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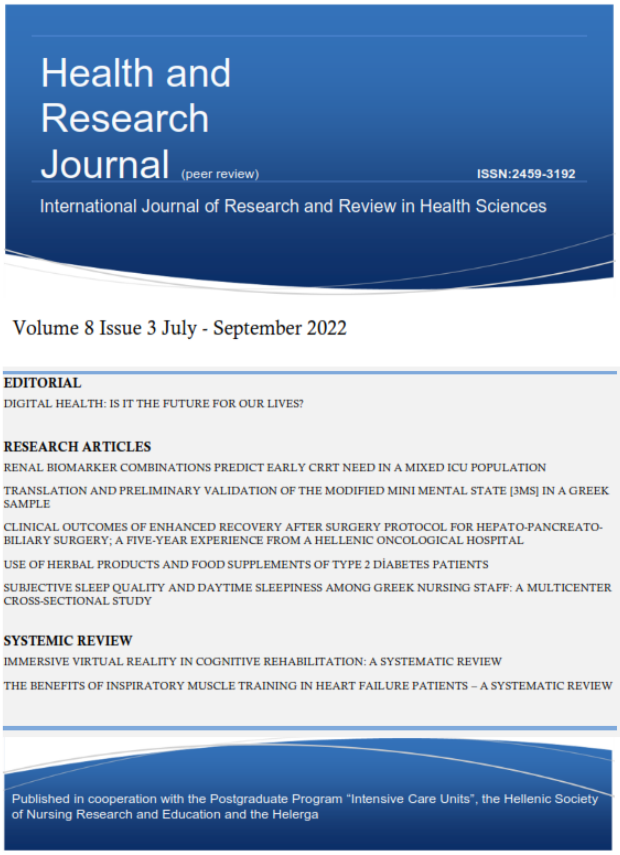

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RESEARCH ARTICLE

USE OF HERBAL PRODUCTS AND FOOD SUPPLEMENTS OF TYPE 2 DİABETES PATİENTS

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Abstract

Background: It has been reported that more than half of those with type 2 diabetes used at least one complementary and alternative approach. Among the most preferred of these approaches, herbal products/food supplements are widely used in the management of diabetes in many countries.

Aim: This study aims to examine the use of herbal products/food supplements in diabetes management of individuals with type 2 diabetes in Turkey.

Method and Material: This study was a cross-sectional and descriptive type. The research is conducted in Diabetes Monitoring and Education Clinics of three hospitals located in a city center in Turkey. The sample of the study consisted of 118 individuals with type 2 diabetes. The data were collected using the Introductory Information Form and the Data Form questioning the use of herbal products/food supplements.

Results: It was determined that 28.8% of the participants used herbal products for glycemic control. The herbal products that are most frequently used by these users are cinnamon (29.4%), lemon and yoghurt (23.5%), and olive leaves (20.5%). A statistically significant difference was found between the use of herbal products with respect to the gender and education ($p < 0.05$) of the users.

Conclusion: It was determined that one of the three diabetic individuals with type 2 diabetes included in the study used herbal products while no food supplement use was observed. It was determined that women prefer herbal products more than men and high school along with university graduates prefer them more than primary school graduates. Most of these users also did not inform health professionals that they used herbal products.

Keywords: Herbal product; food supplements; type 2 diabetes; complementary and alternative therapy.

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INTRODUCTION

According to the data of the International Diabetes Federation (IDF) in 2021, the number of adults with diabetes was 537 million (1 out of 10), while it is estimated that this number will reach 783 million in 2045. It was estimated that USD 966 billion in global healthcare spending was used up for diabetes in 2021.[1] The increasing mortality and morbidity rates, disease burden, labor loss, the economic burden of treatment, alongside macrovascular and microvascular complications due to the increasing prevalence of diabetes day by day clearly show how serious a problem the world is facing.[1,2]

Today, the use of complementary and alternative therapies (CAM) in addition to conventional therapies in various diseases is increasingly common.[3,4] In parallel with the recent developments in science and medicine, individuals' willingness to take responsibility for disease management, efforts to relieve the symptoms of the disease, lack of sufficient interest of healthcare personnel, and inability to meet the cost of treatment due to socioeconomic problems increased the interest in CAM.[5] Medical and economic problems caused by current treatments, ecological imbalances brought about by industrialization in developed countries, threats posed by many chronic diseases whose definitive treatments are not yet known, and the thought that everything natural is harmless, caused herbal treatments become popular.[5] It has been reported that more than half of those with type 2 diabetes use herbal products as an alternative method to medical treatment, to reduce the symptoms of diabetes, and to slow the progression of diabetes.[6-11] Plants have been used in medicine since the past of human history.[12] It has been reported that three out of five people with type 2 diabetes used at least one CAM method after being diagnosed with diabetes.[6] Plants constitute an important resource in the discovery of new drugs with antidiabetic effect. Since oral antidiabetic drugs used in the treatment of type 2 diabetes cause serious toxicity in the liver and kidneys, studies were launched in the early 20th century to use natural resources in the treatment of diabetes and to develop new drug molecules from them.[13]

In addition, food supplements, defined as concentrated food sources, are widely used in the treatment of diabetes. Recently, antioxidants have been demanded heavily to counter the effects of excessively reactive oxygen species in pathologies such as diabetes and obesity. Food supplements are often preferred as they are less costly, more accessible or natural compared to prescription drugs.[14]It is marketed in ready-to-use packages in various forms and measurable doses such as food supplements, tablets, capsules and liquids.[15] Plants along with products derived from herbs are also widely available in the European Union market in the form of food supplements.[12,14]

There are over 30,000 studies in the literature on herbal products and other food supplements used in the treatment of diabetes.[13,16-21] However, limited number of studies were found in investigating the use of herbal products in patients with diabetes in Turkey.[5,22-25] It is important to know the herbal products and food supplements used by individuals with diabetes in scientific research and clinical practice in the management of type 2 diabetes. The questions of this study are:

- What is the frequency of the use of herbal products in individuals with type 2 diabetes?
- What is the frequency of the use of food supplements in individuals with type 2 diabetes?
- What are the sociodemographic characteristics of individuals with type 2 diabetes who prefer to use herbal products/food supplements?

AIM

This study aims to examine the use of herbal products/food supplements as a complementary and alternative approach in diabetes management of individuals with type 2 diabetes in Turkey.

METHODOLOGY

Design

This study was a cross-sectional and descriptive type using a structured questionnaire. The data of the study were collected between 1 to 30 April 2015, in Diabetes Monitoring and Education Clinics of three hospitals located in a city center in Turkey.

Sampling and Study Protocol

The universe of the research constitutes individuals diagnosed with type 2 diabetes who received outpatient treatment at the

Diabetes Monitoring and Education Clinic of three hospitals. During the research period, 371 applications with type 2 diabetes were submitted to hospitals. The sample of the study included 118 individuals who agreed to participate in the study, who were 18 years of age or older, and who had been diagnosed with type 2 diabetes for at least six months.

Data collection

The "Question Form for the Demographic Characteristics of the Individual" and "The Form of Using Herbal Products and Food Supplements" developed by the researchers were used to collect data.

Question Form for Demographic Characteristics of the Individual: This form consists of 14 questions such as age, gender, marital status, employment status, education level, duration of illness, presence of diabetes complications, insulin and / or oral antidiabetic use status, presence of chronic disease.[6-11]

Form of Using Herbal Products and Food Supplements: In this form, there are 15 questions that question which herbal products/food supplements are used the most for glycemic control, how and why they are used, how often they are used, where the participants get the information to use these products, and where the participants get the information to use these products. [6-11]

Data analysis

The data obtained in the study were analyzed using the SPSS 15.0 program. In descriptive statistics, number (n) and percentage (%) were used for categorical variables and mean ± standard deviation (Mean ± SD) value was used for continuous variables. Chi-square (two-group comparisons) and Kruskal-Wallis (three and more group comparisons) tests were used to determine the relationship between some of the introductory characteristics of the participants and the use of herbal products. Statistical significance level was accepted as 95% confidence interval and $p < 0.05$ value.

Ethical Considerations

The approval of the local Ethics Committee (Protocol: 07.04.2015 / 2015-1) and written permission from the hospitals where the study will be conducted was obtained to carry out the study. In addition, the purpose of the study was explained to the participants before the interview and their written consent was obtained. During the research, all principles of the Helsinki declaration were followed.

RESULTS

The mean age of the participants was 50.09 ± 11.63 (minimum-maximum: 31-84) years and the mean duration of diabetes was 9.07 ± 5.00 (minimum-maximum: 1-25) years. Slightly more than half of the individuals with type 2 diabetes were women (53.4%), most of them were married (93.2%) and almost half (47.5%) were primary school graduates. It was found that more than half of the participants (55.9%) used OAD in the treatment of diabetes, 42.4% developed complications due to diabetes, and the most common complication was retinopathy (15.3%). Other chronic disease condition was present in 59.3% of the participants (Table 1).

Table 1. Distribution of descriptive and disease-related characteristics of the participants (n =118)

It was determined that approximately one third of the participants (28.8%) used herbal products and the most frequently used products were cinnamon (29.4%), lemon and yogurt (by mixing the two of them) (23.5%) and olive leaves (22.5%). There was no use of packaged ready-made food supplements among the participants. The majority of diabetic individuals (85.3%) using herbal products stated that they consume these products 1-2 times a day and they mostly used them by mixing them with each other such as lemon and yogurt or by mixing them with other foods and beverages (79.5%) (Table 2).

Table 2. Herbal product usage status of participants (n = 118)

Half (55.8%) of individuals with type 2 diabetes who used herbal products reported that they obtained the herbal products (cinnamon, olive leaf, ginger, turmeric) they used from herbalists. One third of the participants (32.4%) stated that the source of information about these herbal products was their friends, and they then recommended the products they used to other people with diabetes (79.4%). Type 2 diabetic individuals who use herbal products use these products because they believe that "they will benefit in addition to medical treatments" (41.1%), while they do not inform the healthcare personnel about these products (67.6%), they think that "health personnel will react" as the reason for not giving information (52.1%). It

was determined that the users of herbal products (70.5%) thought that the products they used contributed positively to the course of the disease regarding the effectiveness of the products they used.

There was no statistically significant difference between the groups when the marital status, employment status and chronic disease groups of diabetic individuals were compared with the rates of herbal products ($p < 0.05$). For individuals with type 2 diabetes using herbal products, it was determined that women preferred these products more (70.6%) and the difference between the rate of using herbal products in women and men was found to be statistically significant ($\chi^2 = 5.677$, $p = 0.017$). When the use of herbal products is examined according to education level; it was determined that diabetic individuals with high school and university degrees prefer these products more (55.9%) and the difference between the groups was statistically significant ($\chi^2 = 7.062$, $p = 0.008$) when the educational status groups were compared in terms of the rate of using herbal products (Table 3).

Table 3. Comparison of herbal product usage rates of participants using herbal products according to some demographic features (n= 34)

Discussion

Today, more than 400 herbs and more than 120 natural origin products as well many vitamins and minerals known as food supplements are used by diabetic patients to support treatment .[26] Herbal products, one of the most preferred alternative treatments, are widely used in the treatment of diabetes in Asia and in some Western countries, including Germany, France, Italy and the USA.[27] Herbal mixtures (also called medicine) used in traditional Chinese herbal medicine, which has a history of over 2000 years in Asia, are also widespread in the treatment of diabetes. It is also stated that traditional Chinese medicine herbal remedies are marketed in many Western countries without efficacy and safety controls.[4]

Herbal products and dietary supplements have been increasing in popularity in diabetes management recently, and there are approximately 29,000 dietary supplements. In the United States of America, approximately 12 billion USD is spent annually for the consumption of food supplements.[28] In our study, the use of ready-made food supplements was not found in individuals with diabetes. So far, the ready-packaged food supplements in people with diabetes or a study in Turkey, which include a finding concerning the use of herbal medicines has not been found. These results suggest that herbal products are preferred in Turkey because of the fact that they are cheaper than food supplements or that such food supplements are yet to be recognized by diabetic individuals.

It was determined that one out of 3 people (28.8%) with type 2 diabetes who participated in our study preferred to use herbal products for glycemic control as well as diabetes treatments. Candar et al. find that one third (34%) of the participants used herbal products, and it is similar to our study findings.[29] In another study conducted in Turkey, type 2 diabetes individuals who participated in the research half (52%) reported that they use herbal products.[30] In a study conducted in Malaysia; it has been shown that one in every two people (50%) with type 2 diabetes use herbal products.[7] In the study conducted by Shtayeh et al., It was found that half (51.9%) of individuals with type 2 diabetes used herbal products to slow the progression of diabetes.[8] In a study conducted in Iran, it was found that almost all of the participants used herbal products (97.7%).[31] In other studies, it is seen that the rate of using herbal products is higher than ours. It has been reported that low cost and easily accessible use of herbal products in Asian culture is probably effective.[7,26] The widespread use of herbal products in Asian culture supports these views. Low-cost medications used in the treatment of chronic diseases to be covered by the social security in Turkey lowers the probability of using herbal products. It is predicted that individuals with diabetes in our study used these products as a complementary method in addition to medical diabetes treatment. On the contrary, in studies conducted in different countries, it has been evaluated that individuals with diabetes who cannot afford the cost of medication use herbal products as an alternative method to medical treatment.[29] It was evaluated that this situation may have resulted from differences in study designs and samples, as well as cultural differences and differences between countries in access to health care and drugs. However, it seems that more scientific evidence is needed on this subject.

According to the results of the research, the most commonly used herbal products are cinnamon, lemon-yoghurt and olive leaves. Recent developments in the literature investigate the antidiabetic effect of cinnamon and obtain positive results. These positive effects in vivo and in vitro studies show that cinnamon reduces fasting-postprandial plasma glucose and glycated hemoglobin (HbA1C) levels by affecting insulin sensitivity and glucose metabolism.[32,33] In the management of type 2 diabetes treatment, it has been found that cinnamon supplementation in addition to conventional treatments may be effective in regulating blood glucose and blood pressure levels in individuals with type 2 diabetes.[33] In our study, as in the literature, the participants stated that they mostly used cinnamon for glycemic control. In the study conducted by Morajev et al., it was reported that cinnamon was used the most in the treatment of diabetes, followed by walnut, fenugreek, green tea and sumac, as in our study.[9] The widespread use of cinnamon suggests that individuals with diabetes know the effect of cinnamon on glucose control. In this study, no specific question was asked to the participants about where they learned about cinnamon. However, when the information sources of the participants are examined, it is seen that the friend recommendation has an effect. It is known that the use of bitter gourd is common among individuals with diabetes in Asia. In the studies of Sohal et al. And Ching et al., They reported that Asian women with diabetes believed that bitter gourd, okra, and grapefruit were effective in achieving glycemic control.[7,10] A study by Arıkan et al. conducted in Turkey in type 1 diabetic children with their families; it has been determined that most of the CAM methods used herbal products to treat diabetes and lower blood glucose. It has been reported that they commonly prefer thyme, yam, nettle, parsley, sage, mulberry leaves and wild rose plants.[34] The results of the study suggest that the vegetation, culture and beliefs of the geography inhabited may have an effect on the herbal products preferred by individuals with diabetes. We believe that the fact that our study was conducted in the Aegean region of Turkey, a geography known for cultivating olives, pertains to the reason that the participants prefer to use olive leaf and cinnamon.

In a systematic review, although the use of herbal products is common in individuals with type 2 diabetes, it was stated that they did not obtain information from health professionals about the use of these products, and that their main source of information was individuals other than health professionals such as friends and relatives.[11] Individuals with diabetes who participated in our study reported that they learned the herbal products they used from their friends as their main source of information (32.4%). In other studies conducted in Taiwan, Malaysia, Palestine and Turkey, individuals with diabetes have also indicated learning about the CAM methods from their friends.[6-8,27,30,35] The study results in the literature are similar to our study results.

Although the majority of individuals with diabetes change depending on the duration of the diabetes, they think that their dependence on diabetes drugs will decrease by using natural methods such as herbal products.[10] In our study, it was found that approximately two-thirds (70.5%) of diabetic individuals using herbal products thought that the products they used contributed positively to the course of the disease. Chang et al. find that half of the participants (51.3%) used herbal products to reduce the symptoms of diabetes.[6] These results are similar to our study. In a systematic review, it has been determined that individuals with type 2 diabetes from South Asia use herbal products because they believe that using diabetes medications for a long time is harmful. According to this review, most of the individuals with type 2 diabetes stated that the use of herbal products is safer because of the few perceived side effects.[10] However, it should be kept in mind that herbal products may interact with drugs when used simultaneously. As a result of this interaction, toxic effects may occur, and it may also cause negative reflections in the treatment process by reducing the effectiveness of the drug. The easy access to herbal products or food supplements from places such as virtual markets and herbalists also makes it difficult to control the use of these products in terms of compliance.[36] In this context, the importance of diabetic individuals to inform healthcare professionals when using these products should be explained in order to prevent possible side effects and toxicity.

Studies have found that the majority of individuals do not inform their physicians that they use herbal products because they

believe that there are no side effects of herbal products.[8,26,30,37,38] In our study, more than half of the patients (67.6%) stated that they did not inform the healthcare professional about the products they used, and they thought that the health professional would react as the reason for not providing information (52.1%). In a study conducted with Taiwanese individuals with type 2 diabetes, it was reported that half (55.8%) of individuals with diabetes did not inform their physicians about the products they used. The reason for this is the following: they stated that the health professional did not provide information because they did not have sufficient knowledge about CAM and they behaved negatively.[6] It is important for the healthcare professional to question and evaluate the use of CAM on individuals with diabetes routinely, without prejudice, and to provide appropriate training and counseling. Considering the potential damages of the products used, it is valuable for healthcare professionals to have information about the effect profiles of herbal products and to provide necessary guidance and warnings to the diabetic individuals they care for.

Most of those who preferred to use herbal products in our study were women (70.6%), which is similar to other studies investigating CAM methods in diabetes management.[8,31] Ching et al. found that women with type 2 diabetes prefer CAM methods about 2 times more than men, and it is similar to our study results.[7] In the general population, it is observed that women prefer herbal products more than men.[36]

In our study, it was found that individuals with type 2 diabetes with high school and above education level use herbal products more. Ching et al. reported in the study conducted that those who use the CAM method with a high level of education preferred more than those with a low level of education, and this is similar to our study results.[7] Unlike our study, in the study conducted by Hashempur et al., it was determined that individuals with diabetes with a low education level use CAM methods more.[31] Another study, also conducted in Turkey, declares that there is a relationship between gender and educational status of the use of herbal products, the results of our study indicate differences.[30] It is considered that it would be beneficial to examine the effect of education on the use of herbal products with a larger sample with further studies.

Conclusion

In our study, the use of ready-made food supplements was not found in individuals with diabetes. It was determined that one of the three individuals with type 2 diabetes who participated in our study preferred to use herbal products for glycemic control as well as diabetes treatments. It was found that herbal products most frequently used are cinnamon, lemon-yogurt, and olive leaves. The study showed that herbal products are preferred mostly by women as well as high school and university graduates, and most of these users did not inform health professionals that they used herbal products. It is recommended that more evidence is needed on the effect of herbal products on the disease/treatment process and that training on the use of herbal products should be organized for health professionals and individuals with diabetes.

Implications for Clinical Practice

This study determined the use of herbal products/food supplements as a complementary and alternative approach in diabetes management of individuals with type 2 diabetes but, it was determined most of them did not consult health professionals about the respective herbal products. It is important to know the herbal products and food supplements used by individuals with diabetes in scientific research and clinical practice in the management of type 2 diabetes. The importance of diabetic individuals to inform healthcare professionals when using these products should be explained in order to prevent possible side effects and toxicity.

Study Limitations

Participants were asked which product they mostly used as a herbal product, and their use of more than one herbal product could not be determined. The effect of herbal products on objective parameters related to glycemic control goals (fasting and postprandial blood glucose, glycated hemoglobin (HbA1C) level) of participants using herbal products could not be compared. The research findings are due to the limited sample of three public hospitals in one province can not be generalized to patients with diabetes. However, the fact that it is one of the limited studies conducted on the use of herbal products with individuals with type 2 diabetes makes the results of this study

valuable.

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Conflict of Interest

None declared.

REFERENCES

1. IDF Diabetes Atlas, 10th Edition, 2021. www.diabetesatlas.org Accessed October 30, 2021.
2. TEMD Diabetes mellitus study and education group. Turkish endocrinology and metabolism association follow-up guide-2019. 6th edition.
3. Huang CY, Tsai YT, Lai JN, Hsu FL. Prescription pattern of chinese herbal products for diabetes mellitus in Taiwan: a population-based study. Evid Based Complement Alternat Med. 2013;2013:201329. doi: 10.1155/2013/201329. http://dx.doi.org/10.1155/2013/201329
4. Tong XL, Wu ST, Lian FM, Zhao M, Zhou SP, Chen XY, Yu B, Zhen Z, Qi LW, Li P, Wang CZ, Sun H, Yuan CS. The safety and effectiveness of TM81, a Chinese herbal medicine, in the treatment of type 2 diabetes: a randomized double-blind placebo-controlled trial. Diabetes Obes Metab. 2013 May;15(5):448-54. doi: 10.1111/dom.12051.
5. Erdoğan Z, Oğuz S, Erol E. Cardiac patients using complementary therapies. In Spatula DD. 2012;2(3):135–139.
6. Chang HY, Wallis M, Tiralongo E. Use of Complementary and Alternative Medicine among People with Type 2 Diabetes in Taiwan: A Cross-Sectional Survey. Evid Based Complement Alternat Med. 2011;2011:983792. doi: 10.1155/2011/983792.
7. Ching S. M, Zakaria Z. A, Paimin F, et al. Complementary alternative medicine use among patients with type 2 diabetes mellitus in the primary care setting: A cross-sectional study in Malaysia. BMC Complementary and Alternative Medicine. 2013;13:148. doi.org/10.1186/1472-6882-13-148
8. Ali-shtayeh M. S, Jamous R. M, Jamous R. M. Complementary and alternative medicine use amongst Palestinian diabetic patients. Complementary Therapies in Clinical Practice. 2012;18(1):16–21. doi.org/10.1016/j.ctcp.2011.09.001
9. Moravej H, Salehi A, Shamsedini A, et al. Complementary and Alternative Medicine to Treat Diabetes Mellitus Type 1 in Southern Iran. Iran J Med Sci, 2016;41(1):71–72.
10. Sohal T, Sohal P, King-Shier K. M, et al. Barriers and facilitators for type-2 diabetes management in south asians: A systematic review. PLoS ONE. 2015;10(9):1–15. doi.org/10.1371/journal.pone.0136202
11. Muslu L, Öncel S. Herbal therapies used in type 2 diabetes mellitus: a systematic review. Journal of Education and Research in Nursing. 2019;16(3):252–261. doi.org/10.5222/HEAD.2019.252
12. Botanicals introduction EFSA' s role. www.efsa.europa. Accessed August 30, 2020.
13. Arıtuluk Z. C, Ezer N. Plants used in folk against diabetes (Turkey)- II. Hacettepe University Faculty of Pharmacy Journal. 2012;32(2):179–208. doi.org/10.3390/su10020394
14. Ota A, Ulrih NP. An Overview of Herbal Products and Secondary Metabolites Used for Management of Type Two Diabetes. Front Pharmacol. 2017 Jul 6;8:436. doi: 10.3389/fphar.2017.00436.
15. Food supplements introduction EFSA' s role. www.efsa.europa Accessed August 30, 2020
16. Posadzki P, Lee M. S, Ernst E. Complementary and alternative medicine for diabetes mellitus: An overview of systematic reviews. Focus on Alternative and Complementary Therapies. 2012;17(3):142–148. doi.org/10.1111/j.2042-7166.2012.01159.x
17. Watanabe K, Shimada A, Miyaki K, Hirakata A, Matsuoka K, Omae K, Takei I. Long-term effects of goshajinkigan in prevention of diabetic complications: a randomized open-labeled clinical trial. Evid Based Complement Alternat Med. 2014;2014:128726. doi: 10.1155/2014/128726.
18. Mozaffari-Khosravi H, Talaei B, Jalali B. A, et al. The effect of ginger powder supplementation on insulin resistance and glycemic indices in patients with type 2 diabetes: A randomized, double-blind, placebo-controlled trial.

Complementary Therapies in Medicine. 2014;22(1):9–16. doi.org/10.1016/j.ctim.2013.12.017

19. Tu X, Xie C, Wang F, et al. Fructus mume formula in the treatment of type 2 diabetes mellitus: A randomized controlled pilot trial. Evidence-Based Complementary and Alternative Medicine. 2013;2013:787459. doi.org/10.1155/2013/787459
20. Sayeed M. S. Bin, Mostofa A. G. M, Touhidul Islam Ferdous F. M, et al. A randomized, placebo-controlled, crossover study of an herbal preparation containing vernonia cinerea in the treatment of type 2 diabetes. Journal of Alternative and Complementary Medicine. 2013;19(9):767–771. doi.org/10.1089/acm.2012.0063
21. Aslan M, Orhan N. Herbal products and food supplements used in the treatment of diabetes. Mised. 2010;23-24:27–38.
22. Biçen C, Elver Ö, Erdem E, et al. Herbal product use in hypertensive patients. Ondokuz Mayıs University Medicine Journal. 2012;29(2):109–112. doi.org/10.5835/jecm.omu.29.02.005
23. Dağtaş Gülgün C. P, Kaya H. Complementary and alternative medicine use in lung cancer patients and ıts ımpact on the quality of life. Kafkas Journal of Medical Sciences. 2015;5(2):41–47. doi.org/10.5505/kjms.2015.59454
24. Erbaycu A. E, Gülpek M, Tuksavul F, et al. Effect of socio-demographic and tumor related factors on use of various herbal and other mixtures in lung cancer (use of complementary treatment in lung cancer). Turkish Journal of Thorax. 2010;11(3):117–120. doi.org/10.5152/ttd.2010.16
25. Kurt H, Keskek S. O, Çil T, et al. Complementary/alternative therapies in patients with breast cancer. Turkish Journal of Oncology. 2013;28(1):10–15.doi.org/10.5505/tjoncol.2013.827
26. Medagama A, Senadhira D. Use of household ingredients as complementary medicines for perceived hypoglycaemic benefit among Sri Lankan diabetic patients; a cross-sectional survey.Journal of Intercultural Ethnopharmacology. 2015;4(2):138-142. doi.org/10.5455/jice.20150202035223
27. Tabatabaei-Malazy O, Larijani B, Abdollahi M. Targeting metabolic disorders by natural products. Journal of Diabetes and Metabolic Disorders. 2015;14(1):1–21. doi.org/10.1186/s40200-015-0184-8
28. Yılmaz Z, Piracha F, Anderson L, et al. Supplements for diabetes mellitus: a review of the literature. Journal of Pharmacy Practice. 2017;30(6):631–638. doi.org/10.1177/0897190016663070
29. Candar A, Demirci H, Baran A. K, et al. The association between quality of life and complementary and alternative medicine use in patients with diabetes mellitus. Complementary Therapies in Clinical Practice. 2018;31:1–6. doi: 10.1016/j.ctcp.2018.01.002
30. Öztürk S, Gündoğdu PY, Gürsu M, et al. Use of herbal products in type 2 diabetic patients. Medical Bulletin of Haseki. 2015;53(3):214-219. doi.org/10.4274/haseki.2295
31. Hashempur M. H, Heydari M, Mosavat S. H, et al. Complementary and alternative medicine use in Iranian patients with diabetes mellitus. Journal of Integrative Medicine. 2015;13(5): 319–325. doi.org/10.1016/S2095-4964(15)60196-0
32. Anderson R. A, Zhan Z, Luo R, et al. Cinnamon extract lowers glucose, insulin and cholesterol in people with elevated serum glucose. Journal of Traditional and Complementary Medicine. 2016;6(4):332–336. doi.org/10.1016/j.jtcme.2015.03.005
33. Akilen R, Tsiami A, Devendra D, et al. Glycated haemoglobin and blood pressure-lowering effect of cinnamon in multi-ethnic Type 2 diabetic patients in the UK: A randomized, placebo-controlled, double-blind clinical trial. Diabetic Medicine. 2010;27(10):1159–1167. doi.org/10.1111/j.1464-5491.2010.03079.x
34. Arıkan D, Sívríkaya S. K, Olgun N. Complementary alternative medicine use in children with type 1 diabetes mellitus in Erzurum, Turkey. Journal of Clinical Nursing. 2009;18(15):2136–2144. doi.org/10.1111/j.1365-2702.2008.02464.x
35. Duygu İ, Marako K. Complementary and alternative medicine use amongst Turkish type 2 diabetic patients: A cross-sectional study. Complementary Therapies in Medicine. 2018;41:41–46.

36. Bacanlı M, Taner G, Başaran A. A, et al. Plant origin phenolic compounds and their beneficial health effects: review. Turkiye Klinikleri Journal of Pharmacy Sciences. 2015;4(1):9–16. doi.org/10.5336/pharmsci.2014-42688
37. Bechara G. M, Castelo Branco F, Rodrigues A. L, et al. "KiDS and Diabetes in Schools" project: Experience with an international educational intervention among parents and school professionals. Pediatric Diabetes. 2018;19(4):756–760. doi.org/10.1111/pedi.12647
38. Raynor D. K, Dickinson R, Knapp P, et al. Buyer beware? Does the information provided with herbal products available over the counter enable safe use? BMC Medicine. 2011;9(1):94. https://doi.org/10.1186/1741-7015-9-94

ANNEX

Table 1. Distribution of descriptive and disease-related characteristics of the participants (n =118)

Variables		n	%
Gender	Female	63	53.4
	Male	55	46.6
Marital Status	Married	110	93.2
	Single	8	6.8
Education Level	Literate	18	15.2
	Primary School	56	47.5
	High School	17	14.4
	University	27	22.9
Working Status	Working	33	28.0
	Not working/ housewife	40	33.9
	Retired	45	38.1
Type of Treatment	OAD	66	55.9
	OAD and insülin	52	44.1
Presence of complications	Var	50	42.4
	Yok	68	57.6
Complications	Retinopathy	18	15.3
	Neuropathy	13	11.0
	Nephropathy	4	3.4
	Diabetic Foot	2	1.7
	More than one	13	11.3
Presence of Chronic Disease	Yes	70	59.3
	No	48	40.7

	Mean±Std. Dev.	**Min-Max**
Mean Age (years)	50.09±11.63	31- 84
Mean Duration of Diabetes (years)	9.07±5.00	1- 25

OAD: Oral antidiabetic, Std.Dev.:Standard deviation

Table 2. Herbal product usage status of participants (n = 118)

Herbal Product		**n**	**%**
Usage Status	Yes	34	28.8
	No	84	71.2
Frequency of use*	1- 2 times a day	29	85.3
	1- 2 times a week	5	14.7
Usage type *	Mixing	27	79.5
	Infusion	7	20.5
Types of herbal products they use *	Cinnamon	10	29.4
	Lemon and yogurt (as a mixture)	8	23.5
	Olive Leaf	7	22.5
	Lemon	6	17.6
	Ginger	1	2.9
	Turmeric	1	2.9
	Pomegranate Syrup	1	2.9
*Percentages were calculated according to 34 people who stated that they used herbal products.			

Table 3. Comparison of herbal product usage rates of participants using herbal products according to some demographic features (n= 34)

Variables		N	%	Test	P
Age Group	25- 50 years old	17	50.0	χ^2 =5,856	p=0. 053
	51-64 years old	12	35.2		
	65 years and older	5	14.7		
Gender	Female	24	70.6	χ^2 =5.677	**p=0.017**
	Male	10	29.4		
Education status	Primary School	15	44.1	χ^2 =7.062	**p=0.008**
	High School and University	19	55.9		
χ^2: Chi-square test, p<0.005					