

# Dietary Supplements Intake During Covid-19 Outbreak In Turkey

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## Abstract

Medicinal herbs have been used since ancient times in the treatment of many diseases. With the sudden spread of Covid-19 and the lack of treatment, many people resorted to using medicinal herbs and dietary supplements to prevent or treat this disease, and this appeared in the increase in the volume of sales of these supplements. The study reviews the opinions of people in Turkey including the extent to which they use dietary supplements, and purpose of use (prevention or treatment). The study inquires about dietary supplements that are most used during that period, and whether there is a relationship between the use of dietary supplements and the personal disposition of the participants. A cross-sectional questionnaire was used to survey the opinions of the participants within the city of Istanbul in Turkey and it was distributed to the participants through social media. The results were analyzed using Microsoft Excel and SPSS. The results show a greater demand among non-Turks (45.8%) to use dietary supplements for the prevention of Covid-19 compared to Turks (32.3%), whereas for the purpose of treatment of the disease, non-Turks were (69.6%) and Turks (42.9%). The results also showed that women (52.0%) used supplements for treatment more than men (45.1%). Holders of higher degrees and the elderly use it more than others. These findings may lead to further investigation in the future about the effect of each dietary supplement separately, taking into account certain factors such as health conditions that may be affected by the use of dietary supplements.

**Keywords:** dietary supplements, medicinal herbs, Covid-19, Turkey

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## Introduction

The Covid-19 crisis is considered one of the largest crises that the world has faced in the modern era in terms of the number of infections and the speed and size of spread in the countries of the world. Since its appearance in Wuhan, China, at the end of 2019, Covid-19 has spread very quickly in most countries of the world (Elhadary, Elhaty, Mohamed, & Alawna). That is why the World Health Organization has classified COVID-19 as a pandemic. As a result, most countries of the world have taken a set of measures to limit the spread of the disease. In March 2020, Turkey took many measures to reduce the number of infections, and the measures were more severe for the elderly because they are the most vulnerable to

serious complications (Mosier, Elhadary, Elhaty, & Safaei, 2020). At the time of preparing this research, the number of injuries and deaths in Turkey reached 15.0 million and 98801, respectively (worldometers, 2022).

As a result of the spread of fear and panic among people at the beginning of the crisis, some of them resorted to protecting themselves through home isolation, use of disinfectants, and taking some medicinal herbs and dietary supplements. The lack of a cure for the disease has made people search for an alternative and found that in popular herbal remedies and dietary supplements. Social networking programs have helped herbal remedies spread and become popular at a large scale in most communities. Many rumors have spread among people about the effectiveness of some herbs, especially with the promotion of stories of individuals who contracted the disease and were treated by these herbs. The demand for medicinal herbs and dietary supplements continued after the emergence of vaccines as a result of the many rumors that circulated about vaccines, which warn people against obtaining them, especially through social media (Islam et al., 2021). As a result, the concerned authorities in Turkey encouraged people to obtain the vaccine by making it obligatory to return to work, study, and conduct some daily transactions. Some studies have shown an increase in the demand for these herbs and dietary supplements as well as popular medicine during the Covid-19 crisis (AlNajrany, Asiri, Sales, & AlRuthia, 2021; Luo et al., 2020; Nguyen, Tran, Pham, Dao, & Dewey, 2021).

Dietary supplements are generally defined as products taken orally that aim to increase one or more nutritional components (El Khoury, Hansen, Tabakos, Spriet, & Brauer, 2020). There are several dietary supplements in the market such as vitamins, minerals, proteins, probiotics, herbs, fish oil and fiber. Because of the widespread belief among many people about the benefits of dietary supplements, their use is steadily increasing, especially vitamins and minerals, as well as amino acids among athletes. The global dietary supplement market size reached around USD 101.38 billion in 2018 and was expected to grow and reach two times that amount in 2020 (approx. USD 220.3 billion), (Hys, 2020). It has been reported that 50-75% of the world's population takes dietary supplements and almost half of those people take them on a regular basis (Cowan et al., 2018; Sekhri & Kaur, 2014).

Some studies have shown the effectiveness of some herbs for the prevention and treatment of some viral diseases such as cold and influenza (Li et al., 2020). Several studies have also shown the effectiveness of some substances extracted from medicinal herbs against previous coronavirus diseases, which are MERS-CoV, and SARS-CoV, such as tannic acid which extracted from black tea showed good efficacy against SARS-CoV (Chen et al., 2005). Dihydrotanshinone extracted from the root of *Salvia miltiorrhiza* which is well known in Chinese popular medicine as well as Griffithsin extracted from *Griffithsia* genus have effective effect against MERS-CoV (Kim et al., 2018; Millet et al., 2016). Several natural compounds extracted from some medicinal herbs such as rhizomes, galangal, ginger, curcuma, *Nigella sativa* seed oil, Liquoric Root, Baical Skullcap Root, Forsythia Fruit, and Bitter Apricot Seed have been studied against COVID-19 (Goswami, Kumar, Ghosh, & Das, 2020; Koshak et al., 2021). It has been shown that medicinal herbs have a clear effect in alleviating severe symptoms and reducing the number of cases admitted to the hospital, as well as reducing the length of stay in the hospital (Li et al., 2020).

In this study, the opinions of people in Turkey were surveyed about the extent of the prevalence of the use of herbs and dietary supplements in the prevention and treatment of Covid-19 infection. A

questionnaire was distributed to employees and students at Gelişim University as well as to some Turkish and foreign residents in Istanbul via social networking programs such as WhatsApp and Telegram.

## Experimental

### Study Design

In this study, a cross-sectional online questionnaire was prepared using Google Form and conducted between August 15, 2021, and August 25, 2021. The questionnaire consisted of 13 questions and is divided into two main parts. The first part is about the characteristics of the respondents (nationality, gender, age, employment status, and educational level). In the second part, the participants were asked about COVID-19 and dietary supplements. The questionnaire is prepared in three different languages: Turkish, English, and Arabic.

### Population and Sample

This study was conducted in Istanbul, Turkey, and involved participants from Istanbul Gelisim University and some Turkish and foreign residents. The questionnaire was distributed to the participants at Istanbul Gelisim University via email and WhatsApp groups while it's distributed to other participants through WhatsApp and Telegram groups. Some of the WhatsApp and Telegram groups respondents live in residential compounds which accommodate both Turks and foreigners. Some groups are ethnic groups, which include certain nationalities. The names of the participants are ignored in this study to protect the privacy of the participants.

### Data analysis

All responses whether in Turkish, English, or Arabic of the participants were collected and analyzed using SPSS Version 25 software. The choices were converted into numerical values for ease of calculations and analysis. The descriptive statistics of the participants such as frequencies and percentages were presented.

### Results and Discussion

This study aimed to investigate the prevalence of dietary supplements usage in Turkey during COVID-19 outbreak using a cross-sectional questionnaire (Table 1). Among the 600 participants who completed the survey, 72.3% are Turkish and 27.7% are non-Turkish. Of these participants 54.7% are males and 45.3% are females, and the majority of the participants are between the ages of 21 and 30 years with a percentage of 49.3%, followed by those over 40 years old with a percentage of 31.7%, then 31-40 years old (10.7%) and less than 20 years old (8.3%). Most of the participants are employees (45.0%), followed by students (42.3%), and the rest (12.7%) do not work. The levels of educational qualifications of participants vary, and most of them hold a bachelor's degree (53.3%) and the rest have a high school (27.3%), a doctorate (10.3%), a master's degree (8.0%) and below secondary school (1.0%) as shown in Table 2.

**Table 1.** Mean and standard deviation of participants' responses on the questionnaire (n=600).

Question	Mean	SD
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<b>Q1</b>	Nationality		
<b>Q2</b>	Gender		
<b>Q3</b>	Age		
<b>Q4</b>	Occupation		
<b>Q5</b>	Education level		
<b>Q6</b>	Do you think that COVID-19 is a disease and may cause of death?	4.3	0.82
<b>Q7</b>	Do you think that dietary supplements may protect against COVID-19?	3.4	0.96
<b>Q8</b>	Do you think that dietary supplements may help recovering from COVID-19?	3.3	0.96
<b>Q9</b>	Have you had COVID-19?	1.3	0.47
<b>Q10</b>	If you had COVID-19, did you take dietary supplements besides medications?	1.3	0.48
	Which dietary supplements did you take?		
<b>Q11</b>	(Honey, black seed, garlic, lemon, anise, cinnamon, ginger, turmeric, clove, vitamin D, vitamin C, vitamin K, fish oil, omega-3, zinc, selenium, probiotic)		
<b>Q12</b>	Have you taken dietary supplements to protect yourself against COVID-19?	1.3	0.43
	Which dietary supplements did you take?		
<b>Q13</b>	(Honey, black seed, garlic, lemon, anise, cinnamon, ginger, turmeric, clove, vitamin D, vitamin C, vitamin K, fish oil, omega-3, zinc, selenium, probiotic)		

Response scale: 1 = Strongly Disagree; 2 = Disagree; 3 = Maybe; 4 = Agree and 5 = Strongly Agree.

Response scale: 1 = No; 2 = Yes.

**Table 2.** Socio-demographic profile of the participants (n=600).

Variable		Frequency	Percent
<b>Nationality</b>	Turkish	434	72.3%
	Non-Turkish	166	27.7%
<b>Gender</b>	Male	328	54.7%
	Female	272	45.3%
<b>Age</b>	Under 20	50	8.3%
	21 - 30	296	49.3%
	31 - 40	64	10.7%
	Over 40	190	31.7%
<b>Occupation</b>	Working	270	45.0%
	Not working	76	12.7%
	Student	254	42.3%
<b>Education</b>	Less than high school	6	1.0%
	High school	164	27.3%

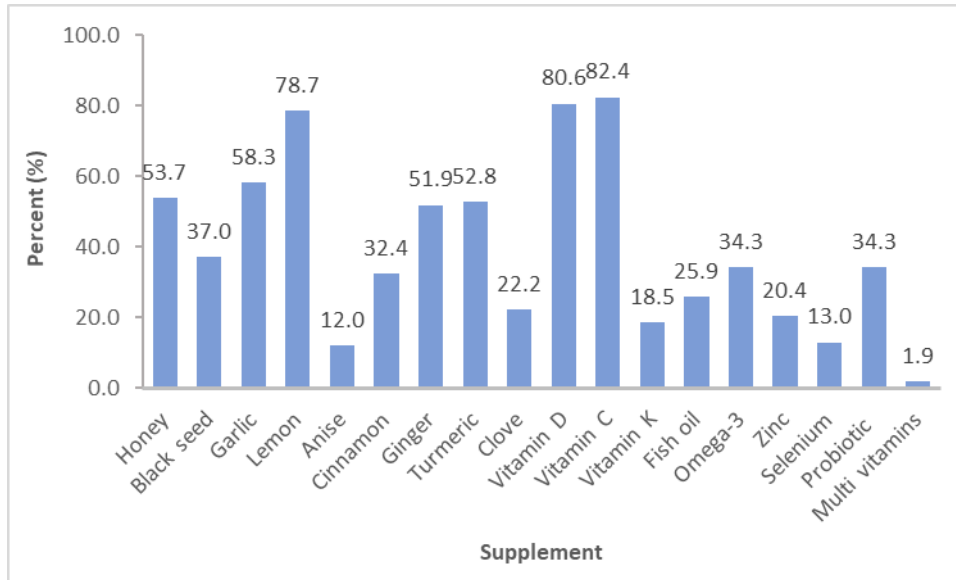
Bachelor	320	53.3%
Master	48	8.0%
Doctorate	62	10.3%

The results show that most of the participants were not affected by the media campaigns that spread via the internet and social media, as well as some satellite channels to question the nature of COVID-19 pandemic and claim that it is a conspiracy and its effect is small on the health of the patient, as 79.6% of the participants agreed that Covid-19 is a disease that may lead to death. Therefore, the belief in the danger of Covid-19 may push people to avoid infection, for example, by using dietary supplements that raise the body's immunity. Besides, the lack of medicine for the disease may urge the infected to use medicinal herbs and some foods in addition to dietary supplements. 44.6% of the participants believe that dietary supplements can prevent Covid-19 infection while 48.0% of them believe that it can treat infection as shown in Table 3.

**Table 3.** Participants' responses on agree/disagree questions (n=600).

	Strongly disagree	Disagree	Maybe	Agree	Strongly agree
<b>Q6</b>	0 (0.0 %)	10 (1.7%)	112 (18.7%)	170 (28.3%)	308 (51.3%)
<b>Q7</b>	36 (6.0%)	30 (5.0%)	266 (44.3%)	200 (33.3%)	68 (11.3%)
<b>Q8</b>	46 (7.7%)	36 (6.0%)	230 (38.3%)	252 (42.0%)	36 (6.0%)

The results show that there is a greater demand among non-Turkish (45.8% ) for dietary supplements for the purpose of preventing infection, while it was 32.2% among Turkish participants and there is no clear reason for this difference between the two parties over the demand of supplements. The reason may be due to the fear of non-Turks of contracting the disease because of the lack of health insurance for many of them, although the state provided free examination and treatment for all. In addition, the percentage of taking dietary supplements among women (41.9%) is greater than that of men (31.1%), and this may be due to the different psychological nature of the two parties. This demand for dietary supplements is consistent with what was published in one of the studies, where the sales of dietary supplements was increased by 44.0% after several weeks of the first wave of outbreak of the disease compared to the same period the year before (Lordan, 2021). Some published studies show that there is a high demand for the use of dietary supplements to prevent Covid-19, as the percentage of those who took these supplements, for example, reached 64.0% in Saudi Arabia (AlNajrany, Asiri, Sales, & AlRuthia, 2021), and 37.7% in China (Zhao et al., 2020). In this study, the results show that 36.0% of participants have taken dietary supplements to protect themselves from Covid-19 infection. It is worth mentioning here that the greatest demand for vitamin C was either as a dietary supplement (82.4%) or as a lemon fruit (78.7%), followed by vitamin D (80.6%). The rest of supplements and medicinal herbs came as follows: garlic (58.3%), honey (53.7%), turmeric (52.8%), ginger (51.9%), black seed (37.0%), omega-3 (34.3%), probiotic (34.3%), cinnamon (32.4 %), fish oil (25.9%), clove (22.2%), zinc (20.4%), vitamin K (18.5%), selenium (13.0%), anise (12.0%) and multivitamins (1.9%) as shown in Figure 1.



**Figure 1.** The most common dietary supplements and herbal medicine used in Turkey during COVID-19 pandemic for protection (n=600).

There is a slight difference between Turks and non-Turks in the use of dietary supplements to prevent Covid-19, as vitamin C and vitamin D came first among Turks with a percentage (90.0%), then lemon (80.0%), garlic (60.0%) and honey (50.0). % and in the case of non-Turks, lemon was the most used (78.8%), then vitamin D (66.7%), vitamin C (63.6%), and honey in the same proportion.

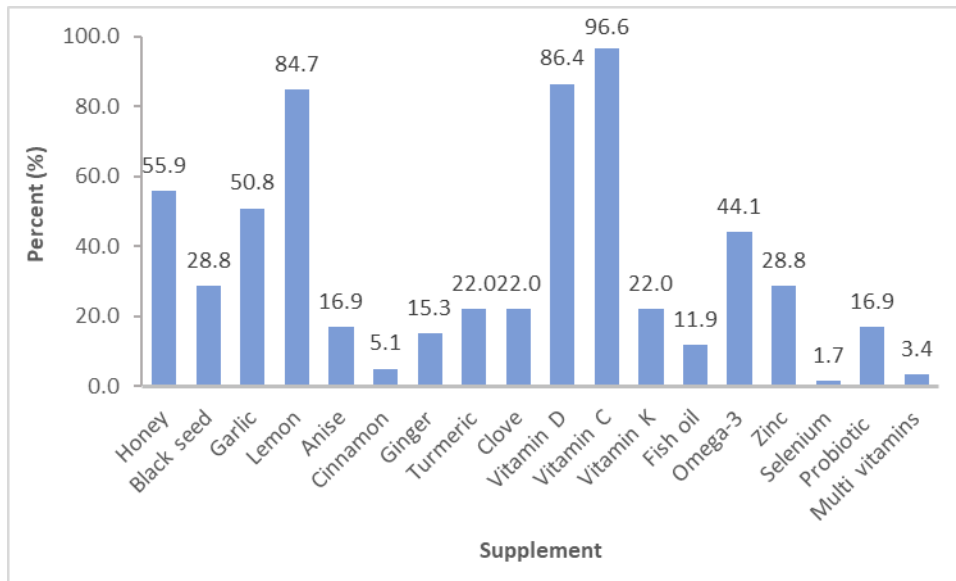
The study shows that 40.3% of the participants have been infected with Covid-19, and 47.9% of them have resorted to dietary supplements in addition to medicines to be cured of this disease. The use of dietary supplements by women (52.0%) was greater than that of men (45.1%), and the use of dietary supplements by non-Turks (69.6%) was greater than that of Turks (42.9%). This difference can be explained by the aforementioned reasons in the case of disease prevention. The results show a somewhat greater tendency to use dietary supplements with increasing age, as the percentage of those under 20 years of age who took food supplements for treatment reached 12.5% and those over 40 years reached 48.9%. The psychological pressure to return to work may explain the increase in the percentage of employees who received dietary supplements (65.2%) compared to those who did not have a job (14.3%). The results also show a high percentage also among master's holders (100%) and doctorate (62.5%) compared to others as shown in Table 4.

**Table 4.** The number and percentage of participants used dietary supplements for treatment and protection (n=600).

Variable	Infected, n, %	Take DS (Treatment), n, %	Take DS (Protection), n, %
<b>Nationality</b>	242 (40.3)	116 (47.9)	216 (36.0)
Turks	196 (45.2)	84 (42.9)	140 (32.3)
Non-Turks	46 (27.7)	32 (69.6)	76 (45.8)
<b>Gender</b>			
<b>Male</b>	142 (43.3)	64 (45.1)	102 (31.1)

	Turks	112 (50.0)	42 (37.5)	56 (25.0)
	Non-Turks	30 (28.8)	22 (73.3)	46 (44.2)
	<b>Female</b>	100 (36.8)	52 (52.0)	114 (41.9)
	Turks	84 (40.0)	42 (50.0)	84 (40.0)
	Non-Turks	16 (25.8)	10 (62.5)	30 (48.4)
<b>Age</b>	Under 20	16 (32.0)	2 (12.5)	20 (40.0)
	21 - 30	92 (31.1)	34 (37.0)	104 (35.1)
	31 - 40	40 (62.0)	34 (85.0)	38 (59.4)
	Over 40	94 (49.5)	46 (48.9)	54 (28.4)
<b>Occupation</b>	Working	92 (34.1)	60 (65.2)	74 (27.4)
	Not working	42 (55.3)	6 (14.3)	18 (23.7)
	Student	108 (42.5)	50 (46.3)	124 (48.8)
<b>Education</b>	Less than high school	2 (33.3)	0 (0.0)	4 (66.7)
	High school	30 (18.3)	16 (53.3)	86 (52.4)
	Bachelor	158 (49.4)	66 (41.8)	80 (25.0)
	Master	4 (8.3)	4 (100)	10 (20.8)
	Doctorate	48 (77.4)	30 (62.5)	36 (58.1)

Vitamin C, whether as a dietary supplement, was the most used among the dietary supplements by (96.6%) or lemon fruit (84.7%), followed by vitamin D (86.4%), honey (55.9%), garlic (50.8%), omega-3 (44.1%), black seed (28.8%), zinc (28.8%), turmeric (22.0%), cloves (22.0%), vitamin K (22.0%), probiotic (16.9%), anise (16.9%), ginger (15.3%), fish oil (11.9%), cinnamon (5.1%), multivitamins (3.4%), and selenium (1.7%) as shown in the Figure 2.



**Figure 2.** The most common dietary supplements and herbal medicine used in Turkey during COVID-19 pandemic for treatment (n=600).

Vitamin C as a dietary supplement or lemon was the most used among the Turks participants (83.3% for both) followed by vitamin D (66.7%) and then honey and garlic (50.0% for both). And almost non-Turks had the same orientation, where vitamin C came in the first place, whether it was in the form of lemon (87.5%) or as a food supplement (81.3%), then vitamin D (76.0%) and then honey (68.8%). The study shows the use of dietary supplements was high among Turkish and non-Turkish from all sectors of society whether for prevention or treatment of Covid-19. The reason may be due to the large number of researches that have been published on the effectiveness of these supplements. Moreover, it may also be due to the lack of a therapeutic alternative before the emergence of vaccination, and also because of the fear of infection or transmission of infection to family and loved ones. The effectiveness of some dietary supplements against COVID-19 has been studied in many published studies. Vitamin C is considered one of the most studied dietary supplements for its positive effect on public health and its use since ancient times in the treatment of colds, as it plays an important role in strengthening the immune system (Carr & Rowe, 2020; Cerullo et al., 2020). Vitamin D is an important supplement in the prevention and treatment of COVID-19 due to its role in immune health as well as as an antiviral. It is also believed that there is a link between vitamin D deficiency and infection with COVID-19 (Lau et al., 2020; Martineau & Forouhi, 2020). The omega-3 supplement also showed the ability to reduce the Covid-19 infection in a study conducted in several countries, and the highest was in the United States of America, where the percentage reached 21% (Louca et al., 2021). In the same study, the use of probiotics reduced the rate of HIV infection by 37.0% in America (Louca et al., 2021). Although some previous studies suggested that zinc and garlic have a role in supporting the immune system and preventing respiratory diseases (Calder, 2020), and one study found a decrease in zinc in Covid-19 patients compared to healthy people (Jothimani et al., 2020), but one recent study has demonstrated that neither has a role in the prevention of COVID-19 (Louca et al., 2021).

Despite the importance of the study in surveying the opinions of society groups in Turkey about the use of dietary supplements for the prevention or treatment of Covid-19, there are some limitations in the study and we hope to examine it in other studies. As the study was conducted in Istanbul only, its generalization to the rest of the country may be a cause for questioning, and the questionnaire is a cross-sectional questionnaire and it was distributed through social media programs. Therefore, it may not be without impartiality. Also, in this study, we did not consider other factors such as health status that may affect the use or non-use of dietary supplements and thus affect the results of the study.

## **Conclusion**

Several studies have shown a clear increase in sales of dietary supplements with the onset of COVID-19 in most countries of the world, including Turkey. This was helped by the lack of a specific treatment for the disease. Therefore, these supplements have been used to prevent, treat or relieve symptoms associated with the disease. The study aims to survey the opinions of people in Turkey about the extent to which they use dietary supplements and what dietary supplements are most commonly used to prevent or treat disease. The study was conducted in Istanbul, Turkey, by distributing a cross-sectional survey to participants via social media, and the results were analyzed using Microsoft Excel and SPSS.



The results show that non-Turks (45.8%) used dietary supplements for the prevention of COVID-19 while Turks (32.3%), and also in the treatment of the disease, the percentage of non-Turks (69.6%) was greater than in the case of the Turks (42.9%). The results also showed a greater turnout of women (52.0%) for supplementation for treatment compared to men (45.1%), as well as a greater turnout of graduate degree holders and the elderly compared to others. These results can be built on by studying the effect of each dietary supplement separately in the future, whether for the prevention or treatment of Covid-19, in order to develop the manufacture of these dietary supplements.

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