

Evaluation of Herbal Products and Dietary Supplements Use in Patients with Respiratory Diseases Applied to Tertiary Health Institution

Short Title: Herbal products and dietary supplements use

Tuğba Subaş¹, Ufuk Özgen¹, Yılmaz Bülbül², Tevfik Özlü², Gülin Renda¹, Abdul Kadir Albayraktar³

¹Department of Pharmacognosy, Karadeniz Technical University, Trabzon, Türkiye

²Department of Chest Diseases, Karadeniz Technical University, Trabzon, Türkiye

³Department of Public Health, Karadeniz Technical University, Trabzon, Türkiye

Corresponding Author Information

Tuğba Subaş

<https://orcid.org/0000-0002-0956-6567>

tugbasubas08@gmail.com

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ABSTRACT

Objectives: In recent years, especially with the COVID-19 pandemic, the use of herbal products in various health problems has been increasing worldwide. This study aimed to determine the frequency of herbal product/dietary supplement uses, the most used products, and the factors affecting the use of these products in patients who applied to the Chest Diseases Clinic.

Materials and Methods: This research is a descriptive survey study and was conducted in Karadeniz Technical University Farabi Hospital Chest Diseases Clinic using a face-to-face interview technique. Adult individuals with subacute respiratory complaints for more than three weeks or a diagnosis of chronic chest disease were included in the study. The questionnaire form includes questions about personal characteristics, data related to disease and treatment, use of herbal products/dietary supplements, and attitudes toward these products. 444 participants without missing data were included in the study. Descriptive statistics, chi-square, and binary logistic regression tests were used.

Results: It was determined that 49.3% of the participants used herbal products/dietary supplements and the most frequently used products were honey, linden, ginger, lemon, and carob. According to the results of the binary logistic regression test, it was determined that patients over 60 years old (OR=2.0, 95% CI: 1.1-3.8, $p=0.042$), have a high education level (OR=2.0, 95% CI: 1.1-3.6, $p=0.018$), live in urban (OR=1.8, 95% CI: 1.1-3.0, $p=0.018$), and have a diagnosis of post-COVID syndrome (OR=2.7, 95%, CI: 1.3-5.5, $p=0.007$) are more likely to use these products. It was determined that 57.9% of the participants used these products to relieve the symptoms of the disease.

Conclusion: Considering the high probability of using these products in patients with respiratory tract disease, it is important for public health that health professionals question the use of these products and provide counseling on this issue.

Key words: Medicinal herb, dietary supplements, respiratory diseases, herb-drug interactions, pharmacist

INTRODUCTION

Respiratory diseases, especially asthma, chronic obstructive pulmonary disease (COPD), and lung cancer, affect many people around the world. According to the World Health Organization (WHO) data, COPD, lower respiratory tract infections, and lung cancer were determined as three of the ten diseases that cause the most death in 2019.¹ "Coronavirus Disease 2019" (COVID-19), which has emerged in recent years and caused a pandemic, significantly affects the respiratory system. Post-COVID syndrome is a condition in which there are new, recurrent or ongoing symptoms and clinical findings after an acute infection of COVID-19. COVID-19 and post-COVID syndrome have increased morbidity and mortality rates.²

With important developments in the treatment of respiratory diseases in recent years, the diseases are controlled and morbidity rates are decreasing.³ However, there is a tendency for different searches in patients due to the increase in the incidence of diseases, the inability to fully recover with known treatment methods, drug side effects, dissatisfaction with treatment and health services, and fear and anxiety caused by the COVID-19 pandemic experienced in recent years.^{4,5} In this context, traditional and complementary treatment methods such as medicinal plants, acupuncture, homeopathy, hypnotherapy, aromatherapy, breathing, and relaxation

techniques are used in respiratory system disorders.^{6,7} Plants have been used for centuries for purposes such as controlling, treating and preventing diseases.⁸ In Türkiye, herbal products are available in the form of finished products as traditional herbal medicinal products and herbal medicines approved by the Ministry of Health, and dietary supplements approved by the Ministry of Agriculture and Forestry, apart from forms such as raw drugs and teas.⁹

There are studies evaluating the use of herbal products/dietary supplements in people with respiratory disorders.¹⁰⁻¹³ The use of herbal products was found to be 61.8% in a study conducted in participants with respiratory tract diseases in Germany.⁸ In another study conducted with 274 students in Saudi Arabia, it was determined that 62.7% of the participants used herbal products for the prevention of respiratory tract infections and 48.5% of them occasionally used herbal products when they had an illness related to respiratory tract infections.⁵ In studies conducted in Türkiye, the frequency of use of herbal products and supplements in patients with various respiratory diseases (asthma, COPD, pharyngitis, cough, flu-cold, rhinitis, tonsillitis, and respiratory tract infections) varies between 64.5-90.8%.^{13,14}

While there were studies investigating the use of herbal products in patients with asthma, COPD, allergic rhinitis, and lung cancer, no study was found in patients with pulmonary embolism, interstitial lung diseases, respiratory symptoms, and post-COVID syndrome. This study aimed to determine the frequency of herbal products/dietary supplement uses, the most used products, the factors affecting the use of these products, and the attitudes of the patients towards these products in patients who applied to the Chest Diseases Clinic.

MATERIALS AND METHODS

Study Design and Sample Size

This descriptive study was conducted at Karadeniz Technical University (KTU) Farabi Hospital Chest Diseases Clinic between 15.11.2021 and 01.05.2022. Adult individuals (≥ 18 years of age) with subacute respiratory complaints for more than three weeks or a diagnosis of chronic chest disease, and who agreed to participate in this study were included in the study. The questionnaire form was applied to the participants using the face-to-face questionnaire technique. Participants were informed about the content and purpose, and their consent was obtained. The interview with each patient lasted approximately 15 minutes. During the study, 459 patients were reached. The collected data were checked by the researchers and 444 participants without missing data were included in the analyses.

Questionnaire form

The questionnaire form was created by examining the literature and consists of four parts: personal characteristics, disease and treatment characteristics, use of herbal products/dietary supplements, and attitudes towards herbal products/dietary supplements.

Personal characteristics were age, gender, education level, place of residence, have a job, self-reported general health status, body mass index (BMI) (kg/m^2). BMI calculated by dividing weight (kg) by the square of height (m). In the next section, chest-related diseases/symptoms, the duration of diagnosis (week, month, year), the medicines used, whether there is a problem with the treatment, and satisfaction with the treatment were questioned. Diseases/symptoms were evaluated in four categories as Post-COVID syndrome, respiratory airway and allergic diseases (asthma, COPD, bronchiectasis and allergic rhinitis), respiratory symptoms (cough, dyspnea, and chest pain) and other diseases group (pulmonary embolism, interstitial lung diseases, lung cancer, and structural disorders in the lung). The GINA symptom control assessment algorithm-scale was used to determine the level of symptom control in asthma patients.¹⁵ According to the results of the pulmonary function test in diseases involving the airways, when the FEV1/FVC ratio is below 80%, it is classified as an obstructive disease, and when the ratio is normal and the FVC is below 80%, it is classified as a restrictive disease.¹⁶

In the section of herbal products/dietary supplements use, there are questions such as the use of herbal products/dietary supplements, the products used, how these products are used, the reason for use, sources of information about these products, place of supply, side effects, and whether the information about the use was given to the doctor. All plant-derived products such as raw drugs, teas, herbal medicinal products, dietary supplements, and herbal preparations were evaluated. The contents of the preparations containing herbal products/dietary supplements were investigated and the mixtures were evaluated separately. In the determination of the products used, the statements of the participants were taken as the basis, and no species identification was made. In the last section, there are six questions evaluating the opinions of all patients toward herbal products/dietary supplements. Before the data were collected, a pre-test was conducted with 20 people. The questionnaire was finalized according to the feedback.

Ethics

Ethics committee approval of the study was received from Karadeniz Technical University Faculty of Medicine Scientific Research Ethics Committee (Date: 24.11.2021, No: 24237859-856, Protocol No: 2021/329).

Statistical analysis

IBM SPSS 23.0 (SPSS Inc., Chicago, IL, USA) statistical package program was used for data analysis.

Descriptive statistics were presented as number (n), percent (%), mean, standard deviation (sd), minimum (min) and maximum (max) values. Chi-square test was used to compare categorical variables.

Multivariate analyzes of the factors affecting the use of herbal products were performed using the logistic regression test. The model was created using the enter method. The independent variables included in the model were age, gender, education level, place of residence, working a job, general health status, BMI, diagnosis/symptoms that are the reason for application, duration of diagnosis/symptoms and regular use of medicines. Results are presented with OR and 95% CI values. Hosmer-Lemeshow test result and Nagelkerke R^2 value were calculated. Statistical significance level was accepted as $p < 0.05$.

RESULTS

The mean age of the participants was 50.7 ± 17.6 years (min=18, max=90). 324 (73.0%) of the participants were women. The personal characteristics of the participants and their use of herbal products/dietary supplements according to these characteristics are presented in Table 1. It was determined that 219 (49.3%) of the participants used herbal products/dietary supplements. The most used products were honey (n=126, 57.5%), linden (n=74, 33.8%), ginger (n=60, 27.4%), lemon (n=53, 24.2%), and carob (n=24, 10.9%). These products were used in different ways: directly, as infusion/decoction, alone or in combination with other herbs, mostly internally. For example, honey was consumed directly or mixed with different herbs such as ginger or turmeric, linden as decoction, lemon directly, as infusion or added to tea, and carob as molasses. Herbal products/dietary supplements used by the participants are presented in Table 2.

Gender, have a job, general health status and BMI were not associated with herbal product use. 71 (%55.0) patients between the ages of 18-40, 73 (%42.0) patients between the ages of 41-60 and 75 (%53.2) patients over the age of 60 were using herbal products/dietary supplements ($p=0.043$). Urban residence ($p=0.003$), high school and above education status ($p=0.004$), and having a job ($p=0.039$) were associated with higher frequency herbal products/dietary supplements use (Table 1).

Of the participants, 160 (36.0%) presented with respiratory airway diseases and allergic diseases (22.5% asthma, 4.7% COPD, 1.8% bronchiectasis, 7.0% allergic rhinitis), 124 (27.9%) with respiratory symptoms (14.2% cough, 8.3% dyspnea, 5.4% chest pain), 78 (17.6%) with ongoing complaints after COVID, and 82 (18.5%) with other diseases (5.9% interstitial lung diseases, 4.7% lung cancer, 4.5% pulmonary embolism, 4.5% structural disorders in the lung). The mean duration of individuals' diagnoses/symptoms was 3.68 ± 5.85 years. There was no significant association between the use of herbal products/dietary supplements and the duration of the disease/symptoms ($p=0.788$), medicine use ($p=0.290$), regular use of medicines ($p=0.056$), treatment satisfaction ($p=0.942$), treatment problems ($p=0.492$), and FEV1/FVC ratio ($p=1.000$). 49 (62.8%) people with post-COVID syndrome, 77 (48.1%) people with respiratory airway diseases and allergic diseases, 62 (50.0%) people with respiratory symptoms, 31 (37.8%) people with other diseases were using herbal products/dietary supplements ($p=0.017$). It was determined that these products were used more in asthma patients than in well-controlled patients with inadequate and uncontrolled symptoms ($p=0.034$). The characteristics of the participants regarding the disease/symptom and treatment and the use of herbal products/dietary supplements according to these characteristics are shown in Table 3.

According to multivariate analysis, herbal products/dietary supplements use was not associated with gender, have a job, general health status, BMI, duration of diagnosis/symptoms, and regular use of medicines. Herbal products/dietary supplements use was higher in patients who were older than 60 years (OR=2.0; 95% CI: 1.1-3.8, $p=0.042$), had high school or above education (OR=2.0; 95% CI: 1.1-3.6, $p=0.018$), and urban resident (OR=1.8; 95% CI: 1.1-3.0, $p=0.018$). Participants with post-COVID syndrome were more likely to use these products than participants with other diseases (OR=2.7; 95% CI: 1.3-5.5, $p=0.007$). The results of the logistic regression analysis regarding the factors affecting the use of herbal products/dietary supplements by the participants are presented in Table 4.

117 (53.4%) of the participants stated the source of information about the products they used as friends/relatives, and 82 (37.4%) of them obtained these products by collecting them from nature. 165 (73.3%) of the participants who used herbal products/dietary supplements thought that the products they used were beneficial. 161 (70.9%) did not inform their doctor about the products they used, and 186 (81.9%) wanted to get information about these products from healthcare professionals. The reasons for the participants' use of herbal products/dietary supplements, the sources of information about these products, the places provided, and the benefit of these products are presented in Table 5.

The opinions of the participants about herbal products/dietary supplements are presented in Table 6.

DISCUSSION

In this study, the use of herbal products/dietary supplements in patients who applied to the Chest Diseases Clinic in a tertiary health institution and the factors affecting the use were evaluated.

The frequency of use of herbal products/dietary supplements for all participants was 49.3%, 62.8% in post-COVID syndrome, 50.0% in patients with subacute/chronic respiratory symptoms, 48.1% in respiratory airway diseases and allergic diseases, and 37.8% in other diseases. In studies conducted in Germany and the USA, it was reported that 61.8% and 41.4% of the participants, respectively, used herbal products/dietary supplements for respiratory disorders.^{8,17} In studies conducted with participants with respiratory system diseases in Türkiye, the frequency of use was found to be between 64.5-90.8%.^{13,14} Studies have mostly focused on certain disease

groups such as asthma, COPD, allergic diseases, and lung cancer. Studies have shown that the frequency of use of herbal products/dietary supplements varies between 28.8-70.1% in COPD patients, 7.8-60% in allergic rhinitis patients, and 24.7-48.1% in lung cancer patients.^{11,12,18-22} There is no study investigating the use of herbal products in patients with post-COVID syndrome. In a study conducted by telephone with COVID-19 patients in a quarantine center in India during the COVID-19 pandemic, it was found that 25.8% applied traditional treatment methods both during and after treatment.²³ In studies conducted in the community during the pandemic period, it is observed that the frequency of use of herbal products/dietary supplements varies between 18-64%.^{24,25} According to the data obtained from this study, the frequency of herbal products/dietary supplements use is high and similar to the data in the literature.

When the use of herbal products/dietary supplements was evaluated according to sociodemographic and personal characteristics, a significant relationship was found with age, education level, and place of residence. In studies conducted during the COVID-19 pandemic, it has been shown that the use of these products increases with age.^{26,27} The reason for this may be the increase in the incidence of chronic diseases with increasing age. In most of the studies conducted on asthma, allergic rhinitis, lung cancer patients and during the COVID period, it was determined that the use of these products increased as the level of education increased.^{14,19,22,28,29} The data obtained in our study are compatible with the literature findings. It has been reported that the use of herbal products/dietary supplements is higher among individuals with chronic diseases in Thailand, those living in rural areas, and those living in urban among participants with respiratory system diseases in Türkiye.^{13,30} In our study, similar results were found in the study conducted in Türkiye.

A significant correlation was found between the use of herbal products/dietary supplements by the participants, the diagnosis, and the level of asthma symptom control (in asthma patients). In previous studies, it was determined that there is a positive relationship between the use of herbal products and the diagnosis of asthma.^{12,20,30} In this study, it was found that the use of herbal products/dietary supplements was higher in asthma patients with inadequately controlled and uncontrolled symptoms than in patients with controlled symptoms. Similar to our findings, a significant relationship was found between the inability to control asthma symptoms and the use of different traditional methods in studies conducted in Canada and England. The use of herbal products has been found to be one of the commonly used methods.^{31,32} During the COVID-19 pandemic period, the inability to determine the treatment protocol to be applied, especially at the beginning of the pandemic, and the long duration of medicine and vaccine studies have led to an increase in the tendency of the society to these products. In our study, a higher frequency of use was found in patients with post-COVID syndrome compared to the other diseases group. This may be due to the uncertainty caused by the pandemic process and the fact that patients turn to these products to eliminate the long-term effects of COVID-19. In studies conducted during previous pandemics, it has been reported that the tendency to traditional and complementary therapies has increased among the people and the use of herbal products has been preferred primarily.³³ In this study, the majority of the participants who used herbal products/dietary supplements stated that they found the product they used beneficial. The findings in the literature support our study and it has been reported that the perceived effectiveness of these products is high.^{12,19,20,30} In a study conducted with patients with respiratory system diseases in Türkiye, it was reported that 87.5% of patients using herbal products stated that they benefited from the products they used, and 90% of them recommended these products to others.¹³ In our study, the main reasons for the participants to use these products are to relieve symptoms and strengthen the immune system. In a study conducted with university students in Saudi Arabia, 55.5% of the participants were found to use herbal products to prevent and control respiratory tract infections and strengthen the immune system.⁵

Information on herbal products/dietary supplements can be obtained from many sources. Obtaining information from scientific sources or healthcare professionals is important for public health. As in this study, in previous studies, participants' sources of information about these products are mostly friends and family/relatives.^{22,28,34} Apart from this, TV/media/newspaper, internet/social media, and herbalists, although to a lesser extent, doctors, pharmacists, and other health personnel are also expressed as sources of information.^{19,20,29} In a study conducted in Germany, individuals who used herbal products in the last 12 months declared the internet 68.2%, pharmacists 54.2%, and family members 45.6% as sources of information.⁸

In this study, it was determined that 70.9% of the participants who used herbal products/dietary supplements did not inform their doctor about this issue, and 81.9% wanted to get information about these products from healthcare professionals. In the literature, in some studies conducted with asthma and COPD patients, it was found that more than half of the individuals did not inform their doctor or other healthcare professionals.^{18,20,33,34}

In some studies, contrary to these findings, it has been determined that individuals inform doctors before or while using these products.^{28,35} It is important for the progress of treatment and public health that healthcare professionals, especially doctors and pharmacists, question the use of natural products by patients and raise awareness on this issue.

Although the regulation of herbal products/dietary supplements varies according to country or region, these products are available in the market with or without a prescription due to the differences in the legislation of

herbal products/dietary supplements in Türkiye. In a study conducted in Thailand, it was determined that patients mostly collect the products they use from nature, and also obtain them from herbal shops and pharmacies.³⁰ In Türkiye, it has been determined that the places of supply for products of natural origin are mostly herbal shops or markets.³⁶ In this study, similar to the literature, it was determined that the participants collected herbal products/dietary supplements from nature and obtained them from herbal shops and markets. In the Black Sea Region, it is known that most of the individuals living in urban as well as those living in the rural areas have a connection with the village and live in harmony with nature. For this reason, it is expected that these products are mostly collected from nature.

Due to the increasing demand and use of naturally sourced products, there are also quality, efficacy, and reliability problems related to these products. Herbal products contain a large number and varying amounts of secondary metabolites, which are responsible for their clinical effects, showing pharmacological activity. The type and amount of secondary metabolites vary according to the way the plant is collected, harvest time, drying, storage, and processing methods. In addition, it is possible that the desired quality product is not obtained due to adulteration, contamination, wrong plant identification, or labeling with other plants or active substances.³⁷

When the attitudes of the participants towards herbal products/dietary supplements were evaluated, it was determined that the majority of them thought that these products support treatment, similar to the literature.³⁸ In addition, it can be said that awareness of herb-drug interactions is not at a sufficient level.

This research was conducted during the COVID-19 pandemic. It is a study that investigates the use of herbal products/dietary supplements in individuals with respiratory disease (including asthma, COPD, lung cancer, as well as post-COVID syndrome, interstitial lung diseases, pulmonary embolism) more comprehensively than studies in the literature and it is thought to provide important scientific data.

Study Limitations

An equal number of patients could not be reached in the groups determined by the prevalence of the diseases. Due to the design of the study, the data obtained may not be generalizable to the population.

CONCLUSION

According to our research results, it has been determined that approximately half of the patients with respiratory diseases use herbal products/dietary supplements at a high frequency. The use of these products by patients varies in terms of sociodemographic and disease-related characteristics. The fact that patients with post-COVID syndrome use more herbal products/dietary supplements compared to other disease groups in this study shows that patients primarily resort to these products in an unknown situation. Considering the information sources and places of supply of the participants about these products, the quality of the products should be increased and they should be controlled by the health authorities in order to prevent the problems caused by the use of irrational herbal products. It is noteworthy that the majority of patients who use herbal products/dietary supplements do not inform their doctors about this. It is important for healthcare professionals to question the use of herbal products by patients and to provide counseling on this subject, in terms of preventing possible adverse effects and herb-drug interactions.

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Table 1. Use of herbal products/dietary supplements and the personal characteristics (N=444)

	Total n (%)*	User n (%)**	Non-user n (%)**	<i>p</i>
Herbal products/dietary supplements	444 (100.0)	219 (49.3)	225 (50.7)	
Age				
18-40	129 (29.1)	71 (55.0)	58 (45.0)	0.043
41-60	174 (39.2)	73 (42.0)	101 (58.0)	
> 60	141 (31.8)	75 (53.2)	66 (46.8)	
Gender				
Female	324 (73.0)	160 (49.4)	164 (50.6)	0.968
Male	120 (27.0)	59 (49.2)	61 (50.8)	
Educational status				
Middle school and below	306 (68.9)	137 (44.8)	169 (55.2)	0.004
High school and above	138 (31.1)	82 (59.4)	56 (40.6)	
Place of residence				
Urban	340 (%76.6)	181 (53.2)	159 (46.8)	0.003
Rural	104 (%23.4)	38 (36.5)	66 (63.5)	
Have a job				
Yes	86 (%19.4)	51 (59.3)	35 (40.7)	0.039
No	358 (%80.6)	168 (46.9)	190 (53.1)	
General health status				
Very good/good	155 (34.9)	74 (47.7)	81 (52.3)	0.875
Middle	218 (49.1)	110 (50.5)	108 (49.5)	
Bad/very bad	71 (16.0)	35 (49.3)	36 (50.7)	
BMI				
<30 kg/m ²	255 (57.4)	124 (48.6)	131 (51.4)	0.733
≥30 kg/m ²	189 (42.6)	95 (50.3)	94 (49.7)	

* column percentage

** row percentage

Table 2. Herbal products/dietary supplements used by the participants (N=219)

	n	%		n	%
Honey	126	57.5	Cinnamon	8	3.6
Linden	74	33.8	Vitamin C	7	3.2
Ginger	60	27.4	Vitamin D	6	2.7
Lemon	53	24.2	Black pepper	6	2.7
Carob	24	10.9	Propolis	6	2.7
Thyme	20	9.1	Vinegar	6	2.7
Peppermint	20	9.1	Bee pollen	5	2.3
Grape/mulberry molasses	20	9.1	Radish	5	2.3
Turmeric	19	8.7	Olive oil	4	1.8
Rosehip	16	7.3	Onion	4	1.8
Pine cone molasses/syrup	15	6.8	Highland tea	4	1.8
Black cumin	12	5.5	Zinc	3	1.4
Garlic	11	5.0	Fennel	3	1.4
Sage	10	4.6	Quince leaf	3	1.4
Green tea	9	4.1	Parlsey	3	1.4
Daisy	8	3.6	Other*	48	21.9

*Cherry stalk, fig leaf, inula molasses, fish oil, hibiscus, rosemary, royal jelly, Korean red ginseng (n=2), marjoram, alkanet (hava civa in Turkish), eucalyptus, udihindi oil, Reishi mushroom, dried fruit tea, glucosamine, Ag ions, saponins, nutmeg, blueberry, multivitamin, coenzyme Q10, olive leaf, lemon balm, flavonoid-polysaccharide fraction, apricot tea, hazelnut shell, hazelnut leaf, orange peel, clove, kiwi tea, peach tea, sumac tea, black grape seeds, St. John's wort, quail eggs, white and black mulberry, cashew, almond, cress, yarrow (n=1)

Table 3. Use of herbal products/dietary supplements and the characteristics of disease/symptom and treatment (N=444)

	Total n (%)*	User n (%)**	Non-user n (%)**	P
Disease/symptoms				
Post-COVID syndrome	78 (17.6)	49 (62.8)	29 (37.2)	0.017
Respiratory airway diseases and allergic diseases	160 (36.0)	77 (48.1)	83 (51.9)	
Respiratory symptoms	124 (27.9)	62 (50.0)	62 (50.0)	
Other	82 (18.5)	31 (37.8)	51 (62.2)	
Duration of diagnosis/symptoms				
< 3 year	286 (64.4)	144 (50.3)	142 (49.7)	0.788
3-10 year	118 (26.6)	55 (46.6)	63 (53.4)	
> 10 year	40 (9.0)	20 (50.0)	20 (50.0)	
Medicine use status				
Yes	279 (62.8)	143 (51.3)	136 (48.7)	0.290
No	165 (37.2)	76 (46.1)	89 (53.9)	
Regular use of medicines				
Yes, regular	208 (74.6)	100 (48.1)	108 (51.9)	0.056
No, irregular	71 (25.4)	44 (61.1)	28 (38.9)	
Treatment satisfaction				
Very good/good	213 (48.0)	108 (50.7)	105 (49.3)	0.942
Middle	43 (9.7)	23 (53.5)	20 (46.5)	
Bad	23 (5.2)	12 (52.2)	11 (47.8)	
Problems in treatment				
Yes	39 (14.0)	18 (46.2)	21 (53.8)	0.492
No	240 (86.0)	125 (52.1)	115 (47.9)	
FEV1/FVC ratio***				
Obstructive disease	51 (60.0)	27 (52.9)	24 (47.1)	1.000
Restrictive disease	34 (40.0)	18 (52.9)	16 (47.1)	
Asthma symptom control level****				
Well controlled	15 (15.0)	3 (20.0)	12 (80.0)	0.034
Poorly controlled	37 (37.0)	19 (51.4)	18 (48.6)	
Uncontrolled	48 (48.0)	28 (58.3)	20 (41.7)	

* Column percentage

** Row percentage

*** Evaluated in patients with respiratory airway diseases (n=85)

**** Evaluated in asthma patients (n=100)

Table 4. Logistic regression analysis of the factors affecting the participants' use of herbal products/dietary supplements (N=444)

	OR (%95 CI)	p
Age		
18-40	1	
41-60	0.9 (0.5-1.6)	0.706
> 60	2.0 (1.1-3.8)	0.042
Gender		
Female	1	
Male	1.2 (0.7-2.0)	0.525
Educational status		
Middle school and below	1	
High school and above	2.0 (1.1-3.6)	0.018
Place of residence		
Rural	1	
Urban	1.8 (1.1-3.0)	0.018
Have a job		
Yes	1	
No	1.5 (0.9-2.7)	0.139
General health status		
Very good/good	1	
Middle	1.3 (0.8-2.0)	0.311
Bad/very bad	1.4 (0.7-2.6)	0.293
BMI		
< 30 kg/m ²	1	
≥ 30 kg/m ²	1.4 (0.9-2.3)	0.141
Disease/symptoms		
Other diseases	1	
Post-COVID syndrome	2.7 (1.3-5.5)	0.007
Respiratory airway diseases and allergic diseases	1.1 (0.6-2.2)	0.684
Respiratory symptoms	1.7 (0.9-3.3)	0.100
Duration of diagnosis/symptoms		
< 3 year	1	
3-10 year	1.0 (0.6-1.7)	0.953
> 10 year	1.1 (0.5-2.4)	0.890
Regular use of medicines		
Yes, regular	1	
Non use medicine	0.7 (0.4-1.1)	0.146
No, irregular	1.6 (0.9-2.9)	0.117

Hosmer-Lemeshow P = 0.821, Nagelkerke R² = 0.12

Table 5. Characteristics associated with the use of herbal products/dietary supplements by the participants (N=219)

	n	%
Reasons for participants to use herbal products/dietary supplements*		
Reducing disease symptoms	127	57.9
Strengthen the immune system	113	51.6
The idea that it is natural and harmless	101	46.1
Support medical treatment	73	33.3
To treat the disease	55	25.1
Relieving medication side effects	5	2.3
Sources of information about the products used*		
Friend/relatives	117	53.4
No information source	70	31.9
Internet, social media	38	17.3
TV, newspaper	19	8.7
Doctor	15	6.8
Other healthcare professionals	4	1.8
Herbalist	2	0.9
Where the used products are supplied*		
From nature	82	37.4
Herbal shop	78	35.6
Market	67	30.6
Friend/relatives	24	10.9
Pharmacy	9	4.1
Internet/TV	4	1.8
Other**	4	1.8
Benefit from the products used		
Yes	165	73.3
No	25	11.1
Indecisive	35	15.6

*More than one option is marked. **Firm (n=3), doctor (n=1)

Table 6
Opinions of the participants about herbal products/dietary supplements (N=444)

		Use of herbal products/dietary supplements					
		Yes		No		Total	
		n	%	n	%	n	%
Do you think that the use of herbal products/dietary supplements in addition to modern medicine supports the treatment?	Yes	182	83.1	115	51.1	297	66.9
	No	23	10.5	59	26.2	82	18.5
	Indecisive	14	6.4	51	22.7	65	14.6
Do you think that herbal products/dietary supplements can also cause harm?	Yes	153	69.9	166	73.8	319	71.8
	No	36	16.4	23	10.2	59	13.3
	Indecisive	30	13.7	36	16.0	66	14.9
Do you think that herbal products/dietary supplements alone are effective on diseases?	Yes	10	4.6	3	1.3	13	2.9
	No	197	90.0	213	94.7	410	92.3
	Indecisive	12	5.5	9	4.0	21	4.7
Do you think that herbal products/dietary supplements should be approved by the Ministry of Health?	Yes	121	55.3	141	62.7	262	59.0
	No	41	18.7	32	14.2	73	16.4
	Indecisive	57	26.0	52	23.1	109	24.5
Do you think herbal products/dietary supplements are completely ineffective?	Yes	12	5.5	11	4.9	23	5.2
	No	196	89.5	202	89.8	398	89.6
	Indecisive	11	5.0	12	5.3	23	5.2
Do you think that concomitant medication use with herbal products/dietary supplements can cause problems?	Yes	52	23.7	53	23.6	105	23.6
	No	87	39.7	80	35.6	167	37.6
	Indecisive	80	36.5	92	40.9	172	38.7