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Investigation of Supplement Products Preferred by Healthcare Professionals During COVID-19 Pandemic Process

COVID-19 Pandemi Sürecinde Sağlık Profesyonelleri Tarafından Tercih Edilen Takviye Ürünlerin Araştırılması

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Abstract

Aim: Various products are used to strengthen immunity in prevention and treatment during the COVID-19 pandemic affecting the whole world, which has no cure yet, and the vaccine has just been used. This study was planned to learn about the supplements used by healthcare professionals.

Material and Method: A questionnaire was applied to the physicians, nurses, technicians, secretaries, and staff working in the operating room, intensive care, ward, and outpatient clinic by e-mail, WhatsApp, or face-to-face interview method.

Results: There was no difference between the groups in terms of being COVID-19-positive. The most used products were primarily Mg and vitamin D, and vitamin C, ginger, Zn, turmeric, green tea, vitamin complex, thyme, black elderberry (sambucus nigra), propolis, prebiotic/probiotic, acetylsalicylic acid (ASA), black cumin (niger sativa), N-acetyl cysteine (NAC), selenium (Se), Coenzyme-Q10, cinnamon, glutathione (GSH) and quercetin respectively. No one had used alpha lipoic acid (ALA). The products that showed significant differences between the groups with and without COVID-19 were vitamin C, prebiotic/probiotic, propolis and ASA.

Conclusion: Since it is not asked when the product is used, although it is not possible to evaluate its effectiveness for preventive or therapeutic purposes, known to be natural, inexpensive, and easily accessible antiviral products may be preferred.

Keywords: COVID-19, healthcare workers, boosting immunity, supplement products

Öz

Amaç: Henüz tedavisi bulunmayan ve aşının da yeni kullanıma girdiği, tüm dünyayı etkileyen COVID-19 pandemi sürecinde korunma ve tedavide bağışıklığı güçlendirmek için çeşitli ürünler kullanılmıştır. Bu anket sağlık çalışanlarının kullandığı takviyeleri öğrenmek amacıyla planlanmıştır.

Gereç ve Yöntem: Ameliyathane, yoğun bakım, servis ve poliklinikte çalışan doktor, hemşire, tekniker, sekreter ve personele elektronik posta, whatsapp veya yüzyüze görüşme yöntemiyle anket uygulandı.

BULGULAR: Gruplar arasında COVID-19 pozitif olma açısından fark yoktu. En çok kullanılan ürünler başta Mg ve D vitamini olmak üzere sırasıyla C vitamini, zencefil, Zn, zerdeçal, yeşil çay, vitamin kompleksi, kekik, kara mürver (sambucus nigra), propolis, prebiyotik/probiyotik, asetilsalisilik asit (ASA), çörek otu (niger sativa), N-asetil sistein (NAC), selenyum (Se), Koenzim-Q10, tarçın, glutatyon (GSH) ve kuersetin idi. Hiç kimse alfa lipoik asit (ALA) kullanmamıştı. COVID-19 olan ve olmayan gruplar arasında anlamlı farklılık gösteren ürünler C vitamini, prebiyotik/probiyotik, propolis ve ASA idi.

Sonuç: Ürünün ne zaman kullanıldığı sorulmadığı için koruyucu veya tedavi amaçlı etkinliğini değerlendirmek mümkün olmasa da doğal, ucuz ve kolay erişilebilir olduğu bilinen antiviral ürünler tercih edilebilir.

Anahtar Kelimeler: COVID-19, sağlık çalışanları, bağışıklığı artırmak, takviyeler

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INTRODUCTION

In December 2019, the outbreak of the new coronavirus disease (COVID-19), caused by SARS coronavirus 2 (SARS-CoV-2), in the city of Wuhan, China, was declared a pandemic on March 11, 2020, by the World Health Organization. During the pandemic period, especially the health workers used very different supportive products as well as personal protective equipment to protect themselves from the disease.

Quite a lot of healthcare workers in the world and Turkey have been infected with the virus, and there have been those who lost their lives during the pandemic. Healthcare professionals have preferred to use products such as vitamin D, vitamin C, Zn, Se, Mg, green tea, elderberry (sambucus nigra), quercetin, propolis, probiotic/prebiotic, ginger(zingiber), turmeric(curcumin), thyme, cinnamon, Coenzyme Q10, acetylsalicylic acid (ASA), N-acetyl cysteine (NAC), glutathione (GSH), and alpha lipoic acid (ALA) to strengthen the immune system in order not to get sick or to be asymptomatic or mildly symptomatic.

This survey study was designed to identify the vitamins, minerals, herbs, and supplements used by healthcare professionals during the pandemic and determine their virus positivity.

MATERIAL AND METHOD

Hospital ethics committee approval (Decision no: 19.04.2021, 109/07) and Ministry of Health (2021-02-08T12-14-16) of the Republic of Turkey were obtained for this survey study. Our study was carried out in accordance with the Helsinki Declaration principles. The questionnaire consisting of 10 questions prepared in February 2021 was administered to physicians, nurses, anesthesia technicians, secretaries, and staff working in different hospitals in April 2021 through e-mail, WhatsApp, or face-to-face interview method. In the first part of the questionnaire, information about the purpose of the study was presented, and consent was obtained. They were asked to fill out the questionnaire form without obtaining specific information such as their identity and the name of the institution they work for. The study reached 288 participants.

Age, gender, working unit, title, duration of professional experience, comorbidity, anxiety about COVID-19, support products used to prevent infection (antioxidant, immunomodulatory, and anti-inflammatory), and COVID-19 test positivity history were evaluated.

Statistical Review

"Statistical Package for Social Sciences-SPSS 17" (Chicago, USA) program was used to evaluate the results.

The descriptive properties of the variables were presented as numbers and percentages. The Chi-square test was used to compare categorical variables. P<0.05 was considered statistically significant.

RESULTS

The data of 288 participants included in the survey were analyzed. No questionnaire form was excluded from the study. 51.38% of the participants were physicians, 19.79% nurses, 17.01% technicians, 7.98% secretaries, and 3.81% personnel (**Figure 1**).

Age, gender, working unit, and professional experience period of the participants were significantly different between physicians, nurse technicians, secretaries, and personnel (p<0.001) (**Table 1**).

Table 1. Demographic data

	Physician (n=148)	Nurse (n=57)	Technician (n=49)	Secretary (n=23)	Personnel (n=11)	p
Sex						<0.001
Female	90	38	26	14	1	
Male	58	19	23	9	10	
Age (year)						<0.001
<30	14 (9.5%)	34 (59.6%)	12 (24.5%)	4 (17.4%)	0 (0)	
30-40	37 (25%)	13 (22.8%)	12 (24.5%)	13 (56.5%)	0 (0)	
40-50	66 (44.6%)	10 (17.5%)	22 (44.9%)	5 (21.7%)	7 (63.6%)	
50-60	31 (20.9%)	0 (0)	3 (6.1%)	1 (4.3%)	4 (36.4%)	
Workplace						<0.001
Operating room	79 (53.4%)	19 (33.3)	43 (87.8)	1 (4.3%)	9 (81.8%)	
Ward	14 (9.5%)	0 (0)	2 (4.1%)	8 (34.8%)	1 (9.1%)	
Outpatient clinic	29 (19.6%)	2 (3.5%)	4 (8.2%)	12 (52.2%)	0 (0)	
Intensive care	26 (17.6%)	36 (63.2%)	0 (0)	2 (8.7%)	1 (9.1%)	
Professional Experience (year)						<0.001
1-5	21 (14.2%)	25 (43.9%)	6 (12.2%)	3 (13%)	0 (0)	
6-10	17 (11.5)	9 (15.8)	7 (14.3)	6 (26.1)	2 (18.2)	
11-15	26 (17.6)	7 (12.3)	5 (10.2)	7 (30.4)	5 (45.5)	
16-20	24 (16.2)	5 (8.8)	9 (18.4)	6 (26.1)	1 (9.1)	
>20	60 (40.5)	11 (19.3)	22 (44.9)	1 (4.3)	3 (27.3)	

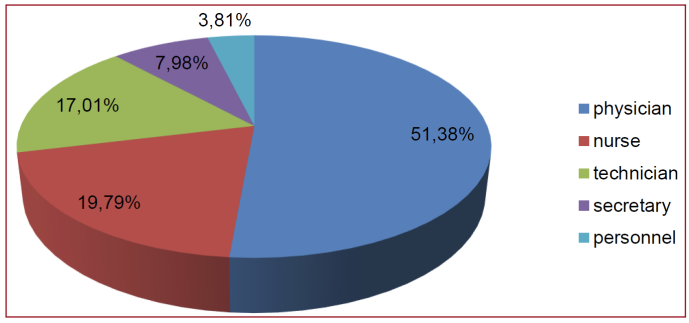

Figure 1. Distribution of the participants by occupational groups

Anxiety levels were significantly different between the groups (p<0.001), as it was the most among physicians (89.9%) and the least among the secretary group (56.5%) (**Figure 2**).

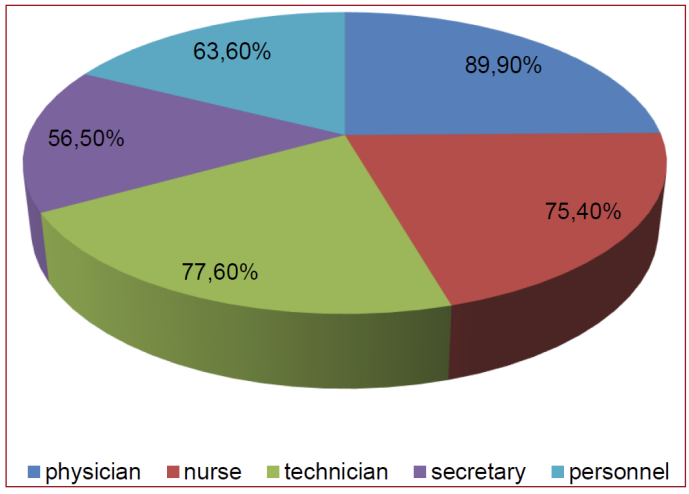

Figure 2. Anxiety rates by occupational groups

The presence of comorbid diseases was not different between the physician, nurse, anesthesia technician, secretary, and personnel groups (27%, 19.3%, 18.4%, 21.7%, and 45.5%, respectively) (p=0.280).

The presence of comorbid diseases was significantly different between groups with and without COVID-19 (p=0.031), while anxiety rates were similar. The products that showed significant differences between the groups with and without COVID-19 were vitamin C, prebiotic/probiotic, propolis and ASA (**Table 2**).

COVID-19 transmission rates were not different between occupational groups (p>0.05), but those with 1-5 years of employment and 16-20 years of employment had higher rates of COVID-19 transmission (p=0.021). There was a comorbid disease in 24.4% (n=70) of the participants, and the incidence increased with age and occupational duration (p<0.001). It was reported that 38.6% (n=27) of those with comorbidities had COVID-19 (p=0.031).

In our study, most common used products by healthcare professionals during the COVID-19 pandemic were primarily Mg and vitamin D, and vitamin C, ginger, Zn, turmeric, green tea, vitamin complex, thyme, black elderberry, propolis, prebiotic/probiotic, respectively.

Table 2. Comparison of groups with and without COVID-19

	COVID-19 (-) (n=206)	COVID-19 (+) (n=82)	p
Physician	111 (53.9%)	37 (45.1%)	
Nurse	36 (17.5%)	21 (25.6%)	
Technician	35 (17%)	14 (17.1%)	0.297
Secretary	18 (8.7%)	5 (6.1%)	
Personnel	6 (52.9%)	5 (6.1%)	
Comorbid disease	43 (20.9%)	27 (32.9%)	0.031*
Anxiety	166 (80.6%)	68 (82.9%)	0.646
Vitamin C	22 (10.7%)	17 (20.7%)	0.024*
Pre/Probiotic	5 (2.4%)	7 (8.5%)	0.019*
Propolis	6 (2.9%)	7 (8.5%)	0.038*
ASA	3 (1.5%)	6 (7.3%)	0.010*

*p <0.05

The usage rate of green tea was high, and the rate of black cumin use was low in those with COVID-19 anxiety (p=0.048 and p=0.001). The use of glutathione and ASA was significant in patients with comorbidities (p=0.012 and 0.003).

Products that were significantly different between groups were Vitamin D, Vitamin C was turmeric, ginger, green tea, black cumin, ASA and vitamin complex (p=0.003, 0.020, 0.008, <0.001, 0.001, <0.001, 0.008, and 0.003, respectively).

The group that received the vitamin complex the most was the secretaries, and the group that received the least was the technicians (p=0.003). It was observed that 12.8% of the physicians and 39.1% of the secretaries used vitamin D, and the difference was significant (p=0.003).

It was seen that vitamin C was used mostly by nurses (24.6%) and least by personnel (9.1%), and the difference between the groups was significant (p=0.020).

The use of turmeric and ginger was significantly different according to occupational groups (p= 0.008 and p<0.001). Both products were mostly used by the personnel group. Green tea was consumed the most by the personnel (18.2%) and the physicians and anesthesia technicians (2%) the least (p<0.001). Those working in the intensive care unit consumed more vitamin C and green tea (p= 0.022 and p<0.001).

Black cumin was consumed mostly by secretaries and least by anesthesia technicians (p<0.001).

None of the participants preferred to use ALA (**Figure 3**).

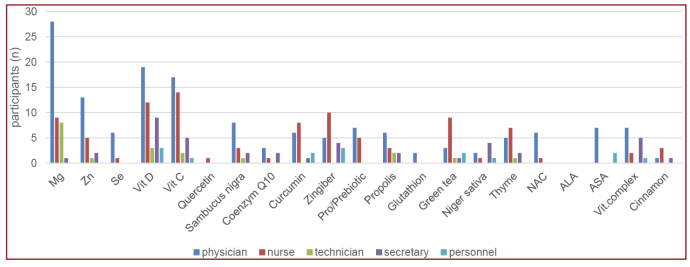

Figure 3. Products used by occupational groups

The group that consumed thyme the most was those working in the wards (p=0.008).

The consumption of vitamin D, vitamin C, turmeric, ginger, probiotic/prebiotic, and green tea was mostly in those who worked for 1-5 years (p=0.004, <0.001, 0.002, 0.020, 0.014, and 0.001, respectively).

Vitamin C, turmeric, green tea, and prebiotic/probiotic use were mostly in the group below the age of 30 (p=0.045, 0.008, 0.009, and 0.024, respectively).

Those who consumed black elderberry the most were those who worked for 16-20 years (p=0.030).

DISCUSSION

Healthcare workers at risk used a wide variety of products besides masks, distance, and personal protective equipment to protect themselves from COVID-19 when there was no cure yet, and vaccination had just begun. In our study, we searched for the supportive products and drugs used by physicians, nurses, anesthesia technicians, secretaries, and personnel working in the operating room, intensive care units, wards, and outpatient clinics to prevent and treat COVID-19 during the pandemic process. The most preferred products by occupational groups respectively, were Mg, vitamin D, vitamin C, Zn and black elderberry in physicians, vitamin C, vitamin D, ginger, Mg, green tea and turmeric in nurses, Mg, vitamin D, vitamin C and propolis in technicians, vitamin D, vitamin C, complex vitamin, ginger and black cumin in secretaries, vitamin D, ginger, turmeric, green tea and ASA were observed in the personnel.

Bioactive substances obtained from immunomodulatory, anti-inflammatory, antioxidant vitamins (A, B, C, D, and E), minerals (Se and Zn), and polyphenols such as turmeric, propolis, green tea have been evaluated as promising nutritional approaches in the fight against COVID-19.[1] It was observed that the combination of vitamin D, magnesium, and vitamin B12 in elderly COVID-19 patients significantly reduces conditions requiring oxygen and intensive care support.[2] The present study determined that the anxiety level was highest in physicians, and they also used Mg, vitamin D, and vitamin C more than other products. Vitamins that also have antiviral effects have also been demonstrated to have a potential role in the management of COVID-19, supplementation is necessary to protect against COVID-19 or relieve symptoms as doses are required too high to come from the diet, but further research is recommended to determine the effective dose.[3] Vitamin D insufficiency increased hospitalization and mortality from COVID-19, and a positive correlation was observed between its deficiency and the severity of the disease and increasing the vitamin D concentration above 40-60 ng/mL should be the target.[4,5] Evidence to date in COVID-19 indicates that oral vitamin C (2-8 g/day) can reduce the incidence and duration of respiratory tract infections, and IV (intravenous) vitamin C (6-24 g/day) may decrease mechanical ventilation and intensive care length of stay and mortality.[6] It has also been predicted that vitamin C which has antithrombotic properties, may reduce the risk of ARDS due to COVID-19.[7,8] However, it is recommended to optimize the high dose IV vitamin C dose.[9,10] In our survey, the rates of vitamin D, vitamin C, and complex vitamin use were significantly higher between the groups.

Mg is known to be a cofactor in many enzymatic reactions in the body. In clinical practice, Mg supplementation protects against SARS-CoV-2 infection and reduces the severity of symptoms while facilitating recovery after the acute phase.[11] In our study, Mg was the most used product together with vitamin D. Although Mg preference was not statistically significant between the groups, it was higher in physicians, technicians, and nurses.

Zn is necessary to protect natural tissue barriers such as respiratory epithelium, prevent pathogen entry, and maintain the immune system's balanced function. Zn deficiency is a predisposing factor to severe COVID-19.[12] Recent studies on COVID-19 patients have revealed that vitamin D and Se deficiencies are evident in patients with acute respiratory tract infections. Vitamin D improves the physical barrier against viruses and stimulates the production of antimicrobial peptides. Se is essential for T-cell-dependent antibody production, while vitamin C has increased the survival rate of COVID-19 patients by reducing the overactivation of the immune response. The combination of these micronutrients can help boost the immune system, prevent the spread of the virus and reduce disease progression.[13] In another study, serum Zn and Se concentrations in the patient group were statistically lower than in the control group.[14] In our study, while the use of Se was significant in the physician group, the use of Zn was not significantly different between the groups. There was no mineral used in the personnel group.

Although there is no standard effective treatment against SARS CoV-2, nutraceuticals such as Zn, Se, vitamin D, and vitamin C are recommended for both prophylaxis and treatment.[15,16]

Spices and herbs with antioxidant and antiviral properties (turmeric, ginger, thyme, cinnamon, green tea, black cumin, elderberry) have also been frequently used during the pandemic. Some herbs and their components, such as turmeric and green tea, have been shown to have promising antiviral properties against SARS-CoV-2.[17] It has been demonstrated that turmeric and ginger, together with their anti-fibrotic effects on the lung, can be helpful in both prophylaxis and treatment in reversing the cytokine storm in severe cases.[18,19] Ninety-three agents, including natural products such as turmeric, green tea, and ginger, have been reported as potential antiviral (for SARS and other viruses) drug candidates.[20]

The phenolic compounds in elderberry have an immunomodulatory effect by increasing macrophage activity and releasing cytokines (TNF-alpha, IL-1, IL-6, and IL-8) from

monocytes. Elderberry has been determined to significantly reduce upper respiratory tract symptoms associated with viral infections but is recommended in the early infection phase as it increases proinflammatory cytokines.[21,22]

The use of vitamin C, pre/probiotic, propolis, and ASA in patients with COVID-19 infection was statistically significantly different.

There is evidence that an aromatherapy blend, including thyme, can significantly improve energy levels in women experiencing fatigue after COVID-19.[23]

Publications support the effectiveness of black cumin and its oil against COVID-19.[24] Although black cumin was used more in secretaries, it was a less preferred product in those with anxiety.

Cinnamon can effectively treat SARS-CoV-2 with its anti-obstructive, diuretic, and tonic effects. There is also pharmacological evidence for its anti-depressant effects.[25]

Green tea-epigallocatechin gallate (EGCG) and black tea-theaflavin plants contain copper (Cu), iron (Fe), manganese (Mn), selenium (Se), and zinc (Zn) from the soil. It is recommended for the prophylaxis and treatment of COVID-19 due to the antiviral, antibacterial, immunomodulatory, antioxidant, and anti-inflammatory effects of the polyphenols it contains.[26-28]

A survey conducted in India found that 93.6% of respondents thought spices were helpful in curing coronavirus or other viral infections and strengthening immunity, and most of them used a mixture of vitamin C and spices to strengthen their immunity. Therefore, it has been concluded from research and available literature that spices and herbs play an important role in enhancing immunity against viral infections.[29] According to our survey results, ginger, turmeric, green tea, thyme, black elderberry, black cumin, and cinnamon were the most preferred herbal products, respectively.

Propolis contains more than 300 chemical components (e.g., terpenes, flavonoids, phenolic acids) and is beneficial in curing symptoms (dry cough, shortness of breath, sore throat, chest pain, fever, dizziness, headache, abdominal pain, and diarrhea) with its antiviral activity against SARS-CoV-2.[30-32] In addition to potent antiviral activity, apitherapy plays a role in stimulating antibody production and maturation of immune cells.[33]

Probiotics can help balance the gut-lung axis and manage the mortality and morbidity rates associated with SARS-CoV-2 infection.[34] The use of probiotics in SARS-CoV-2 virus infection, which was also detected in stool samples, has been suggested as an adjunct treatment for the modulation of microbiota.[35] In our study, we received the answer that the physician and nurse groups used probiotics.

Co-Q10, Quercetin, ALA, ASA, NAC, and GSH are also supplements preferred by healthcare professionals.

Quercetin synergizes antiviral and immunomodulatory properties with vitamin C in both prophylaxis and therapy in high-risk populations in COVID-19.[36] Quercetin is also recommended to alleviate and shorten the duration of the post-COVID-19 syndrome.[37] In addition, both anti-inflammatory and thrombin inhibitory effects of quercetin in COVID-19 should be considered.[38] The rate of quercetin use was very low, and it was determined that only one nurse took it.

Co-Q10 is a cell protective supplement effective on mitochondrial dysfunction and useful in cardiovascular diseases and obesity. Studies have revealed that Co-Q10 has anti-inflammatory and antioxidant effects. It reduces viral load and has been suggested as adjuvant therapy in infectious diseases.[39] Six participants (three doctors, one nurse, and two secretaries) stated that they use it.

The endogenous platelet CoQ10 level decreased in patients after COVID-19. Mitochondrial support is suggested, assuming this may partially block electron transfer in the respiratory chain, resulting in decreased adenosine triphosphate (ATP) production. Platelet mitochondrial function and CoQ10 content may be useful post-COVID-19 health biomarkers.[40]

Based on evidence confirming the ability of glutathione to inhibit viral replication and lower IL-6 levels in human immunodeficiency virus (HIV) and tuberculosis patients, as well as the beneficial effects of GSH on other lung diseases, it has been suggested that its liposomal form may be beneficial in patients with COVID-19.[41] Only two physicians in our study group stated that they used GSH.

GSH and NAC may be beneficial in the prophylaxis and treatment of SARS-Cov-2 with their antioxidant, anti-inflammatory, and immunomodulatory properties.[42] The thiols contained in NAC block the angiotensin-converting enzyme 2 (ACE-2) and prevent SARS-CoV-2 from entering the cells. The benefit of oral intake in influenza-like illnesses has been demonstrated. Moreover, high-dose IV NAC could be expected to play an adjuvant role in treating severe cases of COVID-19 and controlling complications.[43] NAC can reduce cytokine storm, and its antiviral effect on other respiratory viruses suggests its role in the treatment of COVID-19 is worthy of further investigation.[44] It improved clinically by significantly reducing CRP and ferritin in patients infected with COVID-19 on mechanical ventilator.[45] Six out of 7 people using NAC were doctors.

Oxidative stress is considered to play a pathogenic role in viral infections such as COVID-19. Alpha-lipoic acid (ALA) is one of the most studied and used antiviral natural compounds because it has a well-defined antioxidant and immunomodulatory profile.[46] However, no one in our study group used it.

ASA has both anti-inflammatory and antithrombotic effects. Its antiviral activity has been documented against DNA and RNA viruses, including different human coronaviruses. The use of ASA in patients with different infections has been associated with reduced thromboinflammation, lower complication rates, and in-hospital mortality.[47] In hospitalized

COVID-19 patients, prior ASA therapy was associated with less respiratory support and better in-hospital outcomes.[48] It was observed that those with COVID-19 (+) had used ASA. Seven doctors and two personnel from the participants used ASA.

Grouping some plant foods such as Zn, vitamin D, vitamin C, curcumin, cinnamaldehyde, probiotics, Se, and quercetin in the right combination as supplements strengthens the immune system. It inhibits the progression of the disease to the severe stage by suppressing hyper-inflammation in COVID-19.[49]

Natural products such as ginger, turmeric, cinnamon, and green tea have been proven to have therapeutic benefits against acute respiratory infections. These homemade, inexpensive, easily accessible products can be used prophylactically against COVID-19 while stopping the progression of infection in symptomatic patients. In advanced patients, it can alleviate complications and reduce mortality.[19]

Less anxiety in secretaries can be explained by working from a longer distance to the patient.

The limitations of our study and the forms of use of the products (tea, drops, oral, IV, dermal patch) were asked, but they could not be evaluated since the answers were mixed and not regular. The COVID-19's clinical presentation was not questioned; only the test positivity was based on. Chronic disease types were not questioned. At the time the questionnaire was prepared, no questions were asked in this direction, as the vaccination program had just started for healthcare workers.

CONCLUSION

As a result, all health workers, especially physicians, were experiencing anxiety.

While the presence of comorbid diseases differed significantly between groups with and without COVID-19, rates of anxiety were similar.

Use of vitamin C, prebiotic/probiotic, propolis, and ASA differed significantly between groups with and without COVID-19.

One of the reasons for the low use of supplements may be their cost, but natural herbal products known to be antiviral effective and easily accessible can be preferred for prevention and treatment.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study was carried out with the permission of Diskapi Yildirim Beyazit Training and Research Hospital Ethics Committee (Date: 19.04.2021, Decision No: 109/07).

Informed Consent: All participants signed the free and informed consent form.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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