ARAŞTIRMA / RESEARCH

Complementary and alternative medicine and self-efficacy level in Turkish adults with type 2 diabetes mellitus

Tip 2 diabetes mellitusu olan Türk yetişkinlerde tamamlayıcı ve alternatif tıp ve öz-etkililik düzeyi

Alime Selçuk-Tosun[1] ⓘ, Handan Zincir[2] ⓘ, Elif Eliş[3] ⓘ

[1]Selçuk University, Faculty of Health Sciences, Department of Community Health Nursing, Konya, Turkey
[2]Erciyes University, Faculty of Health Sciences, Department of Community Health Nursing, Kayseri, Turkey
[3]Erciyes University Medical Faculty Hospital, Department of Endocrinology and Metabolism, Kayseri, Turkey

Abstract

Purpose: This study was conducted to determine the complementary and alternative medicine (CAM) used for blood glucose control, their self-efficacy level and the factors affecting the use of CAM of individuals with type 2 diabetes mellitus.

Materials and Methods: This cross-sectional study was conducted with a total of 350 individuals with diabetes mellitus in a university hospital. In order to collect the data, Personal information form including descriptive and disease characteristics of the individuals, Self-efficacy Scale for patients with Type 2 Diabetes, and the complementary and alternative medicine questionnaire were used.

Results: The average age of all individuals participated in the study was 55.83±8.82 (min. 29-max.78) years. The prevalence CAM use of the patients was 38.3%. According to the logistic regression analysis, self-efficacy total score, fasting blood glucose, and going to physician control after 6 months were found to be the important determinants for the use of CAM.

Conclusion: Especially herbal products from the complementary and alternative medicine methods were determined to be commonly used. Majority of the patients did not inform the healthcare professionals about the use of CAM during their routine controls. In this respect, especially the nurses, who have important roles in diabetes management should question the use of CAM and the importance of informing the healthcare professionals by the individuals about the use of CAM should be emphasized.

Key words: Type 2 diabetes mellitus, complementary and alternative medicine, self-efficacy, nursing.

Öz

Amaç: Bu çalışma Tip 2 diabetes mellitus'u olan bireylerin kan glikoz kontrolünde uyguladıkları tamamlayıcı ve alternatif tıp (TAT), öz-etkililik düzeyi ve TAT kullanımını etkileyen faktörleri belirlemek amacıyla yapılmıştır.

Gereç ve Yöntem: Bu çalışma bir üniversite hastanesinde toplamda 350 diabetes mellitus'u olan birey ile kesitsel olarak yapılmıştır. Verilerin toplanmasında bireylerin tanıtıcı ve hastalık özelliklerini içeren kişisel anket formu, Tip 2 Diyabetlilerde Öz-Etkililik (Yeterlik) Ölçeği ve tamamlayıcı ve alternatif tıp soru formu kullanılmıştır.

Bulgular: Çalışmaya katılan tüm bireylerin yaş ortalaması 55.83±8.82 (min.29-max.78)'yıldır. Bireylerin TAT kullanım yaygınlığı %38.3 olduğu tespit edilmiştir. Lojistik regresyon analizine göre de öz-etkililik toplam puanı, açlık kan şekeri, hekim kontrolüne 6 ay üzerinde gitmenin TAT kullanma durumu için önemli belirleyiciler olduğu saptanmıştır.

Sonuç: Tamamlayıcı ve alternatif tedavilerden özellikle bitkisel ürünlerin yaygın olarak kullanıldığı belirlenmiştir. Hastaların çoğunluğunun rutin kontrollerinde TAT kullanımı ile ilgili sağlık çalışanlarını bilgilendirmedikleri saptanmıştır. Bu açılardan diyabet yönetiminde önemli rolleri olan ve hastayla daha fazla zaman geçiren ve doğrudan bakımlarında görev alan özellikle hemşirelerin TAT kullanım durumunu sorgulamaları, bireylerin de sağlık çalışanlarını TAT kullanımı konusunda bilgilendirmelerinin önemi konusunda vurgu yapmak gerekmektedir.

Anahtar kelimeler: Tip 2 diabetes mellitus, tamamlayıcı ve alternatif tıp, öz-etkililik, hemşirelik.

INTRODUCTION

The reports by international health organizations state that diabetes mellitus (DM) is an important health issue with ever-increasingly prevalence in many regions of the world in recent years[1-3]. It is estimated that the number of individuals with diabetes in the age group of 20-79 years in the world is 382 million (prevalence is 8.3%) and this number would be 592 million within at least 25 years . In Turkey, its prevalence is reported to be 12.1% [3].

Diabetes management requires the use of long-term health care services for the physical and emotional needs of the patient. Lifestyle change, exercise, nutrition, oral medication, and insulin therapy are important treatment steps for Type 2 DM[4]. Pharmacological treatments have disadvantages such as developing resistance, adverse side effects and lack of response in a great part of the patient population[5]. On the other hand, as a result of increased prevalence of diabetes, it becomes impossible and inadequate to provide sufficient health care services to these patients[6,7]. In addition to the limitations such as failure observed in treatment of the patients and lack of effective delivery of health care services, there have been impressive developments in diagnosis and treatment. Despite these developments, many people use CAM since they consider CAM more effective and safe[5,8,9]. Individuals with DM use complementary and alternative medicines such as yoga, massage, acupuncture, medicinal herbs, supplements, aromatherapy, and color therapy for blood glucose control[5]. In the studies conducted in Turkey, it is observed that the rate of CAM use varies between 25-50.0%[10-14]. In the studies conducted with patients with DM in other countries, the rate of CAM use is 81.9% in the USA[15], 63.9% in Malaysia[6], and 53.0% in Qatar[16], 46.3% in Sydney[17]. When the literature is examined, it is determined in the studies that patients with DM have used mostly herbal products among CAM methods[11-15,18-20].

In a literature review study, it was reported that there was a correlation between the use of CAM and age, duration of diabetes, complication degree, and self-monitoring of blood glucose[21]. Other studies revealed that there was a higher correlation between the use of CAM and female gender and high educational level[22,23]. In the literature, there are no studies investigating that the self-efficacy level is a determinant for the use of CAM except for these factors affecting the use of CAM. The self-efficacy level of the individual is important in gaining positive health behaviors, reducing health risks, and changing behaviors[24]. The studies on self-efficacy in individuals with DM also have revealed that self-efficacy affects health behaviors positively[25-27]. It is thought that the self-efficacy levels of patients with DM as well as their sociodemographic and disease characteristics may also affect their use of CAM.

This study is a step for encouraging the safe use of CAM methods and identifying the condition and planning the strategies to prevent or reduce the possible side effects and undesirable outcomes. From these points of view, this study was conducted to determine complementary and alternative medicine methods used by the patients with diabetes for blood glucose control as well as their self-efficacy level and the effective factors in the use of CAM.

The aims of this study were to determine the rate, sociodemographic and other features, self efficacy levels of individuals using the complementary and alternative medicine.

MATERIALS AND METHODS

The study was designed as cross-descriptive. The study was conducted in Endocrinology and Metabolism clinic and outpatient clinic at Erciyes University Health Practice and Research Center. The data were collected between June and September 2015. A written permission was obtained from Erciyes University Clinical Trials Ethics Committee (Ethics No: 2015/341) and the related institution (Health Practice and Research Center Hospital Directorate) in order to conduct the study. The participants were informed in accordance with the informed consent and their written consents were obtained.

The sample of the study comprised 4,326 individuals with type 2 diabetes mellitus who had consulted endocrinology and metabolism polyclinics and services in the previous year. The study population consisted of approximately 4236 type 2 diabetes mellitus patients who applied to the endocrinology and metabolism clinic and outpatient clinic within one year. A table suggested for "estimating a population proportion with specified absolute precision"[28] was utilized to determine the sample size. As a finding related to the prevalence of the

event examined in the society, the rate (34.6%) reported by Küçük et al.[13] was employed for the rate of CAM use in individuals with Type 2 diabetes. In addition, the confidence level of 95% and the error margin of 5% were taken into consideration and the sample size reported in the table was found to be 350.

The inclusion criteria were; having type 2 diabetes mellitus and being aged 20 years and over. Exclusion criteria were having communication problem and being diagnosed with psychiatric disease.

Measures

Personal information form, questionnaire for complementary and alternative medicine, and self-efficacy scale for patients with Type 2 Diabetes were used to collect the data of the study.

Personal Information Form

Having a total of 21 questions including 14 questions related to the disease and 7 questions related to the sociodemographic characteristics this form was prepared by the researchers. The study assessed "regular use of medicines, adherence to exercise and diet" via disease-related questions based on the participants' statements. Because glikozile hemoglobin (HbAlc) was assessed every three or six months based on the participants' diabetes management, a six-month interval was determined for the question of physician control[44].

Questionnaire for Complementary and Alternative Medicine

This form was prepared based on the literature by the researchers and involved a total of 9 questions to determine the state of the patients to use CAM, their reasons of using CAM, CAMs used by them, persons recommending the use of CAM, the outcome expected from the use of CAM, the side effect of the used CAM method, the health status perceived before and after the CAM use, and sharing of the used CAM with the healthcare personnel[13,14,16,18].

Self-Efficacy (Competence) Scale for Patients with Type 2 Diabetes

The "Self-efficacy Scale" for diabetes management in Type 2 diabetic patients was developed by Van Der Bijl et al.[29] in accordance with western culture to detect the perception of diabetic patients on

power for fulfilling their self-care activities and its Cronbach's alpha value was 0.81. The intercultural adaptation study of the scale was conducted by Kara et al., in Erzurum in 2006 and its Cronbach alpha value was 0.89, its test retest reliability was 0.91 and its construct validity was 0.80. As a result of the factor analysis, it was determined that the scale accounted for 52.2% of the total variance[30].

The scale consists of 20 items. Scale items are rated with likert type scoring ranging from 1 to 5 (5 = Yes, I am sure 4 = Yes, 3 = Neither yes nor no, 2 = No, 1 = No, I'm not sure). In the intercultural adaptation study by Kara et al., three subscales of the scale were specified. These subscales are; diet+foot control (1, 2, 3, 4, 5, 6, 7, 8, 9, 11, 13, 14), medical treatment (10, 12, 18, 19, 20), and physical exercise (15, 16, 17)[30]. While the lowest score to be obtained from the scale is 20, the highest score is 100[29,30]. In the general evaluation of the scale; according to the total mean score obtained based on mean scores of all the subscales, those below the mean score are accepted as low self-efficacy and those above the mean score are accepted as high self-efficacy[29]. The face-to-face interview technique was used to collect the data. The data were collected by the researcher during admission of individuals to the outpatient clinic or service.

While the independent variables were accepted as socio-demographic characteristics, disease-related characteristics, self-efficacy level, the dependent variables were accepted as the state of using the complementary and alternative medicine.

Statistical analysis

The data were evaluated in IBM SPSS Statistics 22.0 (IBM Corp. Armong, New York, AB) program. The number of unit (n), percentage (%), and mean (standard deviation (SD)) values were used as summary statistics. Chi-square test was used to compare categorical variables. The determinants of CAM use were evaluated by multi-factor logistic regression analysis. Since the preprandial blood glucose, total self-efficacy scale score, and physician control over six months variables were found to be significant in the primary analysis, and age, HbA1c (%), and disease duration variables are identified as risk factors[11,14,33,41] in the relevant literature, CAM use was chosen as a determinant. Table 4 shows the independent variable coded as 1 in the logistic regression analysis. The value of $p < 0.05$ was

accepted as statistically significant.

RESULTS

The average age of all participants was 55.83±8.82 (min.29-max.78) years, 72.9% of them were female, 92.9% were married, 72.0% had elementary and lower education, 89.7% were unemployed, 79.2% had middle income level, and 71.4% resided in a city for the longest time. The rate of the patients for current CAM use was determined to be 38.3% (Table 1). When the distribution of the use of CAM in terms of socio-demographic characteristics was examined, a statistically significant difference was found only in terms of the longest residence place (p<0.05) (Table 1).

When the distribution of the CAM use in terms of disease characteristics was examined, the difference between the CAM use and FBG, total self-efficacy, pharmacological treatment, receiving DM training, regular drug use, exercise and going to physician control (p<0.05) was significant (Table 2).

When some properties of individuals using CAM were examined, the first three reasons to start using CAM were the desire of individuals to control their blood glucose (79.9%), the presence of patients benefiting from the method used (32.8%), and psychological comfort (31.3%). The majority of the outcomes expected from the use of CAM was the desire of individuals to control their blood glucose.

Very few of the individuals using CAM experienced side effects (6.0%). It was determined that while majority of the patients perceived the health perception as moderate before and after the use of CAM, most of them (84.3%) reported that they did not share the use of CAM with healthcare professionals (Table 3).

According to the logistic regression analysis, self-efficacy total score, fasting blood glucose, going to the physician control after 6 months were determined to be important determinants for the use of CAM (p<0.05) (Table 4).

Herbal products used

It was determined in the study that the most commonly used herbal products were cinnamon (32.8%), lemon (16.4%), black cumin (12.7%), and olive leaf (9.0%) (Table 5).

Table 1. Descriptive characteristics of participants

Variables	All Participants n=350		CAM use n=134 (%38.3)		No CAM use n=216 (%61.7)		p
	Mean (SD)		Mean (SD)		Mean (SD)		
Age	55.83(8.82)		55.41(8.17)		56.08(9.21)		0.338b
Gender	n	%	n	%	n	%	
Female	255	72.9	103	76.9	152	70.4	0.184a
Male	95	27.1	31	23.1	64	29.6	
Education							
≤Elementary school	252	72.0	97	72.4	155	71.8	0.899a
≥High school	98	28.0	37	27.6	61	28.2	
Perceived income situation							
Good	40	11.4	16	11.9	24	11.1	0.106a
Moderate	277	79.2	111	82.8	166	76.9	
Poor	33	9.4	7	5.3	26	12.0	
The longest place of residence							
Province	250	71.4	100	74.6	150	69.4	0.007a
Town	72	20.6	31	23.1	41	19.0	
Village	28	8.0	3	2.3	25	11.6	

aKi-kare test; bMann-Whitney U test

Table 2. Type 2 DM related characteristics of participants based on CAM

Variables	CAM use (n=134)	No CAM use (n=216)	p
	Mean (SD)	Mean (SD)	
Disease duration	11.52 (7.54)	10.32 (7.83)	0.076b
HbA1c (%)	8.17 (1.77)	7.90 (1.79)	0.134b
Preprandial blood glucose (mg/dl)	185.17 (84.23)	163.87 (79.51)	0.001b

Total self-efficacy scale score	71.46 (9.76)		68.72 (9.56)		0.010c
Pharmacological Treatment	*n*	%	*n*	%	
OAD	35	26.1	83	38.4	
Insulin	23	17.2	59	27.3	<0.001a
OAD+Insulin	76	56.7	74	34.3	
Presence of DM education	114	85.1	162	75.0	0.025a
Regular use of medicines	107	79.9	189	87.9	0.041a
Self-monitoring of blood glucose	125	93.3	194	89.8	0.267a
Adherence to diet					
Good	21	15.7	43	19.9	0.319a
Moderate+poor	113	84.3	173	80.1	
Adherence to exercise	78	58.2	75	34.7	<0.001a
Physican control					
6 months and less	83	61.9	98	45.4	0.003a
Over 6 months	51	38.1	118	54.6	
Other chronic diseases	104	77.6	162	75.0	0.578a

aKi-kare test   bMann-Whitney U test   cT-test

Table 3. Characteristics of CAM use

Characteristics	*n*	%
Reason for use of CAM		
Patients undergoing benefits	44	32.8
Information obtained by research	9	6.7
To reduce the impact of disease	37	27.6
To contribute to the treatment	40	29.9
Psychological relaxation	42	31.3
To control blood sugar	107	79.9
To do everything against the disease	6	4.5
Sources of information		
Family members	31	23.1
My own knowledge	10	7.5
Neighbors	31	23.1
Friends	11	8.2
Herbalists	1	0.7
Social media	47	35.1
Health staff	3	2.2
Expected result of using CAM		
To control blood sugar	57	42.5
Psychological relaxation	33	24.6
Losing weight	2	1.5
Do not get the result	10	7.5
Seeing neither harm nor benefit	8	6.0
Do not see any benefit	24	17.9
Side effect of CAM	8	6.0
Health perception before using CAM		
Good	8	6.0
Moderate	103	76.9
Poor	23	17.2
Health perception after using CAM		
Good	36	26.9
Moderate	94	70.1
Poor	4	3.0
Sharing CAM use with health staff	21	15.7

Table 4. Multifactorial logistic regression analysis for CAM use status

Variables	B	Odds Ratio	95% CI	p value
Age	-0.015	0.986	0.958-1.014	0.308
Total self-efficacy scale score	0.028	1.028	1.004-1.053	0.022
HbA1c (%)	-0.022	0.978	0.832-1.149	0.785
Preprandial blood glucose	0.004	1.004	1.001-1.008	0.015
Disease duration	0.022	1.022	0.990-1.056	0.184
Physican control over 6 months (1)	0.668	1.951	1.238-3.075	0.004

Table 5. Distribution of herbal products used

Herbal product	n	%
Cinnamon	44	32.8
Lemon	22	16.4
Black seed	17	12.7
Olive leaf	12	9.0
Pomegranate flower	6	4.5
Pomegranate sour	4	3.0
Hawthorn leaf	3	0.7
Rose hip	3	0.7
Other	23	20.2

DISCUSSION

This present study evaluated the use of CAM by the patients with Type 2 DM and their self-efficacy levels. It was determined that 38.3% of them were using CAM and the rate of CAM use in patients with DM showed differences in previous studies (40.1%-81.9%)[6,11,14-18,31]. Cultural features and environmental resources were thought to affect the rate of CAM use in previous studies. Additionally, these results may partly reflect dissatisfaction with current DM care or they may show inadequacies of individuals for compliance to traditional disease management.

It was determined that all of the patients using CAM also used an herbal product and most of the participants who used CAM took their medicines irregularly. When the studies investigating the use of CAM use by individuals with DM in the literature are examined, results of the present study show similarities with them[11,13-15,18]. Such preference of herbal applications may be associated with the fact that they are affordable and can be obtained easily without any doctor's prescription. In addition, individuals with DM may think that the herbal products are safe and have no side effects, and may hope to see their effects quickly. However, it was determined in the present study that some of the

patients (6.0%) had side effects such as stomach problems, constipation, hypoglycemia, hyperglycemia and allergic effects after using herbal medicine. In a study similar to those of the present study, very few of the individuals reported to encounter with any side effect[32]. In another study, this rate was 31.9% and it was reported that individuals experienced side effects such as diarrhea, vomiting, fainting, skin reaction, and abdominal pain[33]. The reason behind why the rate of the patients suffering from side effects was lower may be failing to associate the side effects with the herbal product or the lack of awraness in this matter.

In the present study, the most commonly used herbal products were cinnamon (32.8%), lemon (16.4%), and black cumin (12.7%) (Table 5). In their study, Ali and Mahfouz listed the top three plants as fenugreek seed (29.1%), black seed (21.6%) and cinnamon (16.8%)[33]. The similar usage of these products in different cultures makes us think that they might be effective in diabetes treatment but it would be appropriate to prove the effectiveness and use of these products with experimental studies. In a previous study, it was shown that the daily 100gr usage of fenugreek seed caused a decrease of 35.2% in fasting blood glucose level[34]. However, in a systematic review study, when the fenugreek seed was used as an additive to other hypoglycemic treatments, the most common side effects were reported as the possibility of hypoglycemia, temporary diarrhea, flatulation, and dizziness. Daily 6 gr usage of cinnamon was reported to cause a decrease of 29% in blood glucose[35]. In their study, Bahmani et al.[36] determined that caper bush (80.0%), nettle (71.42%) and white nettle (71.42%), and yellow eglantine (71.42%) plants were commonly used in diabetes treatment. In the study by Ceylan et al.[11], the first three herbal products used by the individuals for the blood glucose control were garden thyme *(o. vulgare)* (31.1%), pomegranate syrup (14.3%) and stinging nettle (6.3%).

Antidiabetic effect of nettle was proved with experimental studies[37-39]. In the study by Mohamed et al.[17], the most commonly used CAM methods are herbal powder, bitter gourd, and fenugreek. It was reported in a previous study that Fenugreek (Trigonella foenum graecum) seed, mulberry (Morus alba L.) leaf and American ginseng (Panax quinquefolius) root increased the insulin sensitivity and prevented impaired glucose tolerance[40]. The different frequencies and types of plants used vary based on geographical region, tradition and culture. It is important to plan experimental studies in terms of proving the efficacy of these herbs on DM treatment and their side effects.

In the present study, it was reported that the majority of individuals (42.5%) controlled their blood glucose owing the use of CAM (Table 3). The glycemic values of participants who use CAM may normalize for a short period based on their CAM use. This situation may allow participants to feel that they are in control of their glycemic levels. The present study found that in the long term, the glycemic values of participants who used CAM were higher than those who did not (Table 2). Similar to the present study, in their studies, Küçükgüçlü et al.,[13] and Azizi-Fini et al.[19], expressed that most of the individuals stated that the CAM decreased their blood glucose. In their study, Hasan et al.[6] reported that the condition of individuals improved by using CAM. Ceylan et al.[11] expressed in their study that 42.1% of the individuals experienced no change associated with CAM. These results suggested that individuals used CAM to reduce complaints associated by the disease. This shows that the awareness of the patients about the lifestyle changes that are important in DM treatment should be increased and it is necessary to evaluate the patients in this respect although the used CAM provides positive results in some patients and negative results in some.

In the present study, the individuals started to use CAM due to the effect of social media, which was followed by family members and neighbors. This result is consistent with the study by Kaynak and Polat[14]. In other studies, the patients started to use herbal products with the advice of their relatives or friends[13,39,33]. The fact that the results of the present study were different from the studies can be an indication of easy access to information through the influence of social media as well as the developing technology. On the other hand the reliability of the information sources of the individuals get is contradictive. In this case, in order to prevent negative results (interaction of medication and CAM used, side effects) in terms of patients, healthcare professionals should have knowledge about CAM and the patients should inform the healthcare professionals about their state of using CAM. However, it was reported in the present study that the majority of the individuals (84.3%) did not share the CAM used with the healthcare professionals (Table 3). This result shows similarity with the results of other studies[13,19,33,41,42]. This result may make us think that the patient's compliance to current medical treatment was not fully questioned due to high number of patients in the clinics and outpatient clinics. Therefore, it is useful for the physician or nurse to question the patients about not only their traditional DM treatment but also their status of CAM use and to inform them about their effects and side effects during their routine control. The present study documented a high level of participation in diabetes education among the participants (Table 2). Diabetes education may include CAM application which has proven to be effective.

In the present study, no significant different was found between CAM the use of and duration of diabetes and HbA1c, but the difference between CAM use and fasting blood glucose(FBG) was significant. However, individuals using CAM had higher duration of diabetes, FBG and HbA1c values than those who did not use CAM (Table 2). Other studies conducted differently from the present study, reported a significant difference between the use of CAM and the duration of diabetes [11,14,33,41] and HbA1c (glycemic status)[14]. On the other hand, in the previous studies conducted similar to the present study, it was determined that the difference between the duration of diabetes[16], HbA1c (glycemic status)[16,18] and the presence of additional chronic disease[13] was not significant. When the results of the study were evaluated, it is thought that increased duration of diabetes or the increases in glycemic values makes it difficult to control disease and the individuals use CAM to protect from disease effects.

In the present study, the difference between age, gender, marital status, educational status, employment status and perceived income status was not significant (Table 1). When the current literature is examined, it has been determined that the study

results concerning the use of CAM vary according to the sociodemographic data[11,14,16,19,33,41,43]. The differences in socio-demographic data can be thought to be associated with the effect of cultural and environmental factors in the regions where the studies were conducted.

According to the logistic regression analysis in the present study, self-efficacy total score, fasting blood glucose, and going to the physician control after 6 months were determined to affect the use of CAM (Table 4). Ali and Mahfouz[33] reported in their study that gender, education, duration of diabetes, and place of birth were the determinants for herbal product use. It was found in the study by Ceylan et al.[11] that age, place of birth, family type, duration of diabetes, and educational status were the factors affecting the use of CAM according to the multivariate logistic regression analysis.

In the present study, it was determined that the difference between the use of CAM and self-efficacy level was significant and the individuals using CAM had higher self-efficacy level compared to those who did not use CAM (Table 2). In the logistic regression analysis, it was also found that the self-efficacy level was a factor affecting the use of CAM (Table 4). Additionally, the results of the present study revealed the difference between the use of CAM and pharmacological treatment, DM training, regular drug use, exercise and the status of going to the physician control was significant ($p<0.05$). The rate of those receiving OAD+insulin, receiving DM training, using the drugs regularly, doing exercise, and going to the physician control in 6 months or sooner among the patients using CAM was higher (Table 2). Although the diabetes management of individuals who used CAM and had high self-efficacy were thought to be better, the study found the opposite to be true for the glycemic control (HbAlc, FBG) of these individuals (Table 2). Individuals with high self-efficacy may use CAM improperly and this may affect their glycemic values. In the light of these results, high self-efficacy level which is also important for behavioral change can be examined in terms of bringing positive health behaviors (regular drug use, regular nutrition, and regular exercise program) in favor of individuals. It can be recommended to plan programs that will develop the self-efficacy level of individuals and motivate them.

The limitation of the study is that the study can be generalized to the patients with Type 2 DM since it was conducted in one center. Another limitation of the study is that the variables of "regular use of medicines, adherence to exercise, and diet" were based on the statement of a participant.

Especially herbal products from complementary and alternative medicine methods are widely used in our society. 38.0% of the individuals use an herbal product in addition to their medical treatments. It was concluded that the self-efficacy levels of the patients using complementary and alternative medicine were higher. Also, the majority of the patients did not inform the healthcare professionals about the use of CAM during their routine controls. Even very few of the patients suffered from side effects of CAM. Social media and neighbors/family members were effective in the use of CAM.

It is important to make some regulations in the health care system to manage the accessibility and marketing of herbal products, the most commonly used CAM. In addition, especially the nurses, who have important roles in diabetes management, spend more time with the patients, and involve directly in their care, should question the use of CAM and the importance of informing the healthcare professionals by the individuals about the use of CAM should be emphasized. On the other hand, the integration of herbal medicine into the current medical curriculum of the healthcare professionals during the education process will be beneficial for the healthcare professionals to communicate more easily with the individuals with DM about the current issue.

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