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*Research Article / Araştırma*

# Use of herbal supplements in patients with type 2 diabetes and evaluation of outcomes

## *Tip 2 diyabetli hastalarda bitkisel takviyelerin kullanımı ve sonuçların değerlendirilmesi*

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## ABSTRACT

**Introduction and Purpose**: Patients with diabetes are known to use complementary and alternative therapies more frequently than other patient groups. Evaluating the use of herbal products is essential to prevent potential side effects during the treatment process. This study aimed to assess the use of herbal products and related feedback among diabetic patients. **Materials and Methods**: This descriptive study was conducted between March and December 2022 in the diabetes outpatient clinic of a training and research hospital in Istanbul. Data were collected through face-to-face interviews with 447 type 2 patients with diabetes using questionnaires prepared by the researchers. The data were analyzed using IBM SPSS Statistics 22 software, employing descriptive statistics and assessment of categorical variables was carried out using the chi-square test or Fisher's exact test when applicable. The associations between continuous variables were assessed using the Mann-Whitney U test when abnormally distributed and student T tests when normally distributed. **Finding And Results:** The mean age of the patients was 60.37 ± 10.79 years, and 61.74% were female. Of the participants, 59.28% were using oral antidiabetic drugs (OAD) combined with insulin. Nearly half of the patients (49.5%) reported that herbal therapies were beneficial, particularly in regulating blood glucose levels (67.9%) and improving overall well-being (21.4%). Cinnamon was the most commonly used herbal product (47.7%). Herbal products were generally consumed as tea. However, herbal therapies did not have a significant effect on HbA1c levels, body mass index (BMI), or waist circumference. In conclusion, the use of herbal products remains widespread among type 2 diabetes patients, but these approaches do not significantly impact metabolic parameters. It is important for health professionals to evaluate the use of herbal products in patients with diabetes, provide appropriate counseling, and raise awareness of patients on this issue.

**Key Words:**
Diabetes, Complementary Therapy, Herbal Product Use

**Anahtar Kelimeler:**
Diyabet, Bitkisel Ürün Kullanımı, Tamamlayıcı Tedaviler

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## ÖZ

**Giriş ve Amaç;** Diyabet hastalarının, diğer hasta gruplarına kıyasla tamamlayıcı ve alternatif tedavi yöntemlerini daha sık kullandıkları bilinmektedir. Bitkisel ürünlerin kullanımını değerlendirmek, tedavi sürecinde olası yan etkileri önlemek açısından önemlidir. Bu çalışma, diyabet hastalarının bitkisel ürün kullanımını ve bu ürünlere dair geri bildirimlerini belirlemeyi amaçlamaktadır. **Gereç ve Yöntemler**; Bu tanımlayıcı çalışma, Mart-Aralık 2022 tarihleri arasında İstanbul'da bir eğitim ve araştırma hastanesinin diyabet polikliniğinde yapılmıştır. Araştırmacılar tarafından hazırlanan formlar kullanılarak 447 tip 2 diyabet hastası ile yüzyüze görüşme yapılarak veriler toplanmıştır. Verilerin analizi IBM SPSS Statistics 22 programı kullanılarak yapıldı.Tanımlayıcı istatistiklerin yanı sıra kategorik değişkenler değerlendirilirken ki- kare veya Fisher's exact test, normal dağılım olduğunda student T tests, anormal dağılımda Mann-Whitney-U testi kullanılarak değerlendirilme yapıldı. **Bulgular ve Sonuçlar**; Hastaların yaş ortalaması 60,37 ± 10,79 yıl olup %61,74'ü kadındır. Katılımcıların %59,28'i oral antidiyabetik ilaç (OAD) + insülin tedavisi almaktadır. Hastaların çoğu bitkisel tedavilerin faydalı olduğunu belirtmiş (%49,5), bu faydaların en yaygın olarak kan şekerini dengelemek (%67,9) ve daha iyi hissetmek (%21,4) olduğu ifade edilmiştir. En sık kullanılan bitkisel ürün tarçın (%47,7) idi. Bitkisel ürünler genellikle çay olarak tüketilmişti. Ancak, bitkisel tedavilerin HbA1c, vücut kütle indeksi (VKİ) ve bel çevresi üzerinde anlamlı bir etkisi bulunmamıştır. Sonuç olarak tip 2 diyabetli hastalar arasında bitkisel ürün kullanımının halen yaygın olduğu ancak bu yaklaşımların metabolik parametreler üzerinde belirgin bir etkisi olmadığı saptanmıştır. Sağlık profesyonellerinin, diyabetli hastalarda bitkisel ürün kullanımını değerlendirmesi, uygun danışmanlık sağlaması ve hastaların bu konuda bilinçlendirilmesi önemlidir.



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## INTRODUCTION

Maintaining regular treatment is important to ensure metabolic control and prevent diabetes-related complications (Association, 2020). However, adherence to medical treatment, regular diet and physical activity program may deteriorate over time. Therefore, most diabetic patients, who are both emotionally and physically drained during the disease process, occasionally resort to various complementary medicine procedures to supplement or completely replace standard treatment (Azizi-Fini et al., 2016; Chang et al., 2007; Polat, 2017). The literature reports that patients with diabetes are more likely to use complementary and alternative therapies compared to other patient groups (Çiçek et al., 2021; Küçükgüçlü et al., 2012). The reasons for using these methods include protection from the side effects of medication, cost-effectiveness, ease of access and no prescription required (Alzahrani et al., 2021; Çalık, 2017). According to reports, the proportion of patients with diabetes using alternative treatments ranges from 17-73% worldwide, while in our country this proportion is 25-85% (Chang et al., 2007; Polat, 2017). Commonly used herbal approaches include fenugreek, cinnamon, garlic, onion, black cumin, black seed, cumin, fennel, rye, forty-kilith herb, basil, yam, quince, nettle, pomegranate, okra flower and pery rabbit (Alzahrani et al., 2021; Ergün, 2021). It has been reported in the literature that the intake of some herbal remedies prevents the increase in blood glucose levels by increasing insulin secretion, reducing the absorption of glucose from the intestine or restoring pancreatic tissue functions. In addition, it has been reported that there are more than 400 plant species with hypoglycemic effects and more than 1200 natural products are used to support treatment (Alqathama et al., 2020; Chang et al., 2007; Karaman & Cebe, 2016; Pandey et al., 2011; Sarıkaya, 2010). The efficacy of many herbal approaches for maintaining glycemic control in diabetic patients has been investigated. However, results show that the clinical efficacy of even those products reported to support treatment varies from study to study and is controversial (Asbaghi et al., 2021; Ebada et al., 2019; Elçioğlu & Kemerci, 2017).There are many studies(Aşılar et al., 2023; Candar et al., 2018; Çalık, 2017; Kooti et al., 2016; Mollaoğlu & Aciyurt, 2013; Salehi et al., 2019; Setiyorini et al., 2022; Vishnu et al., 2017) on which herbal products are used by diabetic patients, but there is little research on how these products show effects/side effects considering the frequency, amount and type of consumption. Evaluation of the use of herbal products by patients is important to prevent side effects during the treatment process. Therefore, nurses educating patients with diabetes should be aware of the herbal approaches used for treatment and/or support, and they should be able to inform the patient about the safety of these methods in accordance with the evidence. The aim of this study was to determine the use of herbal products by patients with diabetes and their feedback on the herbal products used.

## MATERIAL AND METHOD

### Study Design and Setting

This descriptive study was conducted in the diabetes outpatient clinic of a training and research hospital on the Anatolian side of Istanbul between March and December 2022. Prior to the commencement of the study, approval was obtained from the Clinical Research Ethics Committee of S.B. İstanbul Medeniyet University Göztepe Training and Research Hospital (Decision No: 2018/0042). During the research process, patients were provided with detailed information about the study, and their written informed consent was obtained.

### Population and Sample Of The Study

The population of the study consisted of all diabetic patients who registered at the diabetes outpatient clinic. The number of registered diabetes patients who registered during the study period was 1890. 483 patients were invited to participate in the study. 18 patients refused to participate in the study, 15 did not participate due to time constraints and 3 wanted to leave while answering the questions. The study was completed with 447 diabetic patients forming the sample group. The sample size was calculated with G-power computer programe. Acording to 95% confidance interval power is 0.80.

### Inclusion and Exclusion Criteria

Patients who had been diagnosed with type 2 diabetes for at least 6 months, who were 18 years or older, who could speak and understand Turkish, who had no problems that would prevent them from participating in the study and answering the questions, and who voluntarily agreed to participate in the study by confirming their informed consent were included.

Patients with type 1 diabetes, gestational diabetes, diabetes lasting less than 6 months, diagnosed chronic complications and/or serious chronic comorbidities (cancer, heart failure, cerebrovascular accident), patients with psychiatric disorders/using psychotropic medications, those on a strict vegan diet, those with extreme dietary habits such as ketogenic diet, patients with cognitive problems, and patients who did not want to participate in the study were excluded from the study.

### Data Collection

A questionnaire developed by the researchers as a result of the literatüre (Elçioğlu & Kemerci, 2017;

Karaman & Cebe, 2016) review was used to collect the research data. This questionnaire contained a total of 20 questions in which the personal data of the patients, the course of the disease, information on metabolic parameters and characteristics in connection with the use of complementary therapies were queried. The data for the study was collected by the researcher through personal interviews with the patients. Data collection took about 10 minutes.

### Data analysis(Muntner et al., 2019)

The statistical analysis was executed using SPSS for Windows, version 26.0 (SPSS Inc., Chicago, IL). The continuous variables were exhibited as either the mean ± standard deviation or the median (minimum-maximum), depending on their distribution, which was established using the Kolmogorov-Smirnov test. The assessment of categorical variables was carried out using the chi-square test or Fisher's exact test when applicable. The associations between continuous variables were assessed using the Mann-Whitney U test when abnormally distributed and student T tests when normally distributed. The significance level employed to determine statistical significance was set at $p < 0.05$. Patients' use of herbal remedies was determined as the dependent variable. The demographic characteristics of the patients [age, body mass index, waist circumference, gender, education level, place of residence] and disease-related characteristics [diabetes diagnosis, duration and treatment, Hb1Ac value] were defined as independent variables of the study.

## RESULTS

The mean age of the patients was 60.37? 10.79 years, more than half were female (61.74%) and 59.28% were using OAD + insulin (Table 1).

Use of herbal approach; Of the patients who participated in the study, 74.7% stated that they did not use any herbal approach. Of the 113 patients who answered that they did, 22 (19.4%) used it regularly, 49 (43.3%) used it occasionally and 42 (37.1%) had stopped using it. Although different answers were given to the question "Why do you use herbal approaches?", the common goal was to ensure glycemic control. When asked where they learned about the approach they used, the answers were obtained from media tools such as internet and TV as well as people they communicated with in social life (Table 2). There were 102 people who did not ask their physician about the approach they used. Of those who asked their physician (n=11), 45.4% were advised not to use it, while the others were told that there was no harm in using it.

**Table 1.** Descriptive Characteristics (n= 447)

| | n | $\bar{X}$±Sd | Median | Minimum | Maximum |
|---|---|---|---|---|---|
| **Age** | 447 | 60,37 ±10,79 | 60,00 | 22,00 | 92,00 |
| **BMI** | 447 | 32,93 ± 7,03 | 32,00 | 18,94 | 59,52 |
| **Waist circumference** | 447 | 104,92 14,09 | 104,00 | 72,00 | 179,00 |
| **Duration of diabetes** | 447 | 12,33 7,49 | 10,00 | 2,00 | 40,00 |
| **HbA1c** | 398 | 9,13 ±2,04 | 8,80 | 6,00 | 17 |
| | | | | n | % |
| **Gender** | | | | | |
| Woman | | | | 276 | 61,74 |
| Male | | | | 171 | 38,26 |
| **Education Level** | | | | | |
| Illiterate | | | | 17 | 3,81 |
| Literate / Primary School | | | | 320 | 71,59 |
| Middle-high school | | | | 90 | 20,13 |
| University | | | | 20 | 4,47 |
| **Where he spent most of his life** | | | | | |
| City | | | | 358 | 80,09 |
| District | | | | 79 | 17,67 |
| Village | | | | 10 | 2,24 |
| **Diabetes Treatment** | | | | | |
| OAD | | | | 89 | 19,91 |
| Insulin | | | | 93 | 20,81 |
| OAD+Insulin | | | | 265 | 59,28 |

BMI: Body Mass İndex, HbA1c (haemoglobin A1c): glycated haemoglobin, OAD: Oral Anti-diabitic Drug

Approximately half of the patients who used herbal products used two or more products (Table 2). Most patients using herbal approaches stated that the method they used helped them (n=56, 49.5%). These benefits were; balancing blood sugar (n=38, 67.9%), feeling more lively/better/stronger (n=12, 21.4%), helping them lose weight (n=1, 0.8%), reducing appetite (n=4, 7.1%), and protecting against disease (n=1, 1.8%). Some said that it did not help or harm them (n=49, 43.3%) and some have (n=8, 7,08%) reported that they were harmed by the herbal approach they used (disrupted bowels, stomach ache, rise blood glucouse).

Herbal approaches used; Cinnamon was found to be the most frequently used herbal approach with 47.7%. In addition to cinnamon, other herbal approaches frequently used by patients to stabilize blood glucose were black cumin with 23.8%, lemon with 11.5%, olive leaf with 11.5%, and rosehip with 7.9% (Table 3).

When the consumption patterns of 113 herbal approaches reported by the patients were analyzed, it was observed that 61.2% of patients used these approaches regularly every day (n=79, 61.2%) and 22 patients (17.0%) used them only when blood glucose levels increased. 45.7% (n=64) of the patients stated that they boiled the herbal approach or soaked it in hot water and drank it as tea, 25.7% (n=36) ate it mixed in a bowl of yogurt, and 16.4% (n=23) ate it directly. The effects of the consumption method, dosage, and frequency of the herbal product on the patients are shown in Table 4 (patients with n=1 are not included in the table).

**Table 2.** Distribution of Characteristics Regarding the Use of Herbal Approach (n= 113)

| | n | % |
|---|---|---|
| **The use of a herbal approach** | | |
| Consistent user | 22 | 19,4 |
| Occasional user | 49 | 43,3 |
| Discontinued user | 42 | 37,1 |
| **Herbal Approach Intended Use** | | |
| Preventing blood sugar spikes | 6 | 5,30 |
| Regulate blood sugar | 39 | 34,51 |
| Lowering blood sugar | 59 | 52,21 |
| Prevent disease progression | 5 | 4,42 |
| Reducing the dose of medication used | 4 | 3,53 |
| **Where He Learned the Herbal Approach** | | |
| Television | 28 | 24,77 |
| From people he knows | 62 | 54,86 |
| Online | 8 | 7,07 |
| From patients in the hospital | 5 | 4,24 |
| Herbalist | 4 | 3,53 |
| From the physician | 3 | 2,65 |
| Dietitian | 2 | 1,76 |
| From a calendar leaf | 1 | 0,88 |
| **Number of Herbal Approaches Used by the Patient** | | |
| One | 63 | 55,75 |
| Second | 27 | 23,89 |
| Third | 16 | 14,16 |
| Four or more | 7 | 6,19 |
| **Benefit - Harm Situation** | | |
| Helpful | 56 | 49,56 |
| No impact | 49 | 43,36 |
| It was harmful | 8 | 7,08 |
| **Recommendation to Other Patients** | | |
| I recommend | 16 | 14,16 |
| I do not recommend | 97 | 85,84 |

**Table 3.** Herbal Approaches Used by Patients to Stabilize Blood Sugar (n= 113)

| | n* | % |
|---|---|---|
| **Type of herbal approach used by the patient*** | | |
| Cinnamon | 54 | 47,79 |
| Black cumin (n=19)/ Black cumin oil (n=7)/ Black cumin capsules (n=1) | 27 | 23,89 |
| Lemon | 13 | 11,50 |
| Olive leaf | 13 | 11,50 |
| Rosehip | 9 | 7,96 |
| Ginger | 8 | 7,08 |
| Turmeric | 8 | 7,08 |
| Garlic | 5 | 4,42 |
| Herbal blend | 5 | 4,42 |
| Nettle | 5 | 4,42 |
| Hibiscus | 4 | 3,54 |
| Cabbage | 4 | 3,54 |
| Sage | 3 | 2,65 |
| Rosemary | 3 | 2,65 |
| Parsley | 3 | 2,65 |
| Onion | 3 | 2,65 |
| Thyme | 2 | 1,77 |
| Mahlep | 2 | 1,77 |
| Pomegranate syrup | 2 | 1,77 |
| Taflan | 2 | 1,77 |
| Radish | 2 | 1,77 |
| Wild Myrtle | 2 | 1,77 |
| The others** | 21 | 18,48 |

*Patient choose one more options

** Use of 21 different products, each with n=1 (Peas, Blackberry grass, Walnut, Bay leaf, Mulberry leaf, Apple cider vinegar, Chicory, Black Putty, Carnation, Carbonate, Flaxseed, Cranberry sour, Fennel, Vinegar, Teff tea, Cherry, Green tea, Quince, Linden, Okra, Mint)

**Table 4.** Use and Efficacy of Herbal Products to Stabilize Blood Sugar (n= 113)

| No | Plant Type | n** | % | Consumption Method | n | % | Consumption Amount | n | % | Every day (1-3 times in a day) | | | Occasionally 2-3 times in a week | | | When blood sugar rises | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Effective | Not effective | Losses incurred | Effective | Not effective | Losses incurred | Effective | Not effective | Losses incurred |
| 1 | Cinnamon (Alone) | 30 | 21,27 | By eating | 5 | 3,55 | 1 teaspoon | 5 | 3,55 | 2 | 3 | | | | | | | |
| | | | | Brewing in hot water | 10 | 7,08 | 1 stick | 10 | 7,09 | 4 | 4 | | | | | 2 | | |
| | | | | By adding to yogurt (1 bowl) | 11 | 7,79 | 1 teaspoon | 2 | 1,42 | 1 | 1 | | | | | | | |
| | | | | | | | 1 teaspoon | 9 | 6,37 | 2 | 4 | 1* | | 1 | | 1 | | |
| | | | | | | | 1 teaspoon | 1 | 0,71 | 1# | | | | | | | | |
| | | | | Adding it to milk | 4 | 2,84 | 1 teaspoon | 2 | 1,42 | 1 | 1 | | | | | | | |
| | | | | | | | 1 stick | 1 | 0,71 | 1 | | | | | | | | |
| | | | | | | | 1 teaspoon | 1 | 0,71 | 1 | | | | | | | | |
| | + Different plants | 16 | 11,34 | By adding to yogurt (1 bowl) | 8 | 5,67 | 1 teaspoon | 6 | 4,26 | 2 | 4 | | | | | | | |
| | | | | | | | 1 tablespoon | 1 | 0,71 | 1 | | | | | | | | |
| | | | | By eating (adding to food) | 1 | 0,71 | Little by little | 1 | 0,71 | 1 | | | | | | | | |
| | | | | Brewing in hot water | 7 | 4,96 | 1 glass | 7 | 4,96 | 2 | 4 | 1^ | | | | | | |
| 2 | Nigella | 21 | 14,88 | By adding to yogurt (1 bowl) | 8 | 5,67 | 1 teaspoon | 1 | 0,71 | | 1 | | | | | | | |
| | | | | | | | 1 teaspoon | 7 | 4,96 | 4 | 2 | | 1# | | | | | |
| | | | | Drinking | 3 | 2,13 | 1 tablespoon | 3 | 2,12 | 1 | | | | | | 2 | | |
| | | | | | | | Little by little | 2 | 1,42 | 2 | | | | | | | | |
| | | | | By eating (adding to food) | 10 | 7,08 | 1 teaspoon | 2 | 1,42 | 2 | | | | | | | | |
| | | | | | | | 1 teaspoon | 6 | 4,26 | 3 | 2 | 1^ | | | | | | |
| 3 | Pomegranate syrup | 2 | 1,41 | Adding it to salad | 1 | 0,71 | 1 teaspoon | 1 | 0,71 | | | | | 1 | | | | |
| | | | | Drinking | 1 | 0,71 | 1 teaspoon | 1 | 0,71 | | | | 1 | | | | | |
| 4 | Turmeric | 3 | 2,12 | By adding to yogurt (1 bowl) | 2 | 1,42 | 1 teaspoon | 1 | 0,71 | | 1 | | | | | | | |
| | | | | | | | 1.5 teaspoon | 1 | 0,71 | 1 | | | | | | | | |
| | | | | By eating (adding to food) | 1 | 0,71 | Little by little | 1 | 0,71 | 1 | | | | | | | | |
| | + Different plants | 1 | 0,71 | By adding to yogurt (1 bowl) | 1 | 0,71 | 1 teaspoon | 1 | 0,71 | | | | | | | 1 | | |
| 5 | Olive leaf | 4 | 2,84 | Brewing in hot water | 4 | 2,84 | 1 glass | 4 | 2,84 | | | | 3 | | | | 1 | |
| | + Different plants | 8 | 5,67 | Brewing in hot water | 8 | 5,67 | 1 glass | 8 | 5,66 | 5 | 2 | | | 1 | | | | |
| 9 | Cabbage leaf | 2 | 1,42 | Brewing in hot water | 2 | 1,42 | 1 glass | 2 | 1,42 | 1 | | 1& | | | | | | |
| | + Different herbs | 2 | 1,42 | Brewing in hot water | 2 | 1,42 | 1 glass | 2 | 1,42 | | 1 | | | | | 1 | | |
| 10 | Rosehip | 6 | 4,26 | Brewing in hot water | 6 | 4,25 | 1 glass | 6 | 4,26 | | 1 | | | | | 3 | 2 | |
| | + Different plants | 1 | 0,71 | Brewing in hot water | 1 | 0,71 | 1 glass | 1 | 0,71 | 1 | | | | | | | | |
| 11 | Herbal blend | 3 | 2,13 | Brewing in hot water | 3 | 2,13 | 1 glass | 3 | 2,12 | 1 | 2 | | | | | | | |
| 12 | Lemon | 5 | 3,55 | By adding to yogurt (1 bowl) | 5 | 3,55 | 1 glass | 5 | 3,55 | | | 1* | | | | 2 | 2 | |
| 13 | Onion | 3 | 2,13 | Boil and drink the water | 3 | 2,13 | 1 glass | 3 | 2,12 | 1 | 1 | 1^ | | | | | | |
| 14 | Sage tea | 2 | 1,42 | Brewing in hot water | 2 | 1,42 | 1 glass | 2 | 1,42 | | | | | 1 | 1* | | | |
| 15 | Garlic + Herb | 5 | 3,55 | By drinking it after soaking in water | 5 | 3,55 | 1 glass | 5 | 3,55 | 3 | | 1^ | 1 | | | | | |
| 16 | Parsley | 2 | 1,42 | He squeezed a lemon and ate it | 2 | 1,42 | 1 pinch | 2 | 1,42 | | 1 | | | | | 1 | | |

* my blood sugar increased,# I lost weight,& it upset my bowels, ^ it upset my stomach ***patient choose one more options

When we examined the effect of herbal approach use on metabolic status, it was determined that herbal approach use was not a significant variable in the change of HbA1c, BMI and waist circumference (Table 5).

## DISCUSSION

There is insufficient evidence to support the routine use of herbal supplements and micronutrients such as cinnamon, turmeric, aloe vera, vitamin D, and chromium to improve glycemic control in individuals with diabetes. It has also been reported that herbal product consumption (ephedra, ginseng, licorice root, etc.) may also be effective among the possible causes of hypertension in patients with diabetes. It is recommended to ask questions about the use of herbal supplements when evaluating the patient. (TEMD, 2024)

In this study examining the use of herbal products by type 2 diabetes patients, it was found that 25.3% of the patients used herbal products; however, the use of these products did not lead to significant changes in HbA1c, body mass index (BMI) or waist circumference. In the literature, the prevalence of herbal product use among patients with diabetes has been reported to range between 22% and 85% (Aşılar et al., 2023; Elçioğlu & Kemerci, 2017; Ergün, 2021; Karaman & Cebe, 2016; Pınar et al., 2017; Şahin, 2019). These rates vary widely across different regions. For example, the prevalence was reported to be 39.3% in the United Arab Emirates (Radwan et al., 2020), 62% in Mexico (Argáez-López et al., 2003), and according to a systematic review and meta-analysis, it was highest in India (89%) and lowest in Australia (8%) (Alzahrani et al., 2021). In a study conducted in West Jamaica, the rate was found to be 65% (Owusu et al., 2020). The 25.3% prevalence observed in our study is consistent with previous reports from different regions, although the wide variation in herbal product use may be attributed to cultural and socioeconomic differences. Furthermore, the lack of significant effects on HbA1c, BMI, and waist circumference suggests that the role of herbal approaches in diabetes management may be limited. This finding highlights the need for caution, as the safety and efficacy of many herbal products remain uncertain, and their use is not recommended in clinical guidelines. Unsupervised or unregulated use of these products continues to raise concerns in the context of diabetes care. Although there is currently insufficient evidence-based, reliable data on the use of herbal products, it has been reported that the consumption of herbal products has increased during the pandemic period. It has been shown that the use of dietary supplements such as vitamin D and magnesium, as well as ginger and turmeric, has increased in patients with type 2 diabetes during the COVID-19 pandemic (Kaner & Bakır, 2023).

In this study, it was found that the purpose of patients using herbal products was to lower/regulate blood glucose (52.2% / 34.5%), 55.7% of patients used at least one herbal product, and the rate of using three or more herbal products was 20.3%. In a literature review of 13 studies examining the use of complementary methods in patients with diabetes, it was found that 55.7% of patients used at least one method and 18.7% used herbal products. Reasons for use included slowing disease progression (14.5%), lowering blood glucose levels (6.6%) and relieving diabetes-related symptoms (4.2%) (Çalık, 2017). In the study by Kaynak and Polat, 90.5% of patients reported that herbal products were used to lower blood glucose levels (Polat, 2017). In the study by Radvan et al. (2020), the reasons for using complementary approaches were the belief that they were useful (66.3%) and dissatisfaction with conventional treatment (23.2%) (Radwan et al., 2020). In another study, the reasons for using complementary approaches were that they were more effective than conventional diabetes medication (58.7%) and that conventional medicine was more expensive (23.5%) (Meshesha et al., 2020). The findings of this study align with prior research showing that a significant proportion of patients with diabetes use herbal products to manage blood glucose levels. However, the variability in usage rates and reported reasons across studies suggests that cultural beliefs, access to healthcare, and patient expectations play critical roles in the preference for herbal and complementary therapies.

When patients were asked how they learned the method they used, it was found that more than half of the patients (54.8%) learned it from people they knew, and that television and the internet were also effective. In another

**Table 5.** Metabolic Parameters of Patients According to the Use of Herbal Approach (n= 447)

| | Patient using herbal approach | Patient not using herbal approach | *p* value |
|---|---|---|---|
| HbA1c median (min-max) | 8,9 (6-14) | 8,7 (6-17) | 0,292 |
| BMI median (min-max) | 32,2 (20,4-52,6) | 31,8 (18,9-59,5) | 0,472 |
| Waist circumference median (min-max) | 104 (75-179) | 104 (72-151) | 0,744 |

**HbA1c** (haemoglobin A1c): glycated haemoglobin, **BMI**: Body Mass İndex

study, this rate was found to be 40.9% from neighbors/friends, and 40.9% from television/internet/newspapers (Polat, 2017). In the study of Ergün et al., 58.1% of the patients learned it from relatives and acquaintances (Ergün, 2021). In the study of Koyu, 67.3% learned it from neighbors/acquaintances, and in the study of Aşılar, 82.4% learned it from relatives and friends (Aşılar et al., 2023; Bellikci-koyu et al., 2021).

The rate of those who received information about the product used from a healthcare professional such as a doctor/pharmacist was similarly low in the studies. The rate of information from a doctor was 2.6% in this study, 3.6% in the study by Kaynak and Polat and 9.9% in the study by Aşılar. In the systematic meta-analysis examining complementary approaches in patients with diabetes, the rate of questioning health professionals about the product they used was 23% (Alzahrani et al., 2021), while this rate was 35.8% (Meshesha et al., 2020) in the Ethiopian study. The findings suggest that patients primarily rely on informal sources such as relatives, friends, and media (television/internet) to learn about herbal or complementary methods, while consultation with healthcare professionals remains notably low. The relatively higher rates of consulting healthcare professionals observed in studies such as the Ethiopian study (35.8%) and the systematic meta-analysis (23%) highlight that cultural and regional factors, as well as the accessibility of healthcare services, may influence these behaviors.

In this study, 49.5% of the respondents said that the herbal product they used helped them, while 7.08% said that it harmed them. In the study by Kaynak and Polat, 40.9% of patients said they benefited and 47.4% said they did not benefit (Polat, 2017). In the study by Radwan et al, 74% of patients reported that they had no side effects and 10% reported that there were side effects (Radwan et al., 2020). In another study, side effects were reported to occur in 13.9% of patients, and these side effects were most commonly constipation, vomiting and headache (Meshesha et al., 2020). No significant difference was found between HbA1c levels, an important marker of glycemic control, and the intake of herbal products ($p<0.02$). In some similar studies, HbA1c levels were found to be significantly higher in patients taking herbal products than in non-users, while in other studies no significant difference was found (Anderson et al., 2016; Chang et al., 2013; Costello et al., 2016; Polat, 2017; Yıldırım & Rashıdı, 2022). The findings reveal mixed outcomes regarding herbal product use, with nearly half of the patients reporting benefits and a smaller percentage reporting harm. Similar variability is observed in other studies regarding side effects and HbA1c levels, suggesting that the effectiveness of these products in glycemic control remains uncertain. The inconsistent results may stem from differences in product types, patient adherence, and study designs. These results highlight the need for caution, as patients might overestimate benefits or overlook risks. In both domestic and foreign sources, cinnamon is the most commonly used herbal product in the treatment of diabetes. (Candar et al., 2018; Costello et al., 2016; Deyno et al., 2019; Şahin, 2019; Tosun et al., 2019). There are studies in the literature showing that cinnamon intake lowers blood glucose levels in patients with type 2 diabetes (Costello et al., 2016; Hasanzade et al., 2013; Khan et al., 2003; Sahib, 2016). In a meta-analysis that included 16 randomized controlled trials investigating the use of cinnamon, it was shown that cinnamon lowered fasting blood glucose but had no effect on HbA1c levels (Deyno et al., 2019). In vivo studies have shown that cinnamaldehyde and cinnamon can support blood glucose control in a dose-dependent manner (Alqathama et al., 2020; Ergün, 2021). In this study, cinnamon (47.7%) was the most commonly used herbal product. After cinnamon, black cumin seed (23.8%), lemon (11.5%) and olive leaf (11.5%) were frequently used. In the study by Ergün et al., cinnamon (60.2%) was in first place and lemon was in second place with 11.4%. In the study by Pınar et al., cinnamon, lemon, pomegranate syrup, green tea, almonds, yarrow, sage, olive leaf tea, ginger, chamomile, etc. were among the top ten. In the study by Aşılar et al. cinnamon, lemon, pine tree/tree sap and parsley were the most commonly used, and in the study by Koyu et al. cinnamon, mixed herbs, black cumin, thyme, olive leaf, artichoke, potassium garnet, black parsley, nettle and lemon were among the top ten (Aşılar et al., 2023; Bellikci-koyu et al., 2021; Ergün, 2021; Pınar et al., 2017). In another study examining the use of herbal products by diabetics, the most commonly used products were cinnamon, fenugreek, onion, garlic, black cumin, black cumin, black mulberry, olive leaf, soybean, bilberry, cumin, fennel, rye, basil, native plantain, leek, quince, nettle, pomegranate and okra (Aslan et al., 2010). The amount of cinnamon consumed in this study was not as high as the amount used in clinical trials and varied. In the interviews, the amount and frequency of cinnamon consumption was found to be unplanned in all patients. No significant correlation was found between the type of consumption and benefit/harm.

In a study examining the use of dietary supplements and herbal products in patients with type 2 diabetes, the rate of herbal product use was 73.5%, and the most frequently preferred product was cinnamon (39.4%). The reason for use for 59.2% of individuals was to increase the effectiveness of diabetes treatment, 50% used supplements with the recommendation of experts, and

43.8% used them with the recommendation of relatives/friends (Ekinoğlu, 2023).

It is emphasized that the effects of many herbal products such as cinnamon, saffron, ginger, and turmeric, which have been examined in different studies and are said to be effective in glycemic control, need to be confirmed (Farhadnejad et al., 2024).

When the side effects of the products used in our study were evaluated, 7.08% of the patients stated that they were harmful. These harms were listed as abdominal pain, intestinal upset and increased blood sugar. In the study by Ergün et al., 3% experienced nausea, vomiting, diarrhea and itching. In the study by Pınar et al., no side effects were observed in any of the patients (Ergün, 2021; Pınar et al., 2017).

When analyzing consumption patterns, it was found that diabetics who used plant-based products often consumed them by brewing and stirring them into milk or yogurt. In the study by Aşılar et al. they were also mostly consumed by brewing, other forms of consumption were adding to milk/yogurt, adding to salad, chewing and adding to a hot drink (Aşılar et al., 2023). Fresh or dried leaves were also consumed brewed in hot water, and powdered products were mixed with food (Meshesha et al., 2020). In contrast to similar studies, this study investigated the effect of the method, amount and frequency of consumption of the products used on blood glucose. In our study, it was observed that patients consumed herbal products by brewing them in hot water and mixing them with yoghurt/milk and other foods. However, a consensus could not be reached because patients used different preparation methods, the amount of product used was variable, and the number of samples was small. It is anticipated that demonstrating the conditions under which the adverse event rate of the products used increases in larger patient groups will contribute to the safety of patients using herbal products.

Additionally, it is important to highlight that healthcare services provided to patients, including educational and counseling interventions, are the result of a collaborative effort by a multidisciplinary team. Although nurses play a pivotal role, especially in diabetes clinics, this team also includes physicians, dietitians, psychologists, and other healthcare professionals. This multidisciplinary approach ensures a holistic care model that addresses the diverse needs of patients with diabetes. Strengthening this aspect through enhanced team collaboration and emphasizing the role of each professional in providing education and counseling could significantly improve patient outcomes.

The findings of this study underline the need for further research to:

- Conduct longitudinal studies to evaluate the long-term effects of herbal product use on glycemic control and overall health.
- Assess the efficacy of specific herbal products under standardized conditions through randomized controlled trials.
- Explore the impact of cultural beliefs, healthcare accessibility, and patient education on the use of complementary therapies.
- Develop structured educational programs to promote informed decision-making and safe practices among patients using herbal products.

## CONCLUSION

Herbs have an important role in the treatment of diabetes, as they do in many other diseases. However, the current evidence is not sufficient to recommend any of these herbs. There is no consensus in the clinical trials of the plants studied. It is believed that their role in the treatment of diabetes may be clarified in the future when well-designed randomized controlled clinical trials or meta-analyzes are available, as well as data on dose, route of administration, side effects and long-term use, and efficacy. For nurses providing holistic care, it is very important to determine the use of herbal products by patients to avoid side effects during the treatment process and to have information about the safety of these methods. Therefore, nurses should evaluate the use of herbal products in patients with diabetes and inform patients that they should avoid the use of non-evidence-based products.

### Limitations of The Study

The study was limited to patients attending the diabetes outpatient clinic of a single hospital, and therefore it may not reflect the condition of diabetes patients receiving primary healthcare services or those treated in private hospitals. Since the study was conducted within a specific time frame, seasonal behaviors or long-term changes were not taken into consideration. Patients who agreed to participate in the study might exhibit different characteristics (e.g., being more aware or motivated) compared to those who declined, which could influence the study results. Additionally, the psychological status, stress levels, or beliefs of the patients and their potential impact on the use of herbal products were not evaluated. As the data were collected based on patient self-reports, factors such as recall bias, misreporting, or hesitation to provide accurate information could also affect the findings of the study.

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