

ORIGINAL ARTICLE

How Covid 19 Fear Affected Nutritional Support in Healthcare Professionals

Covid 19 Korkusu Sağlık Profesyonellerinde Besin Takviyesi Kullanımını Nasıl Etkiledi

¹Pınar Döner Güner , Hilal Aksoy , Emre Dirican 

¹Hatay Mustafa Kemal University, Faculty of Medicine, Department of Family Medicine, Hatay, Türkiye

²Hacettepe University Faculty of Medicine, Department of Family Medicine, Ankara, Türkiye

³Hatay Mustafa Kemal University, Faculty of Medicine, Department of Biostatistics and Medical Informatics, Hatay, Türkiye

Correspondence

Hilal Aksoy, Hacettepe University Faculty of Medicine, Department of Family Medicine, Sıhhiye, Altındag, ANKARA/TÜRKİYE 06230

E-Mail: hilal.aksoy35@gmail.com

How to cite ?

Döner Güner P. , Aksoy H. , Dirican E. How Covid 19 Fear Affected Nutritional Support in Healthcare Professionals. Genel Tıp Dergisi. 2023; 33(1): 106-112.

ABSTRACT

Objectives: Healthcare professionals are the most affected individuals by the Covid-19 pandemic. Spending this period with a healthy and balanced diet will help them have a strong immune system. The objective of the study is to determine the relationship between Covid-19 fear and using vitamin supplements by healthcare professionals.

Methods: This observational study was conducted through the online Google survey application. Questions including demographic details and vitamin use and the fear of Covid-19 scale (FCV-19s) including seven questions were asked. The data were analyzed using the SPSS 21 package program.

Results: 874 healthcare professionals were included in the study. Vitamin / mineral usage frequency increases with decreasing BMI and increasing age and is higher in women, those with chronic illnesses, married people, and those living at home with children or elderly. The most preferred vitamins / minerals of the participants during the pandemic were vitamin D, vitamin C, multivitamin, zinc, magnesium, vitamin B12 and iron, respectively. It was observed that as the number of used vitamins / minerals increased, the average score of the Covid-19 fear scale increased.

Conclusion: COVID-19 fear caused increase in vitamin and mineral usage. Healthcare professionals should be informed about their benefits and harms.

Key Words: vitamins; fear; pandemic

ÖZ

Amaç: Sağlık çalışanları, Covid-19 pandemisinden en çok etkilenen bireylerdir. Bu dönemi sağlıklı ve dengeli bir diyetle geçirmek, güçlü bir bağışıklık sistemine sahip olmalarına yardımcı olacaktır. Çalışmamızın amacı, sağlık profesyonellerinde Covid-19 korkusu ile besin takviyesi kullanımı arasındaki ilişkiyi belirlemektir.

Yöntemler: Bu gözlemsel çalışma, çevrimiçi Google anket uygulaması aracılığıyla gerçekleştirildi. Demografik detaylar ve beslenme durumu ile Covid-19 skalası (FCV-19s) korkusunu içeren 7 şer sorudan oluşan sorular soruldu. Veriler SPSS 21 paket programı kullanılarak analiz edildi.

Bulgular: Çalışmaya 874 sağlık çalışanı dahil edildi. Vitamin/mineral kullanım sıklığı BKİ'nin azalması ve yaşın artmasıyla artmakta ve kadınlarda, kronik hastalığı olanlarda, evlilerde, evde çocuklu veya yaşlılarda yaşayanlarda daha yüksek olduğu tespit edildi. Katılımcıların pandemi süresince en çok tercih ettikleri vitamin/mineraler sırasıyla D vitamini, C vitamini, multivitamin, çinko, magnezyum, B12 vitamini ve demir oldu. Kullanılan vitamin/mineral sayısı arttıkça Covid-19 korku ölçeği ortalama puanının arttığı gözlemlendi.

Sonuç: COVID-19 korkusu vitamin ve mineral kullanımında artışa neden olmuştur. Sağlık çalışanları yararları ve zararları konusunda bilgilendirilmelidir.

Anahtar Kelimeler: vitaminler, korku, pandemi

Introduction

The Covid-19 outbreak threatens the health systems of many countries (1). Delay in developing a vaccine against Covid-19 disease and the increase in rate in the the whole world required both healthcare professionals and health policy makers to take measures against the possible continuity of the disease (2). Of course, healthcare professionals were the most affected sector by this epidemic situation. During this period, they faced a threat that had not been encountered before and had to manage a difficult situation both physically and psychologically (3).

At early stages of the disease, protective immune response is responsible for eliminating virus and, therefore, strategies to improve immune responses are of great importance. As disease progresses, lung inflammation and fibrosis occur due to the release of pro-inflammatory cytokines (4). So, spending this

pandemic period with a healthy and balanced diet will help people to have a strong immune system and prevent unwanted changes in body weight (5). In this regard, the European Society of Parenteral and Enteral Nutrition (ESPEN) has published guide for health professionals (6). During this period, there were also those who used additional vitamin supplements in order to withstand the harsh working conditions and to gain resistance against infection. In addition, in some studies conducted during this period, vitamin C and vitamin D have been reported to have positive effects (7-8).

When healthcare providers are constantly strained, the public is more likely to seek medical information from online sources (9). There are too many experts in different fields and have been featured on television programs and across social media platforms touting the use of certain dietary supplements to both protect

individuals from contracting Covid-19 and aid in its acute treatment. But most of them based on evidence and literature.

Fear is a strong emotion that affects individuals' physical responses, cognitive skills, and moods. A negative emotion causes other negativity and further aggravates the situation (10).

Healthcare professionals working with patients diagnosed with Covid-19 are at high risk for mental problems such as psychological distress, insomnia, alcohol and drug abuse, post traumatic stress disorder symptoms, depression, anxiety, burnout, anger, and high stress perception has been reported (11).

Our aim in this study is to determine the relationship between Covid-19 fear and using vitamin supplements by healthcare professionals.

Material and Methods

This descriptive study was carried out in Türkiye. An online semi-structured questionnaire was developed by researchers with a consent form by using Google forms and the link of the questionnaire was sent through emails, WhatsApp and other social media to the contacts of the investigators between 15th September 2020 and 20th October 2020. The participants were encouraged to roll out the survey to as many people as possible. Since the number of healthcare professionals who would accept to participate in our survey between the ages of 18 and 65 could not be calculated, all participants who had filled out the survey form were included in our study. Sample size has not been calculated in our research. On receiving and clicking the link, the participants got auto directed to the information about the study and informed consent. After they accepted to take the survey they filled up the first section of the survey that consisted of 22 questions including demographic details and a set of questions about vitamin use. The second part consisted The Fear of Covid-19 Scale (FCV-19S) including seven questions.

The ethical permission was obtained from a university with the decision number 31 at the date of July,6,2020.

Limitations of the study: Due to the on-line survey, incomprehensible questions could not be consulted by the participants and the rate of empty questions was high. The data collection time was short and we could not reach more participants.

The Fear of COVID-19 Scale (FCV-19S): The scale was developed by Ahorsu et al. (12) and adapted to the Turkish context within the scope of this study by Bakioglu et al. (13) It is a unidimensional scale with seven items. It has a 5-point Likert-type rating system (ranging from 1: Strongly disagree to 5: Strongly agree). The scores that can be obtained from the scale range from 7 to 35. High scores from the scale mean experiencing high levels of coronavirus fear.

The universe of study constitute of the participants

who are healthcare professionals and willing to give informed consent were included. Those who filled the questionnaire form were included in the study and they formed the sample of the research.

Statistical analysis: In our study, the data were analyzed using the SPSS 21 package program with 95% confidence interval. Mean, standard deviation, minimum and maximum values were used in the expression of continuous variables, frequency and percentage statistics were used for categorical variables. After evaluating the normality with the Shapiro-Wilk test for continuous variables Student-t, ANOVA, and Kruskal Wallis tests were performed. In addition, the relationships with the chi-square test and Spearman correlation coefficient were analyzed.

Results

A total of 938 people answered the e-survey form; people who did not answer all of the questions were excluded. Then 874 people were included in the study. The full response rate of the survey is 93.1%.

About 74.4% of the participants (n= 650) were women; 25.6% (224) were men. The average age of the participants was 37.0± 8.26 (min=20, max= 69). 64% of the population (59) were doctors; 6.6% (58) were other healthcare professionals. Other healthcare professionals included pharmacists, laboratory professionals and health technicians. The socio-demographic characteristics of the participants are given in Table 1.

Table 1. Socio-demographic Characteristics of the participants

	n	%
Gender		
Female	650	74.4
Male	224	25.6
Age		
Below 25	42	4.8
25-35	328	37.5
36-45	357	40.8
46-55	123	14.1
Above 55	24	2.7
Profession		
Doctor	559	64.0
Nurse	257	29.4
Other healthcare professional	58	6.6
Chronic disease		
Yes	191	21.9
No	683	78.1
Marital Status		
Yes	651	74.5
No	223	25.5
Living with the children		
Yes	597	68.3
No	277	31.7
Living with the elderly		
Yes	294	33.6
No	580	66.4

The total number of participants with chronic diseases was 191 (21.9%). 149 people had one disease (17.0%), 39 people had two diseases (4.5%), 3 people had three diseases (0.5%). The most common diseases were hypertension, hypothyroidism, asthma, diabetes

Table 2. Comparison of vitamin intake status with sociodemographic characteristics (N=874)

		No vitamin intake n=443 (%=50.7)	Vitamin intake n=431 (%=49.3)	Total N=874 (%=100.0)	p
Age		36.08 ± 8.06	38.69 ± 8.23	37.36 ± 8.24	0.001**
BMI		25.53 ± 4.54	24.68 ± 4.12	25.11 ± 4.36	0.004**
		n (%)	n (%)	n (%)	
Gender	Female	312 (70.4)	338 (78.4)	650 (74.4)	0.007*
	Male	131 (29.6)	93 (21.6)	224 (25.6)	
Chronic disease	No	362 (81.7)	321 (74.5)	683 (78.1)	0.010*
	Yes	81 (18.3)	110 (25.5)	191 (21.9)	
Marital status	Single	135 (30.5)	88 (20.4)	223 (25.5)	0.001*
	Married	308 (69.5)	343 (79.6)	651 (74.5)	
Living with the children	No	153 (34.5)	124 (28.8)	277 (31.7)	0.067*
	Yes	290 (65.5)	307 (71.2)	597 (68.3)	
Living with the elderly	No	309 (69.8)	271 (62.9)	580 (66.4)	0.032*
	Yes	134 (30.2)	160 (37.1)	294 (33.6)	

*: Pearson Chi-Square. **: Student-t Test. Categorical variables are presented as n (%). continuous variables presented as mean ± SS

Table 3. Distribution of participants according to BMI and Age Groups

BMI Groups		Below 18.5	18.5-25	25.1-29.9	30-39.9	40+	Total
		n(%)	n(%)	n(%)	n(%)	n(%)	n(%)
Age Groups	Below 25	1 (4.2)	30 (6.6)	10(3.5)	1(1)	0(0)	42(4.8)
	25-35	16(66.7)	187(41.2)	86(30.5)	35(34.7)	3(50)	327(37.7)
	36-45	6(25)	181(39.9)	128(45.4)	36(35.6)	2(33.3)	353(40.7)
	46-55	1(4.2)	48(10.6)	50(17.7)	21(20.8)	1(16.7)	121(14)
	Above 55	0(0)	8(1.8)	8(2.8)	8(7.9)	0(0)	24(2.8)
Total		24(100)	454(100)	282(100)	101(100)	6(100)	867(100)

Table 4. Comparison of vitamin intake with change in nutrition and type of eating pattern during pandemics

		No vitamin intake n (%) 443 (50.7)	Vitamin intake n (%) 431 (49.3)	Total N (%) 874 (100.0)	p
Change in nutrition during pandemics	No	281 (63.4)	195 (45.2)	476 (54.5)	0.001*
	Yes	162 (36.6)	236 (54.8)	398 (45.5)	
	No change**	282 (63.7)	195 (45.2)	477 (54.6)	
Type of eating pattern	Less and irregular eating pattern	35 (7.9)	32 (7.4)	67 (7.7)	0.001*
	More healthy eating pattern	88 (19.9)	158 (36.7)	246 (28.1)	
	More eating	38 (8.6)	46 (10.7)	84 (9.6)	

*: Pearson Chi-Square. Categorical variables are presented as n (%).

**In the post hoc analysis based on the category extraction method, it was understood that most of the difference was caused by the "No change" category (p value becomes p=0.032 when the relevant category was removed), and the category that created the second difference was "more healthy" (p=0.392 when this category was excluded)

Table 5. Comparison of vitamin intake with profession and contact with Covid-19 patient during pandemic

		No vitamin intake n (%) 443 (50.7)	Vitamin intake n (%) 431 (49.3)	Total N (%) 874 (100.0)	p
Contact with Covid-19 patient during Pandemic	No	143 (32.3)	105 (24.4)	248 (28.4)	0.009*
	Yes	300 (67.7)	326 (75.6)	626 (71.6)	
Profession**	Doctor	257 (58.0)	302 (70.1)	559 (64.0)	0.001*
	Nurse	157 (35.4)	100 (23.2)	257 (29.4)	
	Other healthcare professionals	29 (6.5)	29 (6.7)	58 (6.6)	

*: Pearson Chi-Square. Categorical variables are presented as n (%).

** In the post hoc analysis based on the category extraction method, it is understood that the difference stems from the "doctor" category (p=0.121 when the relevant category is excluded).

Table 6. Comparison of the COVID-19 Fear Scale with descriptive variables

Variables	Categories	Mean ± SD	Min - Max	p
Gender	Female	18.28 ± 6.52	7 - 35	<0.001*
	Male	15.08 ± 5.47	7 - 33	
Profession**	Doctor	16.62 ± 5.81	7 - 35	<0.001**
	Nurse	19.53 ± 7.24	7 - 35	
	Other healthcare professionals	16.33 ± 6.06	7 - 34	
Chronic disease	No	16.96 ± 6.21	7 - 35	<0.001*
	Yes	19.25 ± 6.81	7 - 35	
Marital status	Single	16.26 ± 6.53	7 - 34	0.001*
	Married	17.87 ± 6.33	7 - 35	
Living with the children	No	16.3 ± 6.39	7 - 35	<0.001*
	Yes	17.99 ± 6.36	7 - 35	
Living with the elderly	No	16.77 ± 6.15	7 - 35	<0.001*
	Yes	18.81 ± 6.71	7 - 35	
Active working status	No	16.89 ± 5.92	7 - 34	0.342*
	Yes	17.53 ± 6.48	7 - 35	
Nutrition change	No	16.63 ± 6.16	7 - 35	<0.001*
	Yes	18.44 ± 6.58	7 - 35	
Vitamin intake	No	16.9 ± 6.23	7 - 35	0.009*
	Yes	18.03 ± 6.55	7 - 35	
Want to get influenza vaccine	No	17.09 ± 6.55	7 - 35	0.05*
	Yes	17.94 ± 6.21	7 - 35	
Want to pneumococ vaccine	No	17.19 ± 6.24	7 - 35	0.05*
	Yes	18.13 ± 6.78	7 - 35	
Want to get Covid-19 vaccine	No	16.77 ± 6.36	7 - 34	0.005*
	Yes	17.99 ± 6.41	7 - 35	
Infected with Covid-19	No	17.41 ± 6.34	7 - 35	0.446*
	Yes	18.01 ± 7.17	7 - 35	
	Not infected	17.41 ± 6.34	7 - 35	
Covid 19 treatment	Not treated	16.21 ± 5.56	7 - 29	0.079***
	Outpatient treatment	17.71 ± 7.24	7 - 33	
	Inpatient treatment	24.86 ± 7.56	12 - 35	

*: Student-t, **: ANOVA, ***: Kruskal Wallis

**Post-hoc analysis with LSD test, it is understood that the difference is due to the "Nurse" category p<0.001)

mellitus and autoimmune diseases, respectively. 49.3% (431) of the participants were using vitamin and mineral supplements. The comparison of the vitamin/mineral use of the participants according to their socio-demographic characteristics is given in Table-2. Distribution of participants according to BMI and age groups is given in Table-3. A statistically significant difference was found between the use of vitamins/minerals and age, BMI, gender, presence of chronic disease, marital status, having child or elderly person living with them at home ($p = 0.001$, $p = 0.004$, $p = 0.007$, $p = 0.010$, $p = 0.001$, $p = 0.06$, $p = 0.032$) respectively. Vitamin/mineral usage frequency; increases with decreasing BMI and increasing age and is higher in women, those with chronic illnesses, married people, those living at home with children or elderly. The most preferred vitamins / minerals of the participants during the pandemic were vitamin D, vitamin C, multivitamin, zinc, magnesium, vitamin B12 and iron, respectively. There were participants who used multiple vitamin & mineral tablets. 72.85% (314) of the vitamin & mineral users were using vitamin D; 60.78% (262) vitamin C, 37.81% (163) multivitamin, 35.03% (151) zinc, 23.89% (103) magnesium, 20.18% (87) and 13.22% (57) iron.

During the pandemic period, 45.5% (398) of the participants had a change in their eating habits. It was determined that 28.1% of the participants (246) had a healthier diet after the pandemic started and 7.7% (67) ate less and irregularly. It was observed that 54.8% (236) of the vitamin / mineral users had nutritional changes and 36.7% (158) of them had a healthier diet during the pandemic. A statistically significant difference was determined between the use of vitamins / minerals and "change in eating habits in the pandemic" period and "type of change" ($p=0,001$)(see Table 4).

The number of the participants who were in contact with the patients with COVID-19 infection during diagnosis, treatment and follow-up during the pandemic period was 626 (71.6%). 75.6% ($n= 326$) of these people were using vitamins / minerals. During the pandemic, the use of vitamins / minerals was higher in doctors. 70.1% of the vitamin / mineral users were doctors and 6.7% (29) were other health professionals. A statistically significant difference was determined between the use of vitamins / minerals and occupational groups and having contact with COVID-19 infected patients (respectively; $p= 0.001$, $p= 0.009$) (see Table 5).

COVID 19 Fear Scale mean score was 17.46 ± 6.414 (min=7, max=35). A statistically significant difference was determined between the Covid-19 Fear Scale scores and the vitamin / mineral use status ($p= 0.009$). It was observed that the Covid-19 Fear mean scores were higher in people who used vitamins / minerals. The comparison of the COVID 19 Fear Scale with the descriptive variables is given in Table 5. In addition, it was observed that Covid-19 fear scores increased in women, nurses, people with chronic diseases, married people, people living with children at home, people living with the elderly at home, those who have a

nutritional change during the pandemic, those who intended to have influenza, pneumococcus and COVID 19 vaccines during the pandemic period, those who have had Covid-19 infection and are treated in a hospital (randomly $p= 0.001$, $p= 0.342$, $p= 0.001$, $p= 0.009$, $p= 0.05$, $p= 0.05$, $p= 0.005$, $p= 0.446$, $p= 0.079$) (see Table 6)

It was observed that as the number of using vitamins / minerals increased, the average score of the Covid-19 fear scale increased. The average scale score of those who did not use vitamins / minerals was 16.85 ± 6.21 (min = 7, max = 35), the average scale score of those who used 1 vitamin / mineral was 17.67 ± 7.04 (min = 8, max = 35), the average scale score of those who used 2 vitamins / minerals was 18.22 ± 6.37 (min = 9, max = 35). In the analysis using one-way ANOVA test; there was a significant difference between the number of using vitamins / minerals and the scale score ($p=0.013$). (Figure 1).

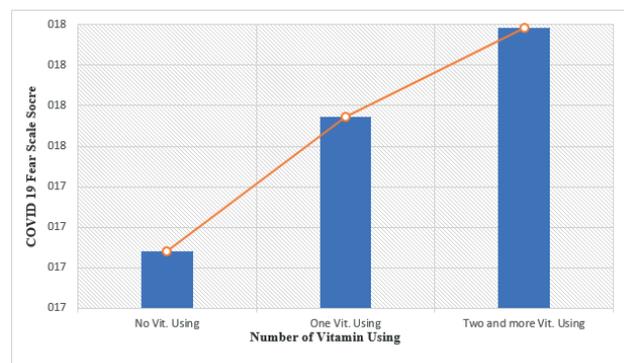


Figure 1: Comparison of number of vitamin intake with COVID-19 Fear Scale

Discussion

During the pandemic, healthcare professionals work under intense and difficult working conditions. This situation can negatively affect the health of healthcare professionals both physically and psychologically. Despite protective equipment, many healthcare workers suffer from Covid-19 infection. In fact, the number of healthcare professionals who receive many intensive care treatments and die is increasing (14-15). In the literature, there are publications about anxiety, depression and fear experienced by healthcare professionals regarding Covid-19 infection (16-21). Many studies have focused on anxiety, depression and fear scales and the psychological effects of COVID-19 infection on healthcare professionals (22-27). There are also publications in the literature that various vitamins and minerals strengthen immunity against Covid-19 infection (28-31) However, there has been no study examining the relationship between the frequency of vitamin use of healthcare professionals and the Covid-19 Fear Scale. Therefore, this study is the first one conducted in our country.

It was observed that 49.3% of the participants started to use vitamins and minerals during the pandemic period. This suggests that healthcare professionals need an additional preventive measure against Covid-19 infection. The fact that 71.6% of the participants were in contact with the patients infected with Covid-19 is a finding that supports this situation.

Covid-19 infection is more common in those with chronic diseases and its mortality is higher (32). The frequency of chronic diseases increases with increasing age (33). It has been reported that the prognosis of COVID-19 infection is more severe and mortality is higher in individuals over 65 years of age (34-35). In this study, it was observed that the frequency of vitamin / mineral use increased in those with increasing age and chronic diseases. In the literature, in addition to the increasing severe prognosis and deaths in the elderly, serious illnesses and deaths including "pediatric multisystem inflammatory syndrome" have been reported in children after COVID-19 infection (36). In this study, it was observed that the frequency of vitamin / mineral use increased in married and people with elderly and children living at their home. A study in Iranian adults found an inverse relationship between anxiety and greater consumption of vegetables and fruits, legume and dairy products (37). Therefore, as healthcare professionals infected with COVID-19; it can be said that they may have increased the use of vitamins and minerals because they fear that the disease will be transmitted to the individuals with whom they live together in their homes, especially to the elderly and children with whom they live and thus the disease may be severe and fatal in these sensitive individuals. Since nutrients can affect immune system through cell activation and gene expression and being important determinants of gut microbial composition and nutritional deficiencies are associated with increased susceptibility to infection, attention should be paid to healthy eating habits to reduce Covid-19 susceptibility and long-term complications (5)

In the literature, there are information about vitamin D, vitamin C, vitamin E, zinc, selenium and omega fatty acids that strengthen immunity against Covid-19 infection (28,30). In this study, in line with this information in the literature, it was observed that 72.85% (n = 314) of the healthcare workers used vitamin D, 60.78% (n = 262) vitamin C, and 23.89% (n = 103) zinc. In Kaya's study, it was determined that 26.7 % of the participants used in particular vitamin C, vitamin D, vitamin B12 and Zn during pandemic³⁸ In the study that was conducted in Saudi Arabia majority of the participants (68.2%) did not take any vitamin supplementations during the period of domestic quarantine as well as enough sun exposure (39). But these studies were done with public not only healthcare professionals. It is observed that the studies in the literature to strengthen immunity are followed and applied by healthcare professionals. It can be said that healthcare professionals may have increased the use of vitamins and minerals due to the publications in the literature stating that vitamins

strengthen immunity and the high risk of infection in those with chronic diseases.

However, taking vitamins without checking vitamin level carries a risk of reaching the toxic dose, especially with vitamin D (40). For this reason, it is important that healthcare professionals are informed in more detail about the use of vitamins / minerals and are guided correctly, taking into account their fear of COVID-19 infection and their desire to take additional protection measures.

Conclusion

The fear of COVID-19 has increased the desire and need for vitamins in healthcare professionals. It was observed that the frequency of vitamin / mineral use increased in those with increasing age and chronic diseases and also higher in married and people with elderly and children living at their home. But it is important that they use appropriate vitamins and be guided correctly in the use of vitamins. Also lifestyle recommendations should be identified to protect and strengthen the physical and mental health of healthcare professionals.

Vitamins and minerals are essential nutrients that body needs in small amounts to work properly. Many people choose to take supplements, but taking too much or taking them for too long could be harmful. But there is still limited evidence that a daily cocktail of essential vitamins and minerals actually meets what you expect.

References

1. World Health Organization. Coronavirus Disease 2019 (COVID-19) Situation Report - 49. World Health Organization. [Internet]. 2020. Erişim adresi: <https://www.who.int/emergencie>
2. Ali I. COVID-19: Are we ready for the second wave? *Disaster Med Public Health Prep.* 2020;1-8.
3. Greenberg N, Docherty M, Gnanapragasam S, Wessely S. Managing mental health challenges faced by healthcare workers during covid-19 pandemic. *BMJ* 2020;368:m1211 doi: 10.1136/bmj.m1211 (Published 26 March 2020)
4. Conti P, Ronconi G, Caraffa A, Gallenga CE, Ross R, Frydas I, et al. Induction of pro-inflammatory cytokines (IL-1 and IL-6) and lung inflammation by Coronavirus-19 (COVI-19 or SARS-CoV- 2): anti-inflammatory strategies. *J Biol Regul Homeost Agents.* 2020;34.
5. Naja F, Hamadeh R. Nutrition amid the COVID-19 pandemic: a multi-level framework for action. *European Journal of Clinical Nutrition* 2020. doi: <https://doi.org/10.1038/s41430-020-0634-3>.
6. <https://www.espen.org> (Erişim tarihi:17/06/2020)
7. High-dose vitamin C (PDQ®)—Health professional version. National Cancer Institute, cited on Feb 9 2020 (. <https://www.cancer.gov/about-cancer/treatment/cam/hp/vitamin-c-pdq>).
8. Ebadi M, Montano-Loza AJ. Perspective: improving vitamin D status in the management of COVID-19. *Eur J Clin Nutr* 2020;74:856-859. <https://doi.org/10.1038/s41430-020-0661-0>
9. Adams KK, Baker WL, Sobieraj DM. Myth Busters: Dietary supplements and COVID-19. *Annals of Pharmacotherapy* 2020;54(8):820-826.
10. Satici B, Saricali M, Satici SA, Griffiths MD. Intolerance of uncertainty and mental wellbeing: Serial mediation by rumination and fear of COVID-19. *International Journal of Mental Health and Addiction*

2020;15:1-2.

11. Stuijtzand S, Deforges C, Sandoz V, Sajin CT, Jaques C, Elmers J, et al. Psychological impact of an epidemic/pandemic on the mental health of healthcare professionals: a rapid review. *BMC Public Health* 2020; 20(1): 1230.

12. Ahorsu DK, Lin CY, Imani V, Saffari M, Griffiths MD, Pakpour AH. The Fear of COVID-19 Scale: Development and initial validation. *International Journal of Mental Health and Addiction* 2020. <https://doi.org/10.1007/s11469-020-00270-8>.

13. Bakioglu F, Korkmaz O, Ercan H. Fear of COVID-19 and positivity: Mediating role of intolerance of uncertainty, depression, anxiety, and stress. *International Journal of Mental Health and Addiction* <https://doi.org/10.1007/s11469-020-00331-y>

14. Ha JF. The covid-19 pandemic, personal protective equipment, and respirator: a narrative review. *International Journal of Clinical Practice* 2020. e13578.

15. Amanullah S, Ramesh Shankar R. The Impact of COVID-19 on Physician Burnout Globally: A Review. *Healthcare* 2020;8(4):421. Multidisciplinary Digital Publishing Institute.

16. Shanafelt T, Ripp J, Trockel M. Understanding and addressing sources of anxiety among health care professionals during the COVID-19 pandemic. *Jama* 2020; 323(21):2133-2134.

17. da Silva, FCT, Neto MLR. Psychiatric symptomatology associated with depression, anxiety, distress, and insomnia in health professionals working in patients affected by COVID-19: A systematic review with meta-analysis. *Progress in Neuro-Psychopharmacology and Biological Psychiatry* 2020;110057

18. Santamaría MD, Ozamiz-Etxebarria N, Rodríguez IR, Alboniga-Mayor JJ, Gorrotxategi MP. Psychological impact of COVID-19 on a sample of Spanish health professionals. *Revista de Psiquiatría y Salud Mental* 2020. 10.1016/j.rpsm.2020.05.004

19. Suryavanshi N, Kadam A, Dhupal G, Nimkar S, Mave V, Gupta A, et al. Mental health and quality of life among healthcare professionals during the COVID-19 pandemic in India. *Brain and behavior* 2020;10(11): e01837.

20. Wu W, Zhang Y, Wang P, Zhang L, Wang G, Lei G, et al. Psychological stress of medical staffs during outbreak of COVID-19 and adjustment strategy. *Journal of Medical Virology* 2020;92(10).

21. Spoorthy MS, Pratapa SK, Mahant S. Mental health problems faced by healthcare workers due to the COVID-19 pandemic—A review. *Asian journal of psychiatry* 2020;51:102119.

22. Elbay RY, Kurtuluş A, Arpacioğlu S, Karadere E. Depression, Anxiety, Stress Levels of Physicians and Associated Factors In Covid-19 Pandemics. *Psychiatry Research* 2020;113130

23. Hacimusalar Y, Kahve AC, Yasar AB, Aydin MS. Anxiety and hopelessness levels in COVID-19 pandemic: A comparative study of healthcare professionals and other community sample in Turkey. *Journal of psychiatric research* 2020;129: 181-188.

24. Ni MY, Yang L, Leung CM, Li N, Yao Xi, Wang Y, et al. Mental health, risk factors, and social media use during the COVID-19 epidemic and cordon sanitaire among the community and health professionals in Wuhan, China: Cross-sectional survey. *JMIR mental health* 2020; 7(5): e19009.

25. Liu CY, Yang YZ, Zhang XM, Xu X, Dou QL, Zhang WW, et al. The prevalence and influencing factors in anxiety in medical workers fighting COVID-19 in China: a cross-sectional survey. *Epidemiology & Infection* 2020; 1-17.

26. Sharif S, Amin F, Hafiz M, Benzel E, Peev NA, Dahlan RH, et al. COVID 19-Depression and Neurosurgeons. *World Neurosurgery* 2020; 140: e401-e410.

27. Yildirim M, Arslan G. Perceived risk and mental health problems among healthcare professionals during COVID-19 pandemic: Exploring the mediating effects of resilience and coronavirus fear. 2020; 10.31234/osf.io/84xju.

28. Iddir M, Brito A, Dingeo G, Fernandez Del Campo SS, Samouda

H, La Frano MR, et al. Strengthening the immune system and reducing inflammation and oxidative stress through diet and nutrition: considerations during the COVID-19 Crisis. *Nutrients* 2020;12(6): 1562.

29. Jovic TH, Ali SR, Ibrahim N, Jessop ZM, Tarassoli SP, Dobbs TD, et al. Could vitamins help in the fight against COVID-19?. *Nutrients* 2020;12(9):2550.

30. Shakoor H, Feehan J, Al Dhaheer AS, Ali HI, Platat C, Ismail LC, et al. Immune-boosting role of vitamins D, C, E, zinc, selenium and omega-3 fatty acids: Could they help against COVID-19?. *Maturitas* 2020; 10.1016/j.maturitas.2020.08.003

31. Mohan M, Cherian JJ, Sharma A. Exploring links between vitamin D deficiency and COVID-19. *PLoS pathogens* 2020;16(9):e1008874.

32. Ajebli M, Amssayef A, Akdad M, Algharras Y, Babakhouya A, Ghanimi D, et al. Chronic diseases and COVID-19: A review. *Endocrine, Metabolic & Immune Disorders Drug Targets*. 2020; 10.2174/187153032066201201110148.

33. Maresova P, Javanmardi E, Barakovic S, Husic JB, Tomsone S, Krejcar O, et al. Consequences of chronic diseases and other limitations associated with old age—a scoping review. *BMC public health* 2019;19(1): 1431.

34. Perrotta F, Corbi G, Mazzeo G, Boccia M, Aronne L, D'Agnano V, et al. COVID-19 and the elderly: insights into pathogenesis and clinical decision-making. *Aging clinical and experimental research*, 2020 Jun 16;1-10.

35. Shahid Z, Kalayanamitra R, McClafferty B, Kepko D, Ramgobin D, Patel R, et al. COVID-19 and older adults: what we know. *Journal of the American Geriatrics Society* 2020; 68(5): 926-929.

36. Naja M, Wedderburn L, Ciurtin C. COVID-19 infection in children and adolescents. *British Journal of Hospital Medicine* 2020; 81(8):1-10.

37. Sadeghi, O, Keshteli, AH, Afshar, H et al. (2019) Adherence to Mediterranean dietary pattern is inversely associated with depression, anxiety and psychological distress. *Nutr Neurosci* 22, 1–12. CrossRefGoogle ScholarOpenURL queryOpenURL query

38. Kaya S, Uzdil Z, Cakiroğlu, F. Evaluation of the effects of fear and anxiety on nutrition during the COVID-19 pandemic in Turkey. *Public Health Nutrition*, 2021; 24(2):282-289. doi:10.1017/S1368980020003845

39. Rasheed Zafar, et al. Impact of COVID-19 pandemic quarantine on physical, nutritional, psychosocial life and work aspects in the Kingdom of Saudi Arabia. *Journal of Family Medicine and Primary Care*, 2022; 11(3): 896-903.

40. Giustina, Andrea, et al. Consensus statement from 2nd International Conference on Controversies in Vitamin D. *Reviews in Endocrine and Metabolic Disorders*, 2020; 21(1): 89-116.