Acta Scientific NUTRITIONAL HEALTH (ISSN:2582-1423)

Volume 6 Issue 4 April 2022

Research Article

Vitamin, Mineral and Dietary Supplement Use of Adults Before and After Covıd-19 Period

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DOI: 10.31080/ASNH.2022.06.1031

Received: March 10, 2022

Published: March 24, 2022

Abstract

Introduction: Coronavirus (Covid-19) is a pandemic, affecting lifestyle, healthcare system, national and worldwide economy. Along with social isolation, we are experiencing the physiological and psychological effects of Covid-19. The immune system can be strengthened by differentiating dietary habits.

Method: The study was distributed over social media through a questionnaire consisting of 29 questions prepared with Google forms between September 2020 and January 2021. In this study, the pre-Covid-19 period is defined as the period until 31.12.2019, and the post-Covid-19 period is defined as the period after 01.01.2020.

Results: The individuals participating in the study were 84.9% women and 15.1% men. The average age of the women, men and all the participants in order were 32.2 ± 11.03, 38.1 ± 11.09 and 33.2 ± 11.20 years. The use of supplementation by individuals has increased during the Covid-19 period. The reason 'increase immunity' for using mineral, vitamin and nutrition support in order was 34.1%, 40.4% and 39.7% after Covid-19. While vitamin C was never used before Covid-19, it was determined that the use of some vitamins and nutritional supplements, especially vitamin C, increased.

Discussion: Vitamin C deficiency impairs immune function and increases susceptibility to infections. People with low vitamin C status might benefit more from vitamin C supplementation than those who already obtain sufficient vitamin C In this study, there was a great increase for taking vitamin C. The participants began to use vitamin C for increase the immune system, and participants began using vitamin with the healthcare professional advice after Covid-19. Participants used vitamin C without knowing their vitamin level.

Conclusion: However, scientific evidence regarding the prevention of chronic diseases by routine use of micronutrients is insufficient, it has been seen that participants decided to use supplementations with but especially without healthcare professional advice.

Keywords: Covid-19; Supplementation; Vitamin C; İncrease İmmunity

Introduction

Vitamins and minerals are essential for healthy development, they are necessary in the prevention of diseases and in maintaining health. In general, although the requirement for all vitamins and minerals is in very small quantities, they must be taken from the outside as they cannot be produced in the body. Vitamin and mineral deficiencies still affect at least half of the children aged 5 and under in the world [1].

Coronavirus (Covid-19) is a pandemic affecting lifestyle, healthcare system, national and worldwide economy. Along with social

isolation, we are experiencing the physiological and psychological effects of Covid-19. Proper nutrition is the basis of maintaining health and improving well-being. In addition, many chronic diseases can be prevented and kept under control with proper nutrition. The immune system can be strengthened by differentiating dietary habits [2].

It has been suggested to use some vitamins and minerals in the treatment of patients with Covid-19 against lung infection. Vitamin A is also known as the anti-infective vitamin. Giving vitamin A to children with vitamin A deficiency reduces mortality from diseases such as measles, measles-related pneumonia, diarrhea, and malaria. The mechanism by which vitamin A and retinoid inhibit measles replication upregulates elements of the innate immune response in uninfected peripheral cells, making them resistant to productive infection during subsequent rounds of viral replication. This suggests that vitamin A may be protective against Covid-19 lung infection [3].

While low serum vitamin D is associated with an increased risk and severity of viral respiratory infections, including community-acquired pneumonia, there is also evidence that vitamin D supplementation that raises serum vitamin D levels above 50 nmol/L may improve this risk. The needs of the elderly with low vitamin D levels should be met [4]. In addition, since vitamin D needs sunlight to become active, vitamin D supplementation is necessary for quarantine [5]. Vitamin D supplementation is related to the decrease in hospital-acquired infections by increasing serum 25-hydroxyvitamin D. It has been stated that the patients and staff in the hospital during the Covid-19 period, take vitamin D to increase the 25 (OH) vitamin D concentration, which is an important step to prevent infection and spread. It has been stated that it may be important for studies to concentrate in this direction [6].

Vitamin C, antimicrobial and natural killer activity affect lymphocyte proliferation chemotaxis. In recent studies, vitamin C supplementation is aimed at improving in Covid-19 patients [7]. Vitamin C has also been cited from insight tests such as sneezing, runny nose, and swollen sinuses, which the community may see as a weak antihistamine agent [6]. Vitamin C is a powerful antioxidant, the positive effects that will include these increased active ingredients [8].

Vitamin E is a vitamin that brings the fat-soluble oxidation damage membrane preparation and development cells against each other. To reduce the use of natural killer cytotoxic pro and macrophagelandin E2 moiety. Vitamin E modulates interferon gamma and interleukin-2. Vitamin E supplementation in malnutrition with Covid-19 may be beneficial [8].

Zinc is a trace element that has an important role in growth, development and maintenance of immune functions. Zinc deficiency increases susceptibility to infections involving viral infections [9]. Zinc supplementation increases the serum zinc level and T-cell count of elderly individuals with home care patients. It has been stated that zinc supplementation to individuals at risk of zinc deficiency may be beneficial in the treatment of Covid-19, although the evidence is limited [8].

While it is not possible to prevent Covid-19 infection with any food or supplement, maintaining physical distance and personal hygiene is the most important method of protection. It is necessary to support the immune system with adequate and balanced nutrition. Consumption of up to 5 servings of vegetables and fruits per day, food variety, use of whole grains, consumption of healthy fats, and prevention of excessive consumption of salt and sugar are the steps to be followed [10].

In cases where the requirements of micronutrients cannot be met by diet, supplementation is recommended. In addition, it has been stated that the requirements are increased; growth, chronic diseases, drug use, malabsorption, pregnancy and lactation period, and dietary intake may be insufficient in old age. However, scientific evidence regarding the prevention of chronic diseases by routine use of micronutrients is insufficient [11].

Method

The study was distributed over social media between September 2020 and January 2021 through a questionnaire consisting of 29 questions prepared with Google forms. In this study, the pre-Covid-19 period is defined as the period until 31.12.2019, and the post-Covid-19 period is defined as the period after 01.01.2020. All literate individuals over the age of 18 participated in the study. 84.9% of the individuals participating in the study were women and 15.1% man. The average age of the women, men and all the participants in order were 32.2 ± 11.03, 38.1 ± 11.09 and 33.2 ± 11.20 years. Obtained quantitative variables were expressed as mean (X), standard deviation (± SD), and qualitative variables were expressed as number (n) and percentage (%). Changes related to the use of supplementation by the participants are shown as the percentage of change. This study was approved by Baskent University Institutional Review Board (Project no: KA20/333) and supported by Baskent University Research Fund. While it was an online questionnaire form, Baskent University Institutional Review Board didn't confirm using informed consent form.

Results

In this study, it was found 25.2% of the participates had chronic diseases. The diseases were 9.8% diabetes mellitus and hyperten-

sion. 18.7% of the participants were using drugs for their chronic illnesses. 35.3% of all participants had vitamin or mineral deficiency, 35.4% of them had vitamin D, 25.4% had Iron, 24.0% had vitamin B_{12} deficiencies. General characteristics of individuals were shown in table1

General characteristics	n	%
Gender		
Woman	118	84.9
Man	21	15.1
Chronic Disease		
Positive *	35	25.2
Diabetes Mellitus	4	9.8
Hypertension	4	9.8
Hyperlipidemia	2	4.9
Rheumatic Disease	3	7.3
Gastrointestinal Disease	1	8.6
Cancer	1	5.7
Obesity	1	2.9
Depression	1	2.9
Other	23	56.1
Negative	104	74.8
Drug Intake		
Using*	26	18.7
Antihypertensive	4	13.8
Cholesterol-lowering	1	3.4
Antirheumatic	1	3.4
Antidepressant	1	3.4
Other	22	75.9
Not Using	113	81.3
Vitamin/Mineral Deficiency		
Positive*	49	35.3
Iron	26	25.4
Zinc	1	1.0
Magnesium	2	2.1
B_{12}	23	24.0
Vitamin D	34	35.4
Folic Acid	9	9.4
Negative	90	64.7

Table 1: General characteristics of individuals.

* Multiple answers.

The reasons for not using vitamin and mineral, dietary supplements before and after the Covid-19 and change percentage were shown on Table 2. The number of participants weren't using mineral, vitamin and nutrition support were 96, 106, 101 respectively before Covid-19. The reason 'no need' for not using mineral, vitamin and nutrition support in order were 87.5%, 72.6% and 89.0% before Covid-19. The number of participants weren't using mineral, vitamin and nutrition support were in order 90, 41, 69 after Covid-19. The reason 'no need' for not using mineral, vitamin and nutrition support in order were 83.3%, 78.1% and 84.1% after Covid-19. The change percentage for not using mineral, vitamin and dietary support were (-6.6%), (-61.3%) and (-31.7%) respectively (Table 2).

	Before		After		
	n	%	n	%	Change %
Mineral*					
No need	84	87.5	75	83.3	-10.7**
Forgetfulness	2	2.1	2	2.2	0
Expensiveness	2	2.1	4	4.5	100
Other	8	8.3	9	10.0	12.5
Total	96	100.0	90	100.0	-6.6**
Vitamin*					
No need	77	72.6	32	78.1	-58.4**
Forgetfulness	22	20.8	2	4.9	-90.9**
Expensiveness	3	2.8	1	2.3	-66.7**
Other	4	3.8	6	14.7	50.0
Total	106	100.0	41	100.0	-61.3**
Dietary supplementation*					
No need	90	89.0	58	84.1	-35.6**
Forgetfulness	4	4.0	2	2.9	-50.0**
Expensiveness	2	2.0	2	2.9	0.0
Other	5	5.0	7	10.1	40.0
Total	101	100.0	69	100.0	-31.7**

Table 2: Reasons for not using vitamin and mineral dietary supplements before and after Covid-19.

* Multiple answers, ** decreased.

The reasons for using vitamin and mineral, dietary supplements before and after the pandemic and change percentage were shown on Table 3. The number of participants were using mineral, vitamin and nutrition support were in order 66, 66, 87 before Covid-19. The reason 'increase immunity' for using mineral, vitamin

and nutrition support in order was 22.2%, 31.8% and 32.8% before Covid-19. The number of participants using mineral, vitamin and nutrition support was in order 44, 161, 141 after Covid-19. The reason 'increase immunity' for using mineral, vitamin and nutrition support in order was 34.1%, 40.4% and 39.7% after Covid-19. The change percentage for using mineral, vitamin and dietary support were 33.3%, 143.9% and 62.1% respectively (Table 3).

	Before		After		
Reasons	**n**	**%**	**n**	**%**	**Change %**
Mineral*					
Healthcare professional advice	24	35.3	-	-	-[α]
Dieting	2	2.9	2	4.5	0
İncrease immunity	15	22.2	15	34.1	0
Be healthier	6	8.8	6	13.6	0
Thinking of insufficient intake	14	20.6	14	31.8	0
Feeling strong	2	2.9	2	4.6	0
Advice from people around	2	2.9	2	4.6	0
Other	3	4.4	3	6.8	0
Total	66	100.0	44	100.0	-33.3**
Vitamin*					
Healthcare professional advice	-	-	31	19.3	-[α]
Dieting	1	1.5	3	1.8	200.0
İncrease immunity	21	31.8	65	40.4	209.5
Be healthier	14	21.2	25	15.5	78.6
Thinking of insufficient intake	15	22.8	21	13.0	40.0
Feeling strong	7	10.6	13	8.1	85.8
Advice from people around	2	3.0	3	1.9	50.0
Other	6	9.1	-	-	
Total	66	100	161	100.0	143.9
Dietary supplement*					
Healthcare professional advice	14	20.9	17	12.1	21.4
Dieting	1	1.5	1	0.7	0
İncrease immunity	22	32.8	56	39.8	154.5
Be healthier	14	20.9	27	19.1	92.8
Thinking of insufficient intake	10	14.9	13	9.2	30.0
Feeling strong	3	4.5	15	10.6	400
Sport	-	-	1	0.7	-[α]
Advice from people around	2	3.0	4	2.8	100
Advertising	-	-	5	3.6	-[α]
Other	1	1.5	2	1.4	100
Total	87	100	141	100	62.1

Table 3: Reasons for using mineral, vitamin, and dietary supplements before and after Covid-19.

* Multiple answers, ** decreased, -[α] can't be calculated.

The minerals, vitamins and dietary supports used after and before Covid-19 were shown in Table 4. The participants who were using minerals number increased from 66 to 85. Usage of zinc percentage changed 86.6%; while iron didn't changed. No participants were using multivitamin or vitamin C before Covid-19, but after Covid-19 32 participant were using multi vitamin and 67 of participants were using vitamin C. Using vitamin D increased 29.6% and the usage of propolis increased 100%. The royal jelly was used by 1 participant before Covid-19, after Covid-19 the number was 21, and the change percentage was 2000% (Table 4).

Discussion

This study was conducted with an online editing questionnaire. Since the study was online, there was no equal distribution in the genders of the participants. Most of the participants are women. It is thought that women are more likely to participate in online surveys.

People require several vitamins and minerals, including vitamin C, vitamin D, and zinc, for proper immune function, and clinical deficiencies of these nutrients can increase susceptibility to infections. Other dietary supplement ingredients, such as botanicals and probiotics, don't have essential roles in the body, but they might affect immune function. Measuring the impact on the immune system of minerals, vitamins, and other dietary supplement ingredients is difficult because the immune system is a complex network of organs, tissues, and cells; no single, straightforward measure of immune system function and resistance to disease exists. Many of these ingredients haven't been studied in people with Covid-19, they might improve immune function and help prevent or reduce symptoms of the common cold, influenza, and other respiratory tract infections [12].

	Before		After		
	n	%	n	%	Change %
Mineral*					
Calcium	4	6.1	7	8.2	75
Magnesium	18	27.3	17	20.0	-5.5**
Zinc	15	22.7	28	32.9	86.6
Iron	19	28.8	19	22.4	0
Multi mineral	6	9.1	10	11.8	66.6
Other	4	6.0	4	4.7	0
Total	66	100.0	85	100.0	28.8
Vitamin*					
Multivitamin	-	-	32	13.9	-[α]
Vitamin D	54	54.0	70	30.4	29.6
Vitamin C	-	-	67	29.2	-[α]
Vitamin B_{12}	26	26.0	24	10.4	-7.7**
Folic acid	5	5.0	13	5.7	160
Vitamin E	1	1.0	5	2.2	400
B complex	3	3.0	10	4.3	233.3
Other	11	11.0	9	3.9	-18.2
Total	100	100.0	230	100.0	130
Dietary supplement*					
Propolis	12	13.8	24	17.0	100
Echinacea	4	4.6	4	2.8	0.0
Beta glucan	5	5.7	30	21.3	500
Omega-3	20	23.0	6	4.3	-70.0**
Pollen	2	2.3	1	0.7	-50.0**
Royal jelly	1	1.1	21	14.9	2000
Turmeric	16	18.4	21	14.9	31.3
Ginger	9	10.4	1	0.7	-88.9
Ginseng	1	1.1	1	1.4	0
Coenzyme Q10	-	-	5	3.5	-[α]
Collagen	-	-	6	4.3	-[α]
Probiotic	17	19.6	20	14.2	17.6
Total	87	100.0	141	100	62.1

Table 4: Mineral, vitamin, and dietary supplements usage before and after Covid-19.

* Multiple answers, ** decreased, -[α] can't be calculated.

Vitamin C plays an important role in both innate and adaptive immunity, probably because of its antioxidant effects, antimicrobial and antiviral actions, and effects on immune system modulators [13-16]. Vitamin C helps maintain epithelial integrity, enhance the differentiation and proliferation of B cells and T cells, enhance phagocytosis, normalize cytokine production, and decrease histamine levels [14]. It might also inhibit viral replication [17]. Vitamin C deficiency impairs immune function and increases susceptibility to infections [14]. Some research suggests that supplemental vitamin C enhances immune function [18], but its effects might vary depending on an individual's vitamin C status [19]. Interest in the use of vitamin C supplements to treat Covid-19 comes from research showing that taking 200 mg/day or more vitamin C supplements on a regular basis helps reduce the duration of the common cold and the severity of its symptoms. Vitamin C's antioxidant action might also help reduce oxidative stress during infections [13,17]. People with low vitamin C status might benefit more from vitamin C supplementation than those who already obtain sufficient vitamin C [19]. In this study, there was a great increase for taking vitamin C. The participants began to use vitamin C for increase the immune system, and participants began using vitamin with the healthcare professional advice after Covid-19. Participants used vitamin C without knowing their vitamin level. Although it was determined that the vitamin C intakes of the individuals participating in the study increased, the relationship between the cases of being infected with Covid-19 could not be questioned. Data are insufficient to support recommendations for or against the use of any vitamin, mineral and dietary supplement ingredient to prevent or treat Covid-19. The dietary supplements marketed for immune health increased after the emergence of Covid-19 because many people hoped that these products might provide some protection from SARS-CoV-2 infection and, for those who develop Covid-19, help reduce disease severity.

Conclusion

It was determined that the use of some vitamins and nutritional supplements, especially vitamin C, increased with the desire to strengthen immunity during the Covid-19 period. However, scientific evidence regarding the prevention of chronic diseases by routine use of micronutrients is insufficient, it has been seen that participant decided to use supplementations with but especially without healthcare professional advice.

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