

# Herbal and vitamin supplement use in patients with cerebrovascular disease: A cross-sectional study

## Serebrovasküler hastalığı olan hastalarda bitkisel ve vitamin takviyesi kullanımı: Kesitsel bir çalışma

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### ABSTRACT

**Aim:** Herbal products, which are among the complementary medicine methods today, maintain their popularity alongside conventional treatment. The use of herbal products by individuals undergoing medical intervention may have important clinical consequences in terms of drug interactions and undesirable side effects. The frequency of use and potential risks, especially in chronic health problems such as cerebrovascular disease, are aimed to be examined in this study.

**Material and Methods:** In this cross-sectional study, the attitudes and sociodemographic characteristics of individuals towards herbal products were examined with a questionnaire applied using the face-to-face interview method to 91 participants who met the inclusion/exclusion criteria out of 108 participants who applied to the cerebrovascular diseases outpatient clinic with ethics committee approval between June 2022 and December 2023. Survey questions that participants did not want to respond due to concerns about information security, possible biases against survey participation or concerns that treatment algorithms might change were left blank.

**Results:** When the gender distribution of the participants was examined, it was seen that women (n: 34, 39.5%) were less than men (n:52, 60.5%). 27.5% of the participants reported that they consumed herbal products. No statistically significant relationship was found between gender and herbal product use (p=0.248). Participants stated that they mostly used herbal products to manage cerebrovascular disease and its symptoms. However, only 36.3% (n:33) of the participants stated that they were aware of the possible side effects of herbal products.

**Conclusion:** In our study, it was determined that 27.5% (n:25) of the participants used herbal supplements and garlic was the most preferred among them. No statistically significant difference was found in the analyses conducted on the effect of gender on herbal product use (p=0.248). It is important for physicians to keep in mind that their patients may be using herbal medicine during their treatment and follow-up.

**Keywords:** Cerebrovascular disease, herbal medicine, herb-drug interaction, prevalence

### ÖZ

**Amaç:** Günümüzde tamamlayıcı tıp yöntemleri arasında bulunan herbal ürünler, konvansiyonel tedavi yanında popülerliğini korumaktadırlar. Tıbbi müdahale gören bireylerin herbal ürünlere başvurmaları, ilaç etkileşimleri ve istenmeyen yan etkiler açısından önemli klinik sonuçlar doğurabilmektedir. Özellikle serebrovasküler hastalık gibi kronik sağlık sorunlarında kullanım sıklığı ve potansiyel riskleri, bu çalışmada incelenmesi amaçlanmıştır.

**Gereç ve Yöntemler:** Kesitsel tipteki bu çalışmada, Haziran 2022-Aralık 2023 tarihleri arasında etik kurul onayı alınarak serebrovasküler hastalıklar polikliniğine başvuran 108 katılımcıdan dahil edilme/edilmeme kriterlerine uygun 91 katılımcıya yüz yüze görüşme yöntemi kullanılarak uygulanan anket ile bireylerin bitkisel ürünlere yönelik tutumları ve sosyodemografik özellikleri incelenmiştir. Katılımcıların bilgi güvenliği, anket katılımına yönelik olası önyargılar veya tedavi algoritmalarının değişebileceği endişesi nedeniyle yanıtlamak istemedikleri anket soruları boş bırakılmıştır.

**Bulgular:** Çalışmaya katılanların cinsiyet dağılımı incelendiğinde, kadınların (n: 34, %39,5) erkeklerden (n:52, %60,5) daha az olduğu görülmüştür. Katılımcıların %27,5'i bitkisel ürün tüketimi olduğunu bildirmiştir. Cinsiyet ile bitkisel ürün kullanımı arasında istatistiksel olarak anlamlı bir ilişki tespit edilememiştir (p=0,248). Katılımcılar, bitkisel ürünleri çoğunlukla serebrovasküler hastalık ve semptomlarını yönetmek amacıyla kullandıklarını belirtmişlerdir. Ancak, katılımcıların sadece %36,3 (n:33) bitkisel ürünlerin potansiyel yan etkileri konusunda bilgi sahibi olduğunu ifade etmiştir.

**Sonuç:** Araştırmamızda, katılımcıların %27,5'inin (n:25) bitkisel destek ürünleri kullandığı ve bunlar arasında en çok sarımsağın tercih edildiği saptanmıştır. Bitkisel ürün kullanımında cinsiyetin etkisi üzerine yapılan analizlerde istatistiksel olarak anlamlı bir farklılık bulunmamıştır (p=0,248). Hekimlerin, hastalarının tedavi ve takipleri sırasında bitkisel ilaç kullanacaklarını akıllarında tutmaları önemlidir.

**Anahtar Kelimeler:** Bitkisel ilaç, bitki- ilaç etkileşimi, prevelans, serebrovasküler hastalık

### Highlights

- According to our study, it was determined that 27.5% of the participants in the cerebrovascular accident outpatient clinic of a university hospital in the western region of Türkiye used herbal supplements and the most preferred one among them was garlic.
- Herbal product use among patients with cerebrovascular disease was not influenced by age, gender, or education level, and was primarily driven by the desire to relieve symptoms, supported by accessibility and trust in these products.
- These findings highlight the need for clinicians to proactively counsel patients on potential risks and underscore the importance of future research to clarify the safety and effectiveness of herbal therapies.

### INTRODUCTION

Cerebrovascular diseases (CVD) are an important public health problem worldwide and are among the disease groups with high morbidity and mortality rates. Cerebrovascular events such as ischaemic stroke and haemorrhagic stroke occur as a result of interruption of blood flow to the brain or bleeding and may leave permanent neurological deficits. CVD cause approximately 5.5 million deaths worldwide and 116.4 million years of loss of quality of life, thus creating a serious economic burden (1). In Türkiye, stroke is the third most common cause of death in women and the fourth most common cause of death in men and is considered to be one of the most important causes of disability (2,3).

Although pharmacological and surgical methods used in the treatment of cerebrovascular diseases are important in improving the course of the disease, functional losses may be permanent in some patients despite these treatments. Rehabilitation processes and secondary prevention strategies play a critical role in improving the quality of life of patients and preventing recurrent events (4). However, anticoagulants and antiplatelet drugs used in pharmacological treatments may cause serious side effects and require careful monitoring in long-term use.

In recent years, interest in complementary and alternative medicine (CAM) methods has increased, with their popularity increasing through media marketing and accessibility via the internet. It is reported that \$3.5 million is spent on herbal products in the United States of America (USA) annually (5). It is known that herbal products and other CAM methods are widely used in Türkiye (6). In a study conducted in Turkey, it was reported that 62.3% of patients with chronic diseases used CAM methods and among these methods, herbal products were the most commonly used method with 58.5% (7). The rate of using Traditional Chinese herbal medicine (TCHMs) in Chinese ischemic stroke patients is 70.6%, and the stroke-related mortality rate is reported to be lower due to the use of TCHMs compared to that report-

ed in Western societies (8). However, the lack of sufficient scientific evidence on the efficacy and safety of these methods indicates that patients should be careful when turning to such applications (9).

In this study, the prevalence of herbal product use and other CAM methods in patients applying to the Cerebrovascular Diseases Outpatient Clinic will be investigated and the relationship between this use and sociodemographic characteristics will be evaluated.

### MATERIAL and METHODS

This study, planned within the framework of the approval number 7199 GOA of the Dokuz Eylül University Non-Interventional Ethics Committee (Decision No: 2022/18-08, Date: 18.05.2022) and in accordance with the Helsinki Declaration, was conducted by including 91 patients who applied to the cerebrovascular diseases outpatient clinic of Dokuz Eylül University Faculty of Medicine Hospital between June 1, 2022 and December 31, 2023.

#### Data Collection Tool

The study was planned as a cross-sectional study. A 15-question survey form was used as a data collection tool. The surveys were conducted in a quiet and calm environment using a face-to-face interview technique, lasting an average of 5-10 minutes. The participants responded verbally to the questions read by the researcher and marked on the survey form by the researcher. The participants' opinions and usage habits about various herbal products and vitamin supplements were questioned in detail in the survey form (Table 1). Survey questions that participants did not want to respond due to concerns about information security, possible biases against survey participation or concerns that treatment algorithms might change were left blank. For this reason, there are inconsistencies in the number of participants who answered some survey questions.

Participants were asked separate questions about the herbal products and vitamins they had consumed regularly in the last three months. In previous studies, it was observed

**Table 1:** Questionnaire form presented to the research group

Dear participant,  
 We would like to conduct a survey on the use of herbal products and drugs in patients who applied to the cerebrovascular diseases outpatient clinic. If you would like to participate, we would be happy to fill out the form below together. We would like to let you know that your information and answers will remain confidential.  
 Thanks for your participation.  
 Get well soon

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1. Your age .....  
 2. Your Gender Female Male  
 3. Your Education Status Illiterate Primary School Middle School High School Master University  
 4. Do you have any Chronic Diseases? Diabetes Hypertension Thyroid Dysfunction Cardiac Disease  
 What? Pulmonary Disease Low Back Pain Other  
 5. What was the main complaint you filed today?  
 6. Have you used vitamins regularly in the last 3 months? Which one? Yes No/ &  
 7. Have you used herbal products regularly in the last 3 months? Yes No  
 8. Please tick if there is any herbal (plant) product you have used in the last 3 months. Garlic Nettle  
Swedish syrup Green Tea  
Mistletoe Gingko Biloba  
Aloe St.John'sWort  
Echinacea Ephedra  
Thyme Cascara  
Ginger Fennel  
Soya granules Fish Oil  
Cinnamon Others  
 9. How often do you use the herbal product? Once a day  
Every other day  
Once a week  
Twice a week  
Monthly  
Occasionally  
 10. For which of your diseases and conditions do you use these products? Strengthening the immune system  
Losing weight  
For my diagnosed chronic disease  
Other  
 11. Have you told your physician that you have used these products during your pain treatment before? Yes No  
 12. Has your physician asked you about the products you used during pain treatment before? Yes No  
 13. How did you start using these products? Doctor Recommendation Newspapers, internet, other media  
Friend recommendation Recommendation of family elders Other  
 14. Do you know about the side effects of herbal products? Yes No  
 15. If you answered yes to the above question, how did you obtain this information? Doctor Recommendation Newspapers, internet, other media  
Friend recommendation Recommendation of family elders Other

that when participants were presented with a specific herbal product list, they often responded with "I do not use", and this period was specified in the present study (10). Participants were given detailed information about the purpose and content of the study and their written consent for participation in the study was obtained.

The survey, designed as the data collection tool used in the study, consists of 15 questions to collect information about the participants' herbal product and vitamin supplement usage habits, current health complaints and socio-demographic characteristics (Table 1). The survey questions were created to be compatible with existing scientific studies on the subject (8,9).

**Inclusion criteria:** To be included in the study, participants had to have applied to the cerebrovascular diseases outpatient clinic, be over 18 years of age, and participate voluntarily in the study.

**Exclusion criteria:** Reasons for exclusion from the study were determined as not volunteering to participate in the study, being under the age of 18, and inability to communicate effectively.

#### Statistical Analysis

The statistical analysis of the data obtained in the study was performed using the SPSS 24.0 statistical package program. Variables with continuous values were presented as mean  $\pm$  standard deviation, and for variables indicating frequency (n) and percentage (%). In determining the differences between the groups Pearson chi-square or Fisher's exact test for categorical variables. The significance level was accepted as 0.05 in all statistical analyses.

## RESULTS

Of the 108 patients who met the inclusion criteria, 6 were excluded because they later reported that they did not volunteer to participate in the study and 11 were excluded because they had an inability to communicate effectively (e.g. aphasia, speech problems; such as dysarthria and apraxia) and the study was started with 91 patients. The average age of the 91 participants included in the study was determined as  $66.73 \pm 13.27$ . When the gender distribution was examined, it was seen that 39.5% (n:34) of the participants were female and 60.5% (n:52) were male. In terms of education level, 44.4% (n:32) of the participants had secondary school or below, and 55.6% (n:40) had high school or above. According to the statistical analysis, no statistically significant relationship was found between the gender of the participants and their age or education level ( $p = 0.205$ ,  $p = 0.418$ , respectively) (Table 2).

When the distribution of chronic diseases of the participants was examined, it was determined that the most common chronic disease was hypertension (n:51, 56%), followed

**Table 2:** Comparison of age and education level by gender

Sociodemographic Characteristics	Female, n (%)	Male, n (%)	P	Total, n (%)
<b>Age (Year)</b>				
<35	1 (4.2)	0	0.387*	1 (1.6)
35 and above	23 (95.8)	38 (100)		61 (98.4)
<b>Education level</b>				
Primary School	7 (25.9)	4 (9.3)	0.422**	11 (15.7)
Middle School	8 (28.6)	14 (32.6)		22 (31.4)
High school	5 (18.5)	9 (20.9)		14 (20.0)
Master	3 (11.1)	5 (11.6)		8 (11.4)
University	4 (14.8)	11 (25.6)		15 (21.4)

n: number of patients, %: percentage, \* Fisher's exact test, \*\* Fisher-freeman-halton- Chi-squared test

**Table 3:** Evaluation of chronic diseases by gender

Chronic Disease	Female, n (%)	Male, n (%)	P	Total, n (%)
Diabetes	+ 11 (32.4)	18 (34.6)	0.828**	29 (33.7)
	- 23 (67.6)	34 (65.4)		57 (66.3)
Hypertension	+ 19 (55.9)	29 (55.8)	0.992**	48 (55.8)
	- 15 (44.1)	23 (44.2)		38 (44.2)
Cardiac Disease	+ 4 (11.8)	6 (11.5)	0.615*	10 (11.6)
	- 30 (88.2)	46 (88.5)		76 (88.4)
Pulmonary Disease	+ 1 (2.9)	0 (0)	0.395*	1 (1.2)
	- 33 (38.8)	52 (61.2)		85 (98.8)
Chronic Low Back Pain	+ 2 (5.9)	0 (0)	0.153*	2 (2.3)
	- 32 (94.1)	52 (100)		84 (97.7)
Other Diseases	+ 13 (38.2)	19 (36.5)	0.874**	132 (37.2)
	- 21 (61.8)	33 (63.5)		54 (62.8)

n: number of patients, %: percentage, \* Fisher's exact test, \*\* Chi-

by diabetes (n:30, 33%). The relationship between the gender variable and chronic disease types was evaluated and no statistically significant difference was found (Diabetes,  $p=0.828$ ; Hypertension,  $p=0.992$ ; Cardiac Disease,  $p=0.615$ ; Pulmonary Disease,  $p=0.395$ ; Chronic Low Back Pain,  $p=0.153$ ; Other Diseases  $p=0.874$ ) (Table 3).

Of the applicants, 22% (n:20) were using vitamin D and 48.4% (n:44) were using vitamin B12. When the participants' vitamin and herbal product usage habits were examined according to their gender, no significant difference was found ( $p=0.707$ ,  $p=0.221$ , respectively) (Table 4). When herbal use was evaluated according to age and education level, no significant difference was found ( $p=0.544$ ,  $p=0.164$ , respectively). Additionally, no significant difference was found when vitamin use was compared according to age and education status ( $p=0.313$ ,  $p=0.310$ , respectively).

**Table 4:** Use of vitamins and herbal products by gender

Product used	Female, n (%)	Male, n (%)	Total, n (%)	p
Vitamin	18 (52.9)	26 (50)	44 (50.5)	0.707**
Vitamin-B12	16 (47.1)	26 (50)	42 (48.4)	0.790**
Vitamin-D	10 (29.4)	10 (19.2)	20 (22)	0.275**
Herbal Product	7 (20.6)	17 (32.7)	24 (27.5)	0.221**

\*Percent of lines, Bold font: Statistically significant, n: number of

**Table 5:** Use and variety of herbal products, n (%)

<input type="checkbox"/> Garlic	22 (24.2)
<input type="checkbox"/> Swedish Bitter	0 (0)
<input type="checkbox"/> Mistletoe	0 (0)
<input type="checkbox"/> Aloe	0 (0)
<input type="checkbox"/> Echinacea (Ekinazya)	0 (0)
<input type="checkbox"/> Thyme	2 (2.2)
<input type="checkbox"/> Ginger	5 (5.5)
<input type="checkbox"/> Soya granules	0 (0)
<input type="checkbox"/> Cinnamon	(8) 8.8
<input type="checkbox"/> Nettle	3 (3.3)
<input type="checkbox"/> Green Tea	6 (6.6)
<input type="checkbox"/> Gingko Biloba	4 (4.4)
<input type="checkbox"/> St. John's Wort	1 (1.1)
<input type="checkbox"/> MaHuang	1 (1.2)
<input type="checkbox"/> Cascare	0 (0)
<input type="checkbox"/> Fennel	1 (1.1)
<input type="checkbox"/> Fish Oil	2 (2.2)
<input type="checkbox"/> Licorice	0 (0)
<input type="checkbox"/> Others	0 (0)

**Table 6:** Sources of recommendation during herbal product use, n (%)

Doctor's recommendation	22 (73.3)
Recommendation from family elders	3 (10)
Newspapers, online media	2 (6.7)
Friends suggestion	1 (3.3)
Other	2 (6.7)

n: number of patients, %: percentage

According to the survey results, 27.5% (n:25) of the participants were regularly consuming herbal products. When the herbal products preferred by the participants were examined, it was seen that garlic was the most frequently used herbal product, followed by cinnamon and green tea, respectively (Table 5).

Of the herbal product users who participated in the study, 63% (n:17) stated that they did not have a regular usage frequency and used herbal products "occasionally". Among the users, 14.8% (n:4) used them once a day, 3.7% (n:1) used them once a week and 18.5% (n:5) used them once a month. No significant difference was found between the frequency of herbal product use and the following 3 parameters: education level, gender and age (p = 0.586, p = 0.248, p = 0.980, respectively).

While 55.6% (n:40) of the participants in the study were found to have high school education or above, the rate of participants using herbal products with high school education or above was determined as 42.9% (n:9). In the analysis conducted to evaluate the relationship between education level and herbal product use, no statistically significant difference was found (p = 0.164). On the other hand, when the reasons for herbal product use were examined, 33.3% (n:9) of the users stated that they used herbal products for cerebrovascular disease and its symptoms (headache, etc), and 14.8% (n:4) stated that they used herbal products to strengthen the immune system. When the relationship between education level and the reasons for herbal product use was evaluated, it was seen that the majority of the participants with middle school education or below (77.8%, n:7) used herbal products for cerebrovascular disease and its symptoms, and this relationship was found to be statistically significant (p = 0.025).

When patient-physician information exchange behaviors among herbal product users were examined, 64% (n:16) of the participants reported that they had informed their physician that they were using herbal products before the examination. On the other hand, 68% (n:17) of the users stated that their physicians had questioned them about their herbal product use.

When the reasons for the participants to start using herbal products were examined, it was determined that 73.3% (n:22) of them started using these products with the recommendation of a physician, 10% (n:3) with the recommendation of their family elders, and 6.7% (n:2) through the media (Table 6). As a result of the analysis conducted to evaluate the relationship between the demographic characteristics of the participants such as education level, gender and age and the reasons for starting to use herbal products, no statistically significant difference was found (p = 0.297, p = 0.389, p = 0.916, respectively).

Among the individuals participating in the study, 36.3% stated that they were aware of the side effects of herbal products. When the sources of information about side effects were examined, it was seen that the majority of the participants (89.3%) received this information from their physicians. As a result of the evaluation conducted to evaluate the relationship between the participants' demo-

graphic characteristics such as education level, gender and age and their knowledge about side effects, no statistically significant difference was found ( $p = 0.760, 0.448, 0.531$ , respectively).

## DISCUSSION

In this study conducted on individuals diagnosed with cerebrovascular disease, it was determined that 27.5% of the participants regularly consumed herbal products. The most frequently preferred herbal products were garlic, cinnamon and green tea, respectively. No significant relationship was found between the demographic characteristics (age, gender, education level) of the participants and the use of herbal products. When the frequency of herbal product use was examined, it was determined that the majority of the participants (63.2%) did not report their use of these products regularly but occasionally. When the reasons for herbal product use were examined, 39.1% of the participants stated that they used these products for cerebrovascular disease and symptoms. This rate was found to be significantly higher, especially among individuals with secondary school or lower education levels. It was observed that the majority of the participants (64%) reported that they informed their physicians that they were using herbal products and that physicians asked their patients questions about this issue (68%). Regarding the side effects of herbal products, 36.3% of the participants stated that they were informed and it was determined that they mostly received this information from their physicians (89.3%).

The American National Institute of Health has classified herbal medicines as any product derived from plants and used to maintain or improve health. In the early years of the 20th century, it was reported that 59% of the products in the USA were based on herbal plants or herbal mixtures (11). In addition, it has been suggested in the literature that the herbal medicinal market in the USA could reach up to approximately \$7 billion (12). Herbal products are currently used clinically for various health problems such as gastrointestinal disorders, gynecological complaints, psychosomatic disorders, upper respiratory and urinary tract infections, and interest in these products has increased in recent years due to the successful results obtained (13). However, adverse effects that may occur when used together with conventional treatments should not be ignored as they may negatively affect patient health (10).

Stroke, one of the most common presentations of cerebrovascular diseases, is the fifth leading cause of death in individuals over the age of 20 in the United States with a frequency of 2.6% (14). The rate of ischemic etiology among strokes is 85%, and the aim of treatment is to reopen the occluded vessel and protect the structures affected by ischemia (14,15). The lack of efficacy of pharmacological drugs used in stroke treatment has led scientists to seek

alternative treatment strategies (16). Herbal products used in traditional Eastern medicine have been identified as possible sources of compounds effective on thrombogenesis, circulation, neuroprotection, and inflammatory processes used in stroke management (17,18). Participants in our study reported that the most frequent reason for using herbal products was the regression of cerebrovascular disease and its symptoms. In the 2015 National Consumer Survey on Medication Experience and Pharmacists' Roles program conducted in the USA with 26,157 participants, the most common conditions associated with herbal product use were stroke (48.7%), followed by cancer (43.1%) and arthritis (43%) (19). In a meta-analysis in the literature including 2,780 patients, it was reported that Chinese herbal patent medicines supported recovery after stroke and significantly improved neurological functional defect scores compared to controls. It was also found that they significantly improved the Barthel index and Fugl-Meyer assessment scores. The authors particularly emphasized that products such as Buchang Naoxintong, Shuxuetong and MLC601 positively regulate stroke recovery (20). Despite these, the complexity of the composition of traditional Chinese medicine prescriptions and the fact that herbal products are used more in the recovery phase and as adjunctive therapy rather than in the development or treatment of stroke indicate that new studies on the pharmacokinetic and pharmacodynamic effects of these products are necessary (21).

In our study, garlic was found to be the most frequently used herbal product among the participants. It is reported that allicin and other sulfur compounds contained in garlic produce neuroprotective effects through anti-inflammatory, antioxidant, antidiabetic and anti-arteriosclerotic properties (22). A meta-analysis reported that ginkgo biloba and garlic were the most frequently used herbal products in elderly patients (23). It is emphasized in the literature that garlic can slow blood clotting and increase the risk of bleeding when used together with anticoagulants (e.g. warfarin) (24). In order to prevent possible herb-drug interactions and minimize complications, it is vital that herbal products are recommended after a close questioning of the patient's medical history and additional medications by the health-care provider.

The effect of gender on herbal product use is a frequently studied topic in health research. This interest may stem from gender roles, biological differences and differences in health quests. There are publications in the literature that gender does not affect the use of these products, similar to the results of our study (19). On the other hand, there are also many studies reporting that herbal product use is more frequent in women (25, 26). It is emphasized that herbal products are consumed more among women for reasons such as pubertal changes, postmenopausal syndrome, hot flashes, female genital tract infections, breast milk produc-

tion, infertility and abortion (27). Since the sample in our study consisted of individuals with cerebrovascular disease, the effect of gender on herbal product consumption may be different in healthy individuals or different disease groups. We believe that future studies conducted in different fields of medicine and in countries with different cultural characteristics with larger patient groups will shed light on the subject. There are many studies on herbal product use and the factors affecting it in Türkiye. In a study investigating the use of herbal products in the elderly population over 65 years of age in 12 provinces located in different geographical regions, herbal product use was determined as 30% and the most commonly used herbal product was determined as lime (28). In another study conducted on patients in the cardiology ward in Hatay province, it was stated that 28.6% of the patients used herbal products and the most common use recommendation was herbal products from their environment such as relatives, friends, neighbors (63.15%) (29). In a study conducted among university students in Kayseri province, it was determined that herbal product use for weight loss was more common in women (30.6%) than in men (15.1%), and more than half of the men (57.6%) used herbal products in case of cold (30). In a study covering participants in Hatay, Adana and Mersin provinces, herbal product use was found to be higher in highly educated individuals than in other participants, and the most frequently used herbal product was linden (31). From history to the present, Turkish society's lifestyle and reserved approach to medicine have fostered a fondness for herbal products, and these products have often been seen as alternatives to medications. While the use of herbal products offers the added benefit of protecting against the side effects of medications, negative consequences can also arise, such as missing out on the benefits of modern medicine and delaying treatment. Although there are different products and different usage characteristics in different geographical regions of Türkiye, it can be emphasized that the use of herbal products in society cannot be ignored and should be taken into consideration when creating a treatment plan.

### Limitations

There are some limitations in our study. The gender imbalance in the participant profile of our study, the relatively small study sample, and geographical limitations limit the generalizability of the findings to the Turkish population. Furthermore, the result that age, gender and education level had no effect on the use of herbal products in our low-sample study should be checked in future studies with larger sample sizes. Another limitation is no separate analysis was conducted for individuals using mixed-ingredient herbal supplements with more than one product; each herbal product was evaluated separately for whether the participant was using it or not. We hope that future studies with

different parameters using double or triple herbal products will eliminate this limitation. In addition, it should be kept in mind that the subjective nature of the survey method and the concerns of the participants about their treatment plans may affect the objectivity of the responses. In future studies, conducting studies on a larger and heterogeneous sample, with participants from different regions and including objective biomarkers will be an important step in overcoming these limitations.

### Study Strengths

In our study, investigating herbal product use in a specific geographic region of Türkiye revealed more endemic results than studies conducted in a larger area. Furthermore, our study provided more definitive answers for a specific disease group than studies conducted on university students or healthy populations.

### Conclusion

This study, which investigates herbal product use and related factors among individuals with cerebrovascular disease, fills important gaps in knowledge on the subject. Our study revealed that the rate of herbal product use in this patient group was 27.5% and garlic was the most frequently preferred. Our study concluded that demographic characteristics of the participants, such as age, gender and level of education, did not significantly affect the use of herbal products. The desire to alleviate cerebrovascular disease symptoms was stated as the main reason for the use of herbal products. This situation is closely related to the accessibility, economic suitability and trust in these products in society. The findings emphasize the importance of healthcare providers to approach their patients more consciously about the use of herbal products and to inform them about the possible risks. Future studies may provide more evidence on the effectiveness and safety of herbal products and increase the knowledge in this area.

### Author Contributions

Çalışma tasarımı ve kavramsallaştırma: **Erkan Özduran, Leyla İyilikçi, Vesile Öztürk, Müge Mercan Kara, Yüksel Erkin, Oktay Faysal Tertemiz, Edip Gönüllü, İlhan Celil Özbek, Volkan Hancı**, veri toplama: **Erkan Özduran, Leyla İyilikçi, Vesile Öztürk, Müge Mercan Kara, Yüksel Erkin, Oktay Faysal Tertemiz, Edip Gönüllü, İlhan Celil Özbek, Volkan Hancı**, sonuçların analizi ve yorumlanması: **Erkan Özduran, Leyla İyilikçi, Vesile Öztürk, Müge Mercan Kara, Yüksel Erkin, Oktay Faysal Tertemiz, Edip Gönüllü, İlhan Celil Özbek, Volkan Hancı**, aday makalenin hazırlanması: **Erkan Özduran, Leyla İyilikçi, Vesile Öztürk, Müge Mercan Kara, Yüksel Erkin, Oktay Faysal Tertemiz, Edip Gönüllü, İlhan Celil Özbek, Volkan Hancı**. Yazar(lar) sonuçları gözden geçirdi ve makalenin son halini onayladı.

### Conflicts of Interest

The authors have no conflict of interest to declare.

## Ethical Approval

The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Non-Interventional Ethics Committee of Dokuz Eylül University (protocol code Decision No: 2022/18-08, approval number 7199 GOA, date of approval: 18.05.2022)."

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