Original article

Can adherence to a mediterranean diet reduce phobia of Covid-19?

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Abstract. *Background and aim:* In this study, it was aimed to examine the relationship between COVID-19 phobia and adherence to the MD in university students. *Materials and Methods:* This research in cross-sectional design was conducted with 351 students studying at Alanya Alaaddin Keykubat University located in the Mediterrenan region of Türkiye between September 2021 - December 2021. The data was collected using Personal Information Form, Mediterranean Diet Adherence Scale (MEDAS) and COVID-19 Phobia Scale. *Results:* The study included a total of 351 students 254 females (72.4%) and 97 males (27.6%) with a mean age of 20.4 ± 2.1 years. When the relationship between the MEDAS score and various variables was examined, no significant relationship was found between gender, smoking, BMI and meal skipping ($p>0.05$), while the MEDAS score of those with high income status was found to be significantly higher than those with low income status ($p<0.05$). There was a strong negative correlation between the MEDAS score and COVID-19 Fobia Scale and its subgrups. It was observed that as the COVID-19 Fobia Scale scores increase, the MEDAS scores decrease ($p < 0.05$). *Conclusion:* Especially during the pandemic period, both the awareness level of the society on healthy nutrition should be increased and its implementation as a lifestyle should be supported. This situation can reduce the fear and phobia in the society.

Key words: Mediterranean Diet, COVID-19 Phobia, MEDAS

Introduction

In December 2019, a new infectious respiratory disease was first reported in Wuhan, Hubei Province, China. Caused by a new class of virus (SARS-CoV-2), it was recognized by the World Health Organization (WHO) as COVID-19 (1). The COVID-19 pandemic has been causing the ever-increasing number of confirmed cases and deaths worldwide (2).

Since death toll increases and virus cannot be taken under control completely, people have been going through various psychological challenges such as fear, panic or phobia (3). Previous studies indicated that there were high rates of anxiety, depression, and psychological distress in the general population during the COVID-19 pandemic (4,5). In addition, COVID-19-related fear was found to be positively associated with mental disorders (6).

During the COVID-19 pandemic, the importance of adequate and nutrition has increased even more. While healthy eating models strengthen the immune system, they are also protective in terms of diseases caused by influenza and viruses (7). In 2012, Food and Agriculture Organization of the United Nations announced that Mediterranean diet (MD) was at the top of the world's most sustainable diets (8). The MD is a dietary pattern that includes regular consumption of olive oil, fruits and vegetables, whole grains, legumes, fish and nuts, with occasional consumption of added sugars and red and/or processed meats (9). The protective effect of the MD against diseases has been reported in many studies (10,11). The

MD is a diet rich in anti-inflammatory and immunomodulatory nutrients. It is also a diet rich in bioactive phenolic compounds. Therefore, it is thought that the MD could potentially be beneficial against infections such as COVID-19 due to its effects on immunity (7). Importantly, MD score has been shown to be inversely associated with psychological stress among adults (12).

This study was carried out on university students studying in Alanya, which is located in the Mediterranean region of Türkiye. In this study, it was aimed to examine the relationship between COVID-19 phobia and adherence to the MD in university students.

Materials and method

This research in cross-sectional design was conducted with students studying at Alanya Alaaddin Keykubat University located in the Mediterrenan region of Türkiye between September 2021 - December 2021. Power analysis was performed with the G*Power Software (v3.1.3) software for the purpose of determining student protection for the measurement of the study. The sample in this study was determined by using the data in the study of Dilbaz et al. (13). The number of students for which the analysis should be performed was aimed, at the dose of alpha (α)=0.05 and power (1-β)=0.95. The study was carried out on 351 volunteer students.

Data collection tools

The data was collected using Personal Information Form, Mediterranean Diet Adherence Scale (MEDAS) and COVID-19 Phobia Scale.

Personal information form

This form prepared by the researchers in accordance with literature information, consists of 7 questions regarding descriptive properties of the students included in the research (age, gender, height, weight, smoking, skipping meal, income). Anthropometric data were evaluated according to the classification of the WHO by calculating body mass index (BMI) as kg/m² by using the body weight/height (m²) formula. According to the World Health Organization (WHO) BMI classification was as: BMI <18.5 kg/m^2 as underweight; 18.5-24.9 kg/m^2 as normal; 25-29.9 kg/m^2 as preobese; ≥30 kg/m^2 as obese (14).

Mediterranean Diet Adherence Scale (MEDAS)

Mediterranean diet conformity screening tool is aimed at rapidly controlling the intake of food interventions from the PREvención con DIeta MEDiterránea (PREDIMED) study (15). Mediterranean Diet Adherence Scale (MEDAS), there are a total of fourteen questions, two of which are about food intake habits and twelve of them about food consumption frequency, and the score range varies between zero and 14 points with a higher score indicating better accordance with the MD. Each question has a score of zero or one point (16). In Türkiye, Pehlivanoglu, Balcoglu and Unluoglu conducted the validity and reliability of the scale.The MEDAS scoring range is 0–14 points, with ≥7 points indicating compliance with MD and <7 points indicating non-compliance with MD. The Cronbach Alpha coefficient of the scale is 0.829, which indicates that the scale is reliable (17).

COVID-19 phobia scale

The scale developed by Dilbaz et al. (13) in Türkiye, to assess phobic symptoms related to COVID-19. The COVID-19 Phobia Scale, comprising 22 items and four subgrups (Worry, Mood, Reassurance Seeking/Precaution and Avoidance) to measure the emotions and behavioral changes observed during the COVID-19 pandemic, was thus shown to be a valid and reliable measurement tool. The scale is in Likert type and all items are rated between "strongly disagree (1)" and "strongly agree (5)". Negative items were reverse-scored (e.g. 1 = 5) so that higher scores indicated higher levels of COVİD-19 phobia. The lowest score that can be obtained from the scale is 22, and the highest score is 110. Higher scores indicated higher levels of COVID-19 phobia. The internal consistency of the COVID-19 Phobia Scale measured by the Cronbach's alpha coefficient was 0.84.

Data collection

The research data was collected from the university students who are agreed to participate in the research. The data was sent to the students through social media accounts (WhatsApp student groups) with online questionnaires prepared by means of Google Forms and they were asked to fill in. It took each participant 10 minutes on average to complete the questionnaires.

Data assessment

For statistical analyses of the data obtained, SPSS 25.0 for Windows software (SPSS, Chicago, Il, USA) was used. In the statistical assessment, descriptive statistics average, standard deviation, percentage distribution were used. Mann-Whitney U and Kruskal-Wallis tests were applied in non-parametric tests. In the Kruskal-Wallis test, the post hoc Mann-Whitney U test was used to determine the group that caused the difference. The correlation between the scales was analyzed with the Spearman correlation test. Significance level was assessed as $p<0.05$.

Ethical regulations

For implementation of the research, ethical approval was taken from the Ministry of Health Türkiye (2021-10-28T10_29_12) and Alanya Alaaddin Keykubat University Health Sciences Scientific Research and Publication Ethics Committee (Decision No: 2021/05). At the beginning of questionnaire items, students were informed about the aim of the research and volunteering students were asked to fill in the questionnaires.

Results and discussions

The study included a total of 351 students 254 females (72.4%) and 97 males (27.6%) with a mean age of 20.4 ± 2.1 years. The income of 57.0% of the students was low, 76.1% of them were non-smoking. Mean BMI values were 21.7 ± 3.2 kg/m^2, and more than half of the individuals had normal body weight (71.5%), and 13.7% were preobese or obese. Non-compliance with MD was 89.5%. (Table 1). When similar studies were examined, compliance with the

Table 1. Distribution of some demographic and nutritional characteristics of the participants (n = 351).

Demographic and nutritional characteristics		**n**	**%**
Gender	Female	254	72,4
	Male	97	27,6
Income	Low	200	57,0
	Moderate	116	33,0
	High	35	10,0
Smoking	Yes	84	23,9
	No	267	76,1
Skipping meal	Yes	112	31,9
	Sometimes	28	8,0
	No	211	60,1
BMI	Underweight	52	14,8
	Normal	251	71,5
	Preobese	42	12,0
	Obese	6	1,7
MEDAS classification	Compliance	37	10,5
	Non-compliance	314	89,5

MD was found to be low and moderate in general population (18,19).

When the relationship between the MEDAS score and various variables was examined, no significant relationship was found between gender, smoking, BMI and meal skipping (p>0.05), while the MEDAS score of those with high income status was found to be significantly higher than those with low income status (p<0.05) (Table 2). When compliance with the MD was examined by gender, the results of many studies were found to be higher in men, as in our study (20,21). An important association found in this study was the relation between adherence to the MD and income status. It is stated that socioeconomic level is an important factor in determining eating habits, and individuals with low income consume less healthy foods (22). In another study, it is stated that those with higher incomes consume more fruits, vegetables and fibrous foods (23). These results are in parallel with the results of our study.

The relationship between the COVID-19 Fobia Scale score and various variables was examined, no significant relationship was found between smoking, BMI and meal skipping (p>0.05), COVID-19 Fobia scale scores belonging to the females were significantly higher than those of the males. (p<0.05) (Table 2). The results of other studies show that the cases caused by the COVID-19 pandemic, as in our study, have more fear and psychological effects in women (24,25). When the studies in the literature are examined, female gender is significantly associated with a greater psychological impact of the outbreak and higher levels of stress, anxiety, insomnia, perceived stress, adjustment disorder, and depression (26,27). This literature information supports the result of our study.

The most intriguing association found in this study was the relation between MEDAS score and COVID-19 Fobia Scale score. There was a strong negative correlation between the MEDAS score and COVID-19 Fobia Scale and >its subgrups. It was observed that as the COVID-19 Fobia Scale scores increase, the MEDAS scores decrease (p < 0.05) (Table 3). When previous studies were examined, in a study conducted during the COVID-19 pandemic period, it was found that the risk of depression and anxiety increased statistically as the adherence to the

Table 2. Relationship between MEDAS score and COVID-19 Fobia Scale score of various variables. (n = 351).

Demographic and nutritional characteristics		**MEDAS score**		**COVID-19 Fobia Scale score**	
		Mean±Sd	**p-value**	**Mean±Sd**	**p-value**
Gender	Female	4,82±1,92	0,362	75,72±14,26	0,012
	Male	5,09±1,89		67,73±16,34	
Income	Low[1]	4,47±1,75	0,032 3>1	72,26±16,12	0,552
	Moderate[2]	5,22±1,83		74,80±14,30	
	High[3]	6,22±2,25		76,40±12,75	
Smoking	Yes	4,83±1,87	0,735	69,65±17,70	0,054
	No	4,91±1,92		74,72±14,23	
Skipping meal	Yes	4,60±1,76	0,132	73,74±15,43	0,828
	Sometimes	4,94±1,94		73,83±14,96	
	No	5,67±2,05		70,82±17,10	
BMI	Underweight	4,65±1,99	0,714	76,03±13,11	0,663
	Normal	4,91±1,90		72,60±15,92	
	Preobese	5,16±1,99		75,73±13,51	
	Obese	4,50±0,54		74,16±15,49	

Mann-Whitney U test, Kruskal Wallis test; p<0,05

Table 3. The relationship between the total and subgroup scores of the COVID-19 Phobia Scale and the MEDAS score.

	MEDAS score	
	r	p-value
COVID-19 Fobia Scale scores (Total)	-0.351	0.00
• Worry	-0.332	0.00
• Mood	-0.257	0.00
• Reassurance Seeking/ Precaution	-0.215	0.00
• Avoidance	-0.324	0.00

Pearson correlation test; p<0.05

MD decreased (p<0.001) (28). In a study conducted in China during the COVID-19 pandemic, eating disorder behaviors increase as the risk of anxiety and depression increases (29). In a study conducted on 3172 adults in Iran, the relationship between food consumption records and depression, anxiety, and psychological distress was examined. They found that high intake of fruits and vegetables was associated with a lower odds of depression, anxiety and psychological distress. In contrast, high intake of grains was positively associated with depression, anxiety and psychological distress (30). MD is rich in fiber, MUFA and omega 3 fatty acids, magnesium and vitamins B including vitamins B1, B2, B6, B12 and folate; Beneficial effects of these nutrients on mental health have earlier been shown (31, 32). As it is a new topic in the literature, research on COVID-19 phobia and adherence to the MD is limited. An another study, unlike our results, no significant relationship was found between fear of COVID-19 and MD (p>0.05) (33).

Conclusion

Undoubtedly, the COVID-19 pandemic has affected the lives of individuals living all over the world. This period also caused fear and anxiety in some people. It is known that healthy nutrition is beneficial both in the prevention of many diseases and in the treatment of diseases in every period of life. One of the most important results of our study was that the phobia of COVID-19 decreased with the increase in compliance with the MD, which is one of the most important models in healthy nutrition. This effect may be due to the potentially immune protective effects of the MD, in particular. The variety of nutrients in the MD is beneficial for health. The inclusion of many vitamins and minerals required for mental health in the MD is beneficial in this regard. Especially during the pandemic period, both the awareness level of the society on healthy nutrition should be increased and its implementation as a lifestyle should be supported. This situation can reduce the fear and phobia in the society. The mental support of the society during the pandemic period should not be neglected.

Limitations

This research was conducted only on university students. In order to get more detailed results, studies can be carried out on large samples in different age groups. Our study was conducted with an online questionnaire form due to the pandemic process. Doing it face-to-face could have different effects on the result. In addition, the participants in our study were not asked whether they used drugs related to anxiety and depression.

Conflict of Interest: each author declares that he or she has no commercial associations (e.g. consultancies, stock ownership, equity interest, patent/licensing arrangement etc.) that might pose a conflict of interest in connection with the submitted article.

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