The Effect of Herbal Product Use on BMI and HbA1c in Patients with Diabetes

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Abstract

Aim: Patients with diabetes can use herbal products to better manage the disease. The aim of this study is to examine the rate of herbal product use and the effect of herbal product use on Body Mass Index (BMI) and hemoglobin A1c (HbA1c) values in patients with diabetes.

Method: The descriptive and cross-sectional study was conducted in the diabetes outpatient clinic of a hospital in Istanbul with a total of 104 patients with diabetes. The data were collected using a data collection form, which questioned the patients' socio-demographic characteristics, disease information and herbal product use. Data analysis was performed using Chi-square, One-Sample Kolmogorov-Smirnov test and Mann Whitney U test in computer environment.

Results: The mean age of patients with diabetes was 61,08±9,3 years, the mean BMI was 26,3±5,4kg/m², and the mean HbA1c value was 6,9%±1,8%. The BMI and HbA1c values of the patients using herbal products were lower than the patients not using herbal products (respectively; p=,002; p=,047). It was determined that the duration of herbal product use did not affect BMI and HbA1c values (p>,05).

Conclusion: The use of herbal products was high in patients with diabetes. It was determined that olive leaf, cinnamon leaf, thyme juice, garlic, black sesame, blueberry, fenugreek seeds, French lavender and bitter almond were used as herbal products. Herbal product use decreased BMI and HbA1c values.

Keywords: Body mass index, herbal product, diabetes, hemoglobin A1c protein.

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Diyabetli Hastalarda Bitkisel Ürün Kullanımının BKİ ve HbA1c Üzerine Etkisi

Öz

Amaç: Diyabet hastaları hastalığı daha iyi yönetebilmek için bitkisel ürün kullanabilmektedirler. Bu araştırmanın amacı diyabetli hastalarda bitkisel ürün kullanım oranını ve bitkisel ürün kullanımının Beden Kütle İndeksi (BKİ) ile hemoglobin A1c (HbA1c) değerleri üzerine etkisini incelemektir.

Yöntem: Tanımlayıcı ve kesitsel nitelikte olan araştırma İstanbul'da bir hastanenin diyabet polikliniğinde toplam 104 diyabetli hasta ile yürütülmüştür. Veriler hastaların sosyo demografik özellikleri, hastalık bilgileri ve bitkisel ürün kullanımına veri toplama formu yardımıyla ulaşılmıştır. Verilerin analizi bilgisayar ortamında Chi-square, One-Sample Kolmogorov-Smirnov testi ve Mann-Whitney U testi kullanılarak yapılmıştır.

Bulgular: Diyabetli hastaların yaş ortalaması 61,08±9,3 yıl; BKİ ortalamaları 26,3±5,4 kg/m²; HbA1c değer ortalamaları %6,9±%1,8 olarak bulunmuştur. Bitkisel ürün kullanan hastaların BKİ ve HbA1c değerleri, bitkisel ürün kullanmayan hastalara göre daha düşüktür (sırasıyla; p=,002; p=,047). Bitkisel ürün kullanım süresinin BKİ ve HbA1c değerlerini etkilemediği saptanmıştır (p>,05).

Sonuç: Diyabetli hastalarda bitkisel ürün kullanımı yüksek olduğu bulunmuştur. Bitkisel ürün olarak zeytin yaprağı, tarçın yaprağı, kekik suyu, sarımsak, çörek otu, yaban mersini, çemen tohumu, karabaş otu ve acı badem kullanıldığı saptanmıştır. Bitkisel ürün kullanımı BKİ ve HbA1c değerlerini düşürmüştür.

Anahtar Sözcükler: Beden kütle indeksi, bitkisel ürün, diyabet, hemoglobin A1c proteini.

Introduction

Diabetes is an important chronic disease with rapidly increasing cases and serious complications. Worldwide, 537 million (10,5%) adults between the ages of 20-79 are living with diabetes and the prevalence is expected to reach 783 million (12,2%) in 2045[1]. It has been reported that diabetes, with its high mortality rate, caused 4.2 million deaths in 2019, with deaths increasing by 11,3% globally[2]. The prevalence of diabetes is 13,7%[3] in Turkey according to the data of the Turkish Diabetes Epidemiology Study (TURDEP)-2 conducted in our country. Medical treatment is of great importance in controlling diabetes, which has a high prevalence and mortality rates and causes serious complications[3]. For treatment, medical nutrition, exercise, oral antidiabetic drug intake and insulin injection are applied in combination[4]. In addition to medical treatments in diabetes, patients often prefer using herbal products[5-6]. The use of herbal products in patients with diabetes is a traditional and complementary medicine approach[7]. It has been determined that patients with type 2 diabetes prefer to use herbal products mostly from traditional and complementary medicine approach[5]. In studies conducted in our country and in other countries, it has been shown that the use of herbal products in patients with diabetes is high[8-12]. Among the reasons for the increasing use of herbal products in patients with diabetes are the chronicity of

the disease, the side effects of the drugs used in the treatment, and the belief that herbal products are harmless and effective[6]. Herbal products contain active and toxic ingredients in their formulas. The active ingredients in herbal products have the effect of activating insulin release and inhibiting lipid synthesis, improving blood glucose, HbA1c, insulin and HOMA-IR levels. Animal experiments and clinical studies with the active ingredients of plants lack detailed and reliable information[7,13]. Although traditional and complementary medicine therapy with herbal products has the potential to be effective, adequate studies have not been conducted on them. It should also be noted that herbal products can be ineffective and harmful. For this reason, it is important for diabetic patients to use herbal products in consultation with health professionals[14]. Herbal products are frequently used in the world and in our country. It is therefore important to investigate the frequency of their use in patients with diabetes and to examine whether there is a health-improving effect between the users and non-users.

Materials and Methods

Purpose of the Study: This descriptive and cross-sectional study was conducted to examine the frequency of herbal product use and its effect on BMI and HbA1c values in patients with diabetes.

Place of Research: It was carried out in a public hospital in Istanbul, after obtaining the necessary ethics committee approval.

Population and Sample of the Study: The population of the study covered diabetic patients who applied to the diabetes outpatient clinic of the hospital at the time of the study, and the sample included 104 diabetic patients who accepted to participate in the study, had no hearing or comprehension problems, and received medical nutrition therapy or oral antidiabetic treatment between these dates.

Data Collection Tools: Questionnaire form prepared by the researchers in line with the literature was used as a data collection tool[6,9,10]. The questionnaire form consists of 21 questions including socio-demographic characteristics, disease information and herbal product use.

Data Collection Method: The patients were informed about the study and their written consents were obtained. Questionnaires were completed using the face-to-face interview technique. BMI values were calculated by taking the height and weight measurements of the patients. The HbA1C values of the patients in the last 6 months were recorded on the questionnaire.

Analysis of the Data: The data was analysed using percentage, mean, standard deviation and minimum and maximum value analyzes in computer environment. Chi-square test was used to compare nominal data. The fit to normal distribution was evaluated with the one-sample

Kolmogorov-Smirnov test. Mann-Whitney U test was used to compare binary parameters without normal distribution. The results were evaluated at the 95% confidence interval and <0,05 significance level.

Ethical Aspect of the Study: This study was carried out with the approval of the ethics committee of Istanbul Gelisim University, dated 22.05.2022 and numbered 2022-09. A signed subject consent form in accordance with the Declaration of Helsinki was obtained from each participant.

Results

The mean age of the patients with diabetes was 61,08±9,3 years, their mean BMI was 26,3±5,4 kg/m² , and mean HbA1c was 6,9%±1,8%. 53,8% were women; 32,7% primary school graduates; 94,2% married and 62,5% had an income equal to their expenses; 40,4% were housewives; 62,5% did do not smoke and 94,2% alcohol. 54,8% were diagnosed between 1-9 years ago; 79,8% were using oral diabetic drugs; 56,7% using drugs other than antidiabetic drugs; 69,2% had chronic diseases; 54,8% had no diabetes-related complications; 47,1% had a normal BMI and weight, and 51% had an HbA1c level of ≥ 6,5% (Table 1).

Table 1. Distribution of Descriptive Characteristics of Patients with Diabetes (n= 104)

Descriptive Characteristics		n	%
Gender	Female	56	53,8
	Male	48	46,2
Education	Illiterate	33	31,7
	Literate	11	10,6
	Primary school	34	32,7
	High school	18	17,3
	University	8	7,7
Marital status	Married	98	94,2
	Single	6	5,8
Income	Income equals expense	65	62,5
	Income more than expenses	10	9,6
	Income less than expenses	29	27,9
Occupation	Retired	37	35,6
	Housewife	42	40,4
	Self-employment	17	16,3
	Officer	7	6,7

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	Employee	1	1
Smoking	Yes	21	20,2
	No	65	62,5
	Quit smoking	18	17,3
Alcohol use	Yes	4	3,8
	No	98	94,2
	Quitting alcohol	2	1,9
Duration of diabetes	1-9 years	57	54,8
	≥10 years	47	45,2
Oral antidiabetic drug use	Yes	83	79,8
	No	21	20,2
Drug use other than antidiabetics	Yes	59	56,7
	No	45	43,3
Presence of chronic diseases	Yes	72	69,2
	No	32	30,8
Chronic diseases	Cardiovascular disease	30	28,8
	Kidney disease	14	13,5
	Lung Disease	6	5,8
	Hypertension	22	21,2
Presence of diabetes complications	Yes	47	45,2
	No	57	54,8
Complications	Nephropathy	20	19,2
	Retinopathy	18	17,3
	Diabetic foot	3	2,9
	Neuropathy	6	5,8
BMI (kg/m²)	18,5-24,9	49	47,1
	25-29,9	36	34,6
	≥ 30	19	18,3
HbA1c	5,6%-6,4%	51	49
	≥ 6,5%	53	51

53,8% (n=104) used herbal products. Of the 56 diabetic patients using herbal products, 23,2% reported that they used olive leaf as an herbal product, 51,8% used the herbal product for three years or more, and 42,9% used once a week (Table 2).

Table 2. Distribution of Herbal Product Uses by Patients with Diabetes (N= 104)

Features Related to Herbal Product Use		n	%
Herbal product use	Yes	56	53,8
	No	48	46,2
Herbal products used	Olive leaf	13	23,2
	Cinnamon leaf	9	16,1
	Thyme juice	9	16,1
	Garlic	9	16,1
	Black sesame	7	12,5
	Blueberries	3	5,4
	Fenugreek Seed	3	5,4
	French lavender	2	3,6
	Bitter almond	1	1,8
Recommendation of herbal products used	Doctor	4	7,1
	Nurse	12	21,4
	Relatives	28	50,0
	Others (television, internet)	12	21,4
Duration of use of herbal products	1-2 years	27	48,2
	3 years and above	29	51,8
Frequency of use of herbal product	Everyday	22	39,3
	Once a week	24	42,9
	Twice a week	6	10,7
	Others	4	7,1

There was no significant difference between gender, education, marital status, income, occupation, smoking and alcohol use and herbal product use (p>,05). No significant difference was found in the comparison of herbal product use with the parameters of time since diagnosis, oral antidiabetic drug use, drug use other than antidiabetics, presence of a chronic disease and diabetes complications (p>,05).

Table 3. Comparison of Herbal Product Usage and Duration with BMI and HbA1c Averages

	n	BMI			HbA1c		
		Mean±SD	Med.	U/p	Mean±SD	Med.	U/p
Herbal Product Usage							
Yes	56	25,27±5,4	24,00	**865,50**	6,64±1,3	6,25	**1039,50**
No	48	27,60±5,1	26,50	**,002****	7,42±2,1	6,70	**,047***
Use of Herbal Products Duration							
1-2 years	27	26,21±6,7	23,00	391,00	6,46±1,1	6,00	333,00
3 years ve above	29	24,39±3,4	24,00	,993	6,80±1,5	6,50	,336

SD: Standard deviation; Med: Median; Mann-Whitney U test,*p<,05;** p<,01

The BMI of the patients using herbal products was 25,27±5,4 kg/m² compared to 27,60±5,1 kg/m² in the patients not using herbal products. There was a significant difference between the use of herbal products and the average BMI (p=,002). The HbA1c values of patients using and not using herbal products were 6,64±1,3% and 7,42±2,1% respectively. There was a significant difference between the use of herbal products and the average of HbA1c (p=,047). There was no significant difference between the duration of herbal product use and BMI and HbA1c values (p>,05) (Table 3).

Discussion

Patients with diabetes look for alternative ways within traditional and complementary medicine to better manage diabetes and improve their health. The use of herbal products is one of these alternative ways.

The use of herbal products was 53,8% in this study. The same value was 69,3% in a study conducted with Latino/Hispanic immigrants with Type 2 diabetes in the USA[8]. In a study conducted in Nigeria, the use of herbal products among patients with Type 2 diabetes was 67,3%[11] compared to 58,5% in adult diabetic patients in Ethiopia[12]. In studies conducted in our country,

the use of herbal products seems to be a common practice among patients with Type 2 diabetes[6,9,10]. The use of herbal products in this study is consistent with the studies conducted in the world and in our country.

In this study, olive leaf was used the most as an herbal product. Other herbal products used were cinnamon leaf, thyme juice, garlic, black sesame, blueberry, fenugreek seeds, French lavender and bitter almond. In the study of Çınar et al., patients with type 2 diabetes used cinnamon and olive leaves[15]. In the study of Karaman et al., cinnamon, thyme, blueberry, fenugreek, garlic and olive leaves were used as herbal products[10]. In studies conducted in African countries, regional herbal products (*Caylusea abyssinica*, *Otostegiaintegrifolia*, *Hagaenia abyssinicaa*, *Moringa oleiferaseeds*, *Ocimumgratissimum*) were mostly used[11,12,16]. In a study in Saudi Arabia, cinnamon, ginger and fenugreek were used as herbal products[17]. In a randomized clinical study, patients with Type 2 diabetes and rats were given 500 mg of oral olive leaf extract in tablet form and it was found that the olive leaf extract normalized glucose homeostasis[18]. Some studies report the use of olive leaves and other products consistent with the results of our study, while others have found that different herbal products specific to the region are used. There are also clinical and experimental animal studies supporting the effect of olive leaf, which was the most used herbal product in this study, on diabetes[18,19].

The BMI and HbA1c values of the patients using herbal products were lower than the patients not using herbal products (p=,002; p=,047 respectively). A randomized clinical study found that total cholesterol, triglyceride and BMI values of patients using turmeric decreased after compared to before treatment, and BMI values decreased when compared to patients using placebo[20]. In another study conducted in overweight diabetic patients, the herbal combination they created with a mixture of black cumin and fenugreek decreased BMI[21]. It was determined that the herbal composition created with white mulberry, nettle, cinnamon and dandelion in patients with type 2 diabetes did not affect BMI[22]. There are also other studies in the literature in which the use of herbal products did not decrease BMI[6,23]. In a clinical and animal experimental study, diabetic patients treated with olive leaf extract for 14 weeks had lower HbA1c values than those treated with placebo[18]. In a single-blind clinical experimental study, garlic reduced fasting blood glucose and HbA1c values compared to metformin and placebo groups[24]. In another double-blind clinical experimental study, an herbal combination in the capsule form in patients with Type 2 diabetes reduced HbA1c by 1.3%[25]. Other studies in which the use of herbal products did not reduce HbA1c were also found in the literature[23,26]. The results of this research are consistent with the results of the studies showing decreased HbA1c and BMI values.

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Conclusion

In conclusion, it was determined that the use of herbal medicine in diabetic patients was common, with olive leaves, cinnamon leaves, thyme juice, garlic, black sesame, blueberry, fenugreek seeds, French lavender and bitter almond being used as herbal products. It was concluded that the use of herbal products decreased BMI and HbA1c values, and the duration of use of herbal products had no effect on BMI and HbA1c values. There is a need for randomized clinical and meta-analysis studies on herbal products used for diabetes. Increasing such studies will provide more reliable and detailed information about herbal products that are frequently used in diabetes.

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