

# Comparison of Vitamin and Mineral Usage Status of Patients Applying to Family Health Centers Before and After Covid-19

## ABSTRACT

**Objective:** Our aim in this study was to determine how the coronavirus disease 2019 (COVID-19) pandemic affects the use of vitamins and minerals and to determine the level of vitamin and mineral use compared with that in the pre-COVID-19 period.


**Methods:** Our study is a cross-sectional descriptive study and was conducted with 306 volunteer participants over the age of 18 who applied to three different family health centers (FHCs) in Erzincan city center between February and April 2023. A survey of 25 questions was prepared and administered to the participants.

**Results:** In our study, regular vitamin and mineral use (20.6%) was found to be low, but the use approximately doubled in cases of illness (39.9%). Additionally, vitamin and mineral use during the COVID-19 pandemic (56.7%) was higher than the rate used while currently ill. The percentage of participants who said that they did not use vitamins or minerals without consulting their doctor was 75.2%. These participants again stated that it is necessary to check the blood levels of vitamins and minerals (77.4%) and that too much is harmful (81%). A total of 84.3% of the participants said that they expected vitamins and minerals to be prescribed by the doctor when they were sick. Those who used vitamins and minerals before and during the COVID-19 pandemic claimed that their use of vitamins and minerals increased in the post-COVID-19 period as well. In addition, the percentage of women who reported that the COVID-19 pandemic increased their use of vitamins and minerals was greater than that of men.

**Conclusions:** In our study, the use rates of vitamins and minerals, which are known to have effects on many systems, especially the immune system, were low before the COVID-19 pandemic but increased during the post-pandemic period. To improve health and maintain well-being, deficiencies in vitamins and minerals should be replaced, and patients should be more informed of these issues.

**Keywords:** COVID-19, Use of vitamins, Supplementary minerals, Immunity supplements, Health behaviors

**Mercan YAĞIZ KARATAŞ<sup>1</sup>**   
Family Medicine, Provincial Health Directorate,  
Elazığ, Türkiye

**Hatice ÇAKIR<sup>2</sup>**   
Department of Anatomy, Faculty of Medicine,  
Erzincan Binali Yıldırım University, Erzincan,  
Türkiye



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### Corresponding author:

Hatice ÇAKIR

**E-mail:** dr.haticecakir24@gmail.com

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## INTRODUCTION

The COVID-19 pandemic has spread rapidly around the world since late 2019, becoming a global health crisis. This unique situation has affected individuals' health-related behaviors and habits, leading to changes in topics such as nutrition and supplement intake.<sup>1,2</sup> In particular, the use of vitamin and mineral supplements to strengthen the immune system has become a popular topic during the pandemic.<sup>3</sup>

Many individuals have explored the potential benefits of vitamins and minerals in the search for prevention and treatment strategies against COVID-19.<sup>4,5</sup> In particular, substances known for their immune-supporting properties, such as vitamin D, vitamin C, zinc, and selenium, have attracted widespread interest.<sup>6,7</sup>

Studies worldwide have shown that COVID-19 patients are malnourished and have deficiencies in some nutrients, such as vitamins C, D, and B12, selenium, iron, omega-3, and medium- and long-chain fatty acids.<sup>8,9</sup> These findings emphasize the potential health effects of vitamins and minerals in preventing infection-related mortality and morbidity.

As a result of this interest, many individuals have begun consuming supplements containing these substances or have increased their current consumption.<sup>4,10</sup> However, issues such as whether these supplements truly have a protective or therapeutic effect against the disease, at what dose and for how long they should be used, possible side effects and interactions, and possible misuse after the pandemic have not yet been sufficiently investigated.

Therefore, this study aimed to determine the current vitamin and mineral utilization levels of patients after the COVID-19 pandemic and to examine whether the pandemic affected vitamin and mineral utilization.

## METHODS

The study was cross-sectional and descriptive and was conducted with volunteers aged 18 years and over who applied to three different family health centers in Erzincan Province between February and April 2023. Informed consent was obtained from the participants.

In this study, individuals who applied to three different family health centers in the Erzincan city center between February and April 2023, who were 18 years of age or older, and who voluntarily agreed to participate in the study were included. Those who were not included in the study were those under the age of 18, those who refused to participate in the study, those who could not complete the questionnaire, and individuals who may have affected the immune system due to chronic disease or continuous treatment.

This study was approved by the Erzincan Binali Yıldırım University Clinical Research Ethics Committee on January 19, 2023, with approval number 2023-02/2. All procedures performed in the study were in accordance with the ethical standards of the institutional and national research committees and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

In this study, a questionnaire consisting of 25 questions prepared by the researchers by reviewing the literature and questioning the demographic data and vitamin and mineral usage status of the participants was applied face-to-face.

There are sources in the literature that recommend reaching 10 times as many people as the number of items in the questionnaire when determining the sample volume in cross-sectional studies.<sup>11</sup> In this context, considering the 10% data loss, a minimum of 275 people were planned to be interviewed, and a total of 306 people were included in the study.

Statistical analyses were performed by the researchers, and SPSS Statistics 23 (IBM SPSS Corp., Armonk, NY, USA) software was used. Descriptive analyses were performed, and nominal variables are presented as the number of cases (n) and percentage (%). The chi-square test was used to compare two categorical datasets.

The statistical significance level was set at  $P < .05$ .

## RESULTS

A total of 306 participants, 44.1% male (n=135) and 55.9% female (n=171), with a mean age of 37.58 years (min=18, max=86), were included in the study. Among the participants, 40% (n=95) were primary-secondary school graduates, 27.5% (n=84) were high school graduates, 37.9% (n=116) were university graduates, and 3.6% (n=11) were illiterate.

While the percentage of those who did not receive vitamin-mineral support before the COVID-19 pandemic was 60.8% (n=186 people), this percentage decreased to 28.4% (n=87) after the pandemic, but the difference was not statistically significant ( $P = .606$ ). We questioned whether the participants were currently actively using vitamins and minerals and whether they used vitamins and minerals when they were ill, during pregnancy, and during the pandemic. When the answers were evaluated, 79.4% of the respondents did not use vitamins regularly, 60.1% of the respondents did not use vitamins and minerals when questioned about vitamin mineral use when ill, and 73% of the respondents used vitamins and minerals when questioned about use during pregnancy. It was observed that 60.8% of those who did not use vitamins and minerals before the COVID-19 pandemic; 56.7% of those who used vitamins and minerals while having COVID-19 infection. The answers of the participants to the questions about their vitamin and mineral utilization status are given in Table 1.

**Table 1:** Vitamin and mineral utilization status of the participants

		n	%
Are you currently using vitamins and minerals regularly?	Yes	63	20.6
	No	243	79.4
Do you use vitamins and minerals when you are sick?	Yes	122	39.9
	No	184	60.1
Did you use vitamins and minerals during your pregnancy?	Yes	73	73
	No	27	27
Have you had a COVID-19 infection before?	Yes	134	43.8
	No	172	56.2
Were you taking vitamin-mineral supplements before the COVID-19 pandemic?	Yes	120	39.2
	No	186	60.8
Did you use vitamins and minerals while having a COVID-19 infection?	Yes	76	56.7
	No	58	43.3
What are the vitamin-mineral supplements that you use regularly or irregularly?	Vitamin C only	40	13.1
	Iron Only	29	9.4
	Vitamin B12 only	23	7.5
	Vitamin D only	18	5.8
	Only Other	5	1.6
	I use two or more of these	104	33.9
Do you use vitamins-minerals without consulting your doctor?	Yes	76	24.8
	No	230	75.2

While 76.5% (n=234) of the participants agreed/completely agreed that vitamins were useful in the treatment of diseases, the percentage of those who expected to be prescribed vitamins and minerals by the doctor when they were sick was 84.3%

(n=258). Participants' knowledge and attitudes about vitamins and minerals were questioned. The answers of the participants to the attitude questions about vitamin and mineral use are given in Table 2.

**Table 2:** Respondents' answers to attitude questions about vitamin-mineral use

		n	%
Vitamins are useful in the treatment of diseases	Totally agree	82	26.8
	Agree	152	49.7
	I'm undecided	48	15.7
	I disagree	11	3.6
	Completely disagree	13	4.2
Vitamins are useful in preventing diseases	Totally agree	77	25.1
	Agree	166	54.2
	I'm undecided	40	13.1
	I disagree	13	4.2
	Completely disagree	10	3.3
It is necessary to look at the blood level of vitamins and minerals	Totally agree	102	33.3
	Agree	135	44.1
	I'm undecided	39	12.7
	I disagree	19	6.2
	Completely disagree	11	3.6
An excess of vitamins and minerals is harmful	Totally agree	94	30.7
	Agree	154	50.3
	I'm undecided	32	10.5
	I disagree	16	5.2
	Completely disagree	10	3.3
My family doctor tells me about vitamins and minerals.	Totally agree	97	31.7
	Agree	131	42.8
	I'm undecided	44	14.4
	I disagree	24	7.8
	Completely disagree	10	3.3
When I am sick, I wait for the doctor to prescribe vitamins and minerals	Totally agree	106	34.6
	Agree	152	49.7
	I'm undecided	27	8.8
	I disagree	13	4.2
	Completely disagree	8	2.6

Among the 86 women (n=48) and 48 men (n=28) who had COVID-19, 55.8% (n=48) and 58.3% (n=28) used vitamin-mineral supplements during infection, and there was no statistically significant difference between them ( $P=.778$ ). It was questioned whether there was a change in the rate of vitamin and mineral

use during the COVID-19 pandemic and what they thought about the disease when it was used during this period. The relationships between the increase in vitamin and mineral use and various parameters during the COVID-19 pandemic are presented in Table 3.

**Table 3.** Effects of the COVID-19 pandemic on various parameters related to vitamin and mineral use

		Has the COVID-19 pandemic increased the use of vitamins and minerals?			P
		Increased	Reduced	Did not impress	
Gender	Woman	111 (64.9%)	11 (6.4%)	49 (28.7%)	<.001
	Male	58 (43%)	21 (15.6%)	56 (41.5%)	
Education	Illiterate, primary-secondary school	52 (49.1%)	9 (8.5%)	45 (42.5%)	<.001
	High School	37 (44%)	15 (17.9%)	32 (38.1%)	
	University	80 (69%)	8 (6.9%)	28 (24.1%)	
Were you taking vitamin mineral supplements before the COVID-19 pandemic?	Yes	82 (68.3%)	10 (8.3%)	28 (23.3%)	.001
	No	87 (46.8%)	22 (11.8%)	77 (41.4%)	
Have you had COVID-19?	Yes	81 (60.4%)	11 (8.2%)	42 (31.3%)	0.230
	No	88 (51.2%)	21 (12.2%)	63 (36.6%)	
Did you use vitamins and minerals while having COVID-19?	Yes	61 (80.3%)	4 (5.3%)	11 (14.5%)	<.001
	No	20 (34.5%)	7 (12.1%)	31 (53.4%)	
Are you currently using regular vitamins and minerals?	Yes	45 (71.4%)	1 (1.6%)	17 (27%)	.004
	No	124 (51%)	31 (12.8%)	88 (36.2%)	
Do you use vitamins and minerals when you are sick right now?	Yes	88 (72.1%)	5 (4.1%)	29 (23.8%)	<.001
	No	81 (44%)	27 (14,7%)	76 (41.3%)	

## DISCUSSION

This study revealed a significant increase in vitamin and mineral supplement use during the COVID-19 pandemic, reflecting increased awareness of their potential benefits. Despite this, the statistical analysis revealed no significant difference in usage compared with pre-pandemic levels. Many participants believed in the efficacy of these supplements for disease prevention and treatment. Demographic differences were noted, with women and higher-educated individuals being more likely to increase their usage. These findings highlight the need for clear public health guidelines on the effective and safe use of vitamin and mineral supplements.

In our study, the prevalence of the regular use of vitamins and minerals (20.6%) was low, but the prevalence of their use (39.9%) approximately doubled in cases of illness. In a study conducted by Coskun et al. in Istanbul, 34.6% of the study group used vitamins regularly, 40.8% used vitamins occasionally, 35.2% of the people stated that they used vitamins because they felt tired, 31% because they did not have a balanced diet, and 22% because their doctor recommended it.<sup>12</sup> In addition, in our study, the use of vitamins and minerals while having COVID-19 (56.7%) was found to be higher than the rate used while currently ill. This may be attributed to the fact that vitamin and mineral supplementation (vitamin D and vitamin C) is important in the treatment of COVID-19.

When the most frequently used vitamins and minerals were

analyzed, vitamin C (13.1%) was the most frequently used vitamin and mineral. However, vitamin D levels are very low in our country, and the utilization rate is expected to be relatively high. Despite this, the low rate of vitamin D utilization (5.8%) was surprising. However, the use of more than one vitamin or mineral (33.9%) was more common than single use. Therefore, since vitamins and minerals other than vitamin D are used, the rate of vitamin D utilization may be higher overall. In addition, the number of participants who did not use any vitamins or minerals was undeniably high (28.4%).

In our study, 75.2% of the participants stated that they did not use vitamins or minerals without consulting their doctor. The majority of the participants thought that vitamins and minerals are useful in the prevention and treatment of diseases. These participants also stated that it is necessary to check the blood levels of vitamins and minerals (77.4%) and that too much is harmful (81%). A total of 84.3% of the participants said that they expected vitamins and minerals to be prescribed by a doctor when they were ill. As such, doctors should inform their patients about vitamin and mineral support during periods of illness and disease prevention. In addition, another reason why the rate of vitamin and mineral use during the COVID-19 period was higher than the rates of vitamin and mineral use while currently ill may be that these supplements are recommended to every patient by doctors and healthcare professionals in COVID-19 treatment. Therefore, vitamins and minerals are also evaluated as medicines by patients, and physician support should be given in terms of

correct use. The majority of the participants (74.5%) stated that their family physician informed them about vitamins and minerals, but a contradiction was found between this answer and the other answers when the situations listed above and their usage status were considered.

In our study, a statistically significant difference was found between the answers of women and men to the question about the effect of the COVID-19 pandemic on vitamin and mineral use ( $P < .001$ ). The majority of women (64.9%) stated that the COVID-19 pandemic increased the use of vitamins and minerals. However, a study by Bulbul et al. revealed that vitamin use did not differ according to the presence of a health problem or sex.<sup>13</sup>

This study revealed that pre-pandemic vitamin and mineral users were more likely to report increased use during the COVID-19 pandemic, reflecting greater receptiveness among those familiar with supplementation. A significant difference was observed between supplement use during COVID-19 infection and the pandemic's impact ( $P < .001$ ), with 80.3% of those using supplements during infection reporting increased use. Additionally, both current regular supplement users and those using supplements when ill reported significant increases due to the pandemic ( $P = .004$  and  $P < .001$ , respectively). These findings align with previous research and highlight the pandemic's role in promoting supplement use as a perceived protective measure, underscoring the need for clear public health guidelines.<sup>14</sup>

When the female participants in our study who had a history of pregnancy were asked about their vitamin and mineral use, 73% of them took vitamin and mineral supplements during pregnancy. This may be associated with the regular follow-up of pregnant women by family physicians and the provision of vitamin and mineral supplements free of charge. Similarly, it has also been reported in the literature that vitamin and mineral use during pregnancy is high and is supported by health services.<sup>15</sup> This finding emphasizes the effectiveness of prenatal care services and the access of pregnant women to nutritional supplements.

### Limitations

This study has several limitations. The cross-sectional design limits causality assessment between the pandemic and supplement use changes. Self-reported data may introduce recall and social desirability biases. The use of samples from three health centers in Erzincan limits generalizability. Other influencing factors, such as socioeconomic status and healthcare access, were not considered. Additionally, the survey did not specify supplement types or brands, which could provide more detailed insights. Future research should use longitudinal designs, larger and more diverse samples, and detailed data collection methods.

### CONCLUSION

In conclusion, in our study, while the rate of use of vitamins and minerals, which are known and proven to affect many systems, especially the immune system, was low before the COVID-19 pandemic, it increased in the post-pandemic period. Doctors, especially family physicians, have a great job for proper and

correct use. To improve health and maintain well-being, deficiencies in vitamins and minerals should be replaced, and patients should be informed more about these issues.

**Ethics Committee Approval:** Erzincan Binali Yıldırım University, Clinical Research Ethics Committee, date: 19.01.2023, number no: 2023-02/2.

**Informed Consent:** Informed consent was obtained from the participants.

**Peer-review:** Externally peer-reviewed.

**Author Contributions:** Concept – MYK, HC; Design - MYK, HC; Supervision – MYK, HC; Resources - MYK, HC; Materials – MYK, HC; Data Collection and/or Processing – MYK, HC; Analysis and/or Interpretation MYK; Literature Search – MYK, HC; Writing Manuscript - MYK, HC; Critical Review - MYK, HC.

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

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