al-Asadi and Saleh reported that the most common HMs among diabetics were cinnamon (12.4%), black seed (11.1%), garlic (6.5%), and aloe (3.9%) [29]. These findings were consistent with another study conducted in Sudan where fenugreek (29.1%), black seed (21.6%), cinnamon (16.8%), olive leaf (15.7%), and ginger (14.7%) were the most common herbs used by diabetics [30]. It is clear that HMs are commonly used by diabetic patients and that several studies have investigated CAM use in general, but few have investigated the characteristics of HM users, the association between HMs and diabetic diagnosis, the reasons behind using certain HMs, and the sources of HMs deeply. This kind of investigation is necessary because of the growing herbal medicine and dietary supplements market and the ease of accessibility of these products to diabetic patients.

The relationship between CAM use and the age of users has been studied in various ways. An analysis of 134 studies indicated the significant relationship between age and CAM use. These findings revealed that 18 studies suggested that middle-aged (40-60-year-old) patients are more likely to use CAM, while 26 studies found that CAM use increases with age. Twenty-seven studies indicated that CAM use decreases with age. The evidence regarding an association between CAM use and age is inconsistent, and this may be because there is no consensus on how to categorize age for such analyses. However, based on existing literature, young and middle-aged people are more likely to use CAM than the elderly [31]. This study showed that herbal medicines were used by all age groups to a much greater extent than other CAM forms, and suggests that herbal medicines are not closely associated with particular socio-demographic or diabetic type-related characteristics.

Evidence regarding when diabetic patients start to use CAM is inconsistent. It has been shown that 21% of the adult population of the United States has concurrent use of non-vitamin dietary supplements and prescribed medications [32].

This study identified 30 patients (30.6% of CAM users and 90.9% of HMs users) that reported concurrent use of HMs with prescribed medications. It also reported that 69% of dietary supplement users did not consult with their healthcare professionals before use [32]. These findings are in agreement with our study results, as 64% of HM users did not consult their physicians before use. Surprisingly, about 50% of HM users believe patients are supposed to consult their physicians about HM use, but they themselves did not.

About two-thirds of HM users in this study had used up to seven herbal medicines concurrently with their conventional medicines. These results indicate the higher potential of herb-drug interactions for the participants. The possibility of interactions occurring between herbs and drugs may be higher than between multiple conventional drugs because of the large number of components in the herb compared to the single active substance used in conventional medicine [33]. The large number of herbal products containing a wide variety of chemical constituents, and used to treat the same illness, make interactions difficult to interpret accurately [34].

Herbalists believe herbs are more potent than isolated compounds because of the synergistic interactions between the known and unknown chemical components of the herbs. Therefore, the relationship between these ingredients is as important as the actual ingredients themselves. Accordingly, most herbal preparations available in practice are whole extracts of herbs prepared in a traditional manner that aims to provide the best balance of the constituents [9, 35]. This study confirmed these beliefs, and most of the patients expressed positive feelings and experiences regarding HM use. They believed their HMs helped them. Some patients were certain; some HMs were 'better' than conventional medicine and helped them control their diabetes. It is apparent that diabetic patients had high expectations of HMs. Although some HMs have fairly good evidence for their use, some do not have supporting evidence for use as diabetes treatments, as patients believed.

The source from which patients obtain their herbal medicines and dietary supplements may determine the quality and even the safety of these products. About 70% of the participants cited herbal shops as a primary source of products. This is in agreement with other findings that reported that herbal shops were cited by 59.2% as a source for herbs [30]. Herbal shops in Saudi Arabia provide products as raw materials and extracts. The fact is that there are few quality standards for herbal products [36-37,] and this issue is exacerbated because of a lack of regulation. The quality of herbal medicinal products is a crucial issue, and many difficulties have been identified surrounding their purity, standardization, identity, compatibility, and stability. A study was conducted to assess the quality of herbal remedies present in the market in Saudi Arabia for safety concerns. Researchers showed that patients use herbal remedies in discriminately. They recommended that there is an urgent need to control the production, import, and sale of herbal preparations [38].

Another important issue in this regard is the disagreement between healthcare professionals, researchers, and CAM practitioners on how the evidence concerning CAM safety and efficacy should be formed, as well as how the current evidence should be interpreted. In other words, there is a strong demand for an ideal framework for evaluating CAM safety and efficacy at different levels of patients' needs, including social, epidemiological, and clinical studies. By solving such problems, clinicians can confidently deal with CAM practices, products, and their patients in this regard [39].

This study included a combination of open-ended and closed-end questions to obtain factual and holistic information about patients' CAM use with their conventional medicines. However, it is difficult to draw firm conclusions about the benefits or harms of CAM using questionnaire-based studies, especially when the methods of measuring the harm and effectiveness of HM are highly controversial. In addition, the sample size of patients included in the study could affect the study's generalizability. Nevertheless, these studies are a necessary preliminary phase for further sociological, pre-clinical, and clinical investigations and provide information about patients' motives, expectations, and experiences of CAM use.

CONCLUSION: From this study and other published work, it is clear that concerns about diabetic patients and CAM, and particularly HM, need to be addressed for the following reasons: diabetic patients commonly use HMs, many use them concomitantly with conventional medicines, some patients do not advise a healthcare professional of their HM use, and there is a risk of HM-drug interactions (HDIs), which may be serious. By integrating the findings of this study, a fuller picture of diabetic patients' involvement with CAM can be seen. We know the proportion of diabetics using CAM, the modalities used and why, where they obtain their information and therapies, and their experiences and perceptions about CAM. The study's findings suggest that further exploration is needed to identify the physical and psychological needs of diabetic patients and what they expect from CAM treatments. By doing so, the integration of CAM with conventional treatments could be made safer and even beneficial.

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DATA AVAILABILITY: The data used to support the findings of this study are included in the article.

CONFLICTS OF INTEREST: The author declares no conflict of interest.

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