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Lifestyle Behavior Changes and Adherence to the Mediterranean Diet During the COVID-19 Pandemic: A Cross-Sectional Study from Turkey

COVID-19 Pandemisi Sürecindeki Yaşam Tarzı Davranış Değişiklikleri ve Akdeniz Diyetine Uyum: Türkiye'den Kesitsel Bir Çalışma

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Abstract

This study aims to identify changes in lifestyle behaviors, diet, sleep duration, and physical activity, which are the main determinants of health, during the COVID-19 quarantine. Changes in nutrition, physical activity, and sleep patterns of 3294 adults (18-65 years old) living in Turkey were examined through an online questionnaire. Evaluation of the periods before and during the pandemic revealed a statistically significant increase in body weight (70.5±15.12 kg, 71.5±15.58 kg, p<0.001) and BMI (24.0±4.24 kg/m2, 24.3±4.36 kg/m2 p<0.001) values in participants. The mean Mediterranean Diet Adherence Score of the participants was 7.0±2.37, with 25.0% low, 60.5% moderate, 14.5% high-level Mediterranean diet pattern. The physical activity duration was less than 30 minutes or 30-45 minutes in the majority of women (80.8%), and 30-45 minutes or more than 45 minutes in the majority of men (68.8%) (p<0.001). All food groups' consumption frequency increased statistically significantly compared to the pre-quarantine period (p<0.001). Compared to the pre-quarantine period, the participants' water consumption (46.7%) and sleep duration (44.3%) increased, while their physical activity levels (57.5%) decreased. The results of this study confirm that nutrition and lifestyle behaviors have changed drastically during the pandemic. Based on the relationship between the immune system and nutrition, it is crucial to raise awareness in society about healthy, adequate, and balanced nutrition and physically active life.

Keywords: Body mass index, COVID-19, dietary habits, physical activity

Özet

Bu çalışma, COVID-19 pandemisi sırasında sağlığın temel belirleyicileri olan diyet, fiziksel aktivite, uyku süresi ve yaşam tarzı davranışlarındaki değişiklikleri belirlemeyi amaçlamaktadır. Türkiye'de yaşayan 3294 yetişkinin (18-65 yaş) beslenme, fiziksel aktivite ve uyku düzenindeki değişiklikler online bir anket aracılığıyla incelenmiştir. Pandemi öncesi ve pandemi sırasındaki dönemler değerlendirildiğinde bireylerin vücut ağırlığı (70,5±15,12 kg, 71,5±15,8 kg, p<0,001) ve beden kütle indeksi (24,0±4,24 kg/m2, 24,3±4,36 kg/m2 p<0,001) değerlerinde istatistiksel olarak anlamlı artış saptanmıştır. Katılımcıların ortalama Akdeniz Diyeti Uyum Puanı 7,0±2,37 olup, %25,0 düşük, %60,5 orta, %14.5 yüksek düzeyde Akdeniz diyeti örüntüsüne sahiptir. Fiziksel aktivite süresinin kadınların çoğunluğunda (%80,8) 30 dakikadan az veya 30-45 dakika, erkeklerin çoğunluğunda (%68,8) ise 30-45 dakika veya 45 dakikadan fazla olduğu belirlenmiştir (p<0,001). Tüm besin gruplarının tüketim sıklığı karantina öncesine göre istatistiksel olarak anlamlı olarak artış göstermiştir (p<0,001). Karantina öncesi döneme göre katılımcıların su tüketimi (%46,7) ve uyku süreleri (%44,3) artarken, fiziksel aktivite düzeyleri (%57,5) azalmıştır. Bu çalışmanın sonuçları, pandemi sırasında beslenme ve yaşam tarzı davranışlarının büyük ölçüde değiştiğini doğrulamaktadır. Bağışıklık sistemi ve beslenme arasındaki ilişkiye dayanarak, toplumda sağlıklı, yeterli ve dengeli beslenme ve fiziksel olarak aktif bir yaşam hakkında farkındalık yaratmak çok önemlidir.

Anahtar Kelimeler: Beden kütle indeksi, beslenme alışkanlıkları, COVID-19, fiziksel aktivite

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1. Introduction

We are facing a serious public health crisis due to the COVID-19 pandemic. National and international measures have been taken against the pandemic, and quarantine practices and restrictions have been implemented. The pandemic restrictions are considered to facilitate coping with the transmission of the disease, but also adversely affect health by causing obesity and weight gain associated with immunological and cardiopulmonary complications (Poskute et.al., 2021).

During the pandemic period, sleep duration may be prolonged for various reasons. Social distancing and work-from-home recommendations and policies aimed at reducing the spread of the virus are likely to increase sleep duration, unlike what has been observed in previous crises, as most of the population commutes less, stays at home more, and spends less time socializing (Lewnard et.al.,2020). Monitoring sleep duration may be beneficial to identify poor sleep practices and developing appropriate interventions to improve sleep during the lockdown (Robbins et.al.,2021).

Providing and maintaining optimal nutrition is imperative to establish a defense mechanism against the SARS-CoV-2 virus. Unhealthy eating habits may contribute to mortality rates during the pandemic. A recent study reported that high-level consumption of diets rich in sugars, refined carbohydrates, and saturated fats may contribute to prevalence of type 2 diabetes and obesity and increase the COVID-19 mortality and morbidity risk (Butler et.al., 2020). Therefore, it is crucial to access to healthy foods more than ever, and community-wide care should be taken in maintaining healthy dietary habits to decrease susceptibility to COVID-19 and its long-term complications. Besides preventing obesity, Mediterranean diet can be protective against COVID-19, thanks to the macro and micronutrients it contains (Zargarzadeh et al.,2022).

There is limited evidence on how quarantine affects physical activity, sleep duration, and nutritional behaviors. It is essential to explore how physical activity, dietary habits, and body composition may be affected by long-term restrictions and quarantine to develop quarantine-specific nutrition and physical activity guidelines that include lifestyle changes (Martínez-de-Quel et.al., 2021).

2. Method

2.1. Objectives

This study aims to examine the changes in lifestyle habits such as nutritional behavior, physical activity, and sleep during the COVID-19 quarantine. The results of the study will provide information to the literature by determining the effect of quarantine on lifestyle behaviors such as dietary behavior, nutritional status, physical activity, and sleep duration.

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2.2. Questions

The questions of this study are “Have there been any changes in the diet and adherence to the Mediterranean Diet of individuals residing in Turkey during the pandemic?” and “Has there been a difference in the physical activity levels of individuals residing in Turkey during the pandemic?”

2.3. Sample Size and Participants

This cross-sectional study was conducted among randomly selected adults from Turkey. The questionnaire was administered via an electronic Google form and was sent online (WhatsApp, Instagram, and email) from October to December 2020. The sample size was calculated using the biostatistical power analysis program G-Power, based on 95% power, an effect size of 0.1, and α=0.05. Permanent residents in Turkey aged 18-65 were included in the study, while those younger than 18 or older than 65, non-Turkish citizens and non-residents of Turkey, those with chronic diseases, those on a special diet, and pregnant women were excluded from the study. A flowchart of patient selection according to exclusion and inclusion criteria is shown in Figure-1.

2.4. Data Collecting

The data were collected from the volunteer participants using an online questionnaire. Informed consent form was obtained from all participants before participation. Precaution was taken to protect the privacy and confidentiality of personal information. The confidentiality of the information provided by the research participants and the confidentiality of the respondents were ensured. The questionnaire form includes the general characteristics of the individuals, information about their nutritional status before and during the quarantine, their nutritional habits, self-assessed anthropometric measurements (height and body weight), physical activity level, sleep duration, and questions to determine the adherence to the Mediterranean diet.

2.4.1. Determination of Nutritional Status

Height and body weight values before and during quarantine were recorded based on the statements of the participants. The 14-item food consumption frequency questionnaire (FFQ) was used to evaluate the nutritional habits of the participants before and during the quarantine. The frequency in the FFQ was evaluated as; none, 1-3 times a month, once a week, several times a week, once a day, and several times a day. The frequencies of some food groups’ consumption were scored as 0: Never, 1: 1-3 times a month, 2: Once a week, 3: Several times a week, 4: Once a day, 5: Several times a day.

2.4.2. Assessment of the Adherence to the Mediterranean Diet

The Mediterranean diet pattern characteristics of individuals were assessed by the Mediterranean Diet Adherence Score (MEDAS) developed by Martínez-González et al. (2012). A MEDAS score of lower than 5 was considered poor adherence, 6–9 moderate adherence, and a score of ≥10 good adherence.

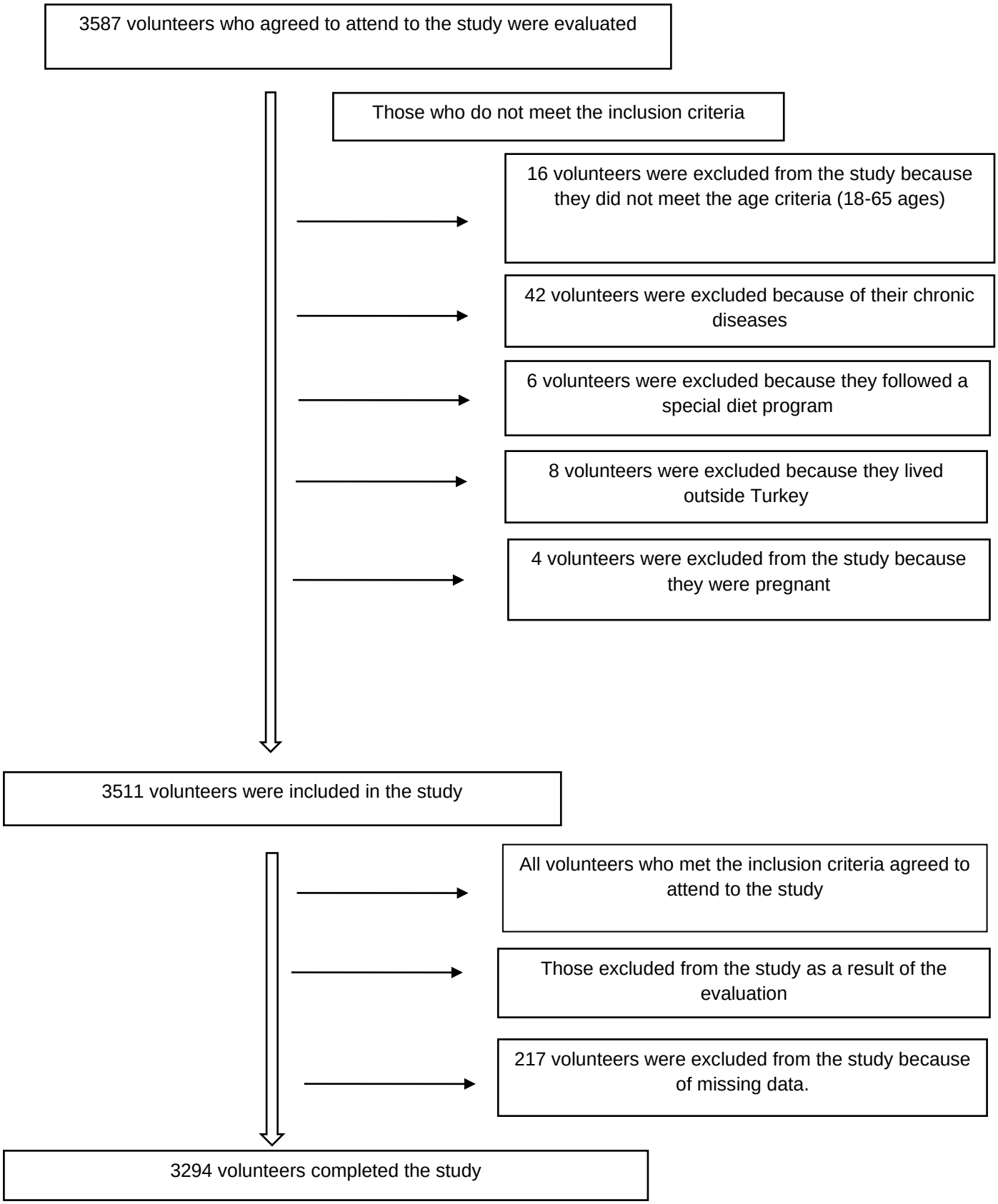

Figure 1. Participants' recruitment flow chart

2.4.3. Assessment of Sleep and Physical Activity Status

Questions about sleep duration and physical activity duration were directed to the participants, and the change experienced during the pandemic was questioned and evaluated based on the participants' statements.

2.5. Ethics Committee

This study was conducted in line with the principles of the Declaration of Helsinki ("World Medical Association Declaration of Helsinki: Ethical Principles for Medical Research Involving Human Subjects," 2014). Ethics committee approval for the study was obtained from Istanbul Medipol University Non-Interventional Ethics Committee with reference number 10840098-772.02-E.60601 dated 22/10/2020.

2.6. Limitations

The present study has some limitations. The restrictions applied due to the pandemic made it necessary to gather data with the online survey tool. Therefore, all components including height, body weight, physical activity, nutrition, and sleep habits were based on individuals' self-report, recall, and perception. Another limitation of the study is that dietary habits were based only on the frequency (not quantity) of food consumption.

2.7. Analysis

Descriptive statistics were presented as frequency and percentage for categorical variables and mean±standart deviation for continuous variables. Student's t Test was performed to compare two independent groups and Paired Samples t Test was used to compare two dependent groups. Chi-Square Test was conducted to compare two categorical variables. All statistical analyses were performed using SPSS 23.0. $p<0.05$ was considered as statistically significant.

3. Results

The general characteristics of the individuals participating in the study are given in Table 1. This study included 3294 people with a mean age of 28.9±10.9 years, 48.8% were male, and 51.2% were female.

Table 1. General characteristics of the participants

	Male		Female		Total	
	n	**%**	**n**	**%**	**n**	**%**
Gender	1606	48.8	1688	51.2	3294	100.0
Age (X±SD)	29.71±11.40		28.21±10.40		28.94±10.92	
Marital status						
Married	510	31.8	539	31.9	1049	31.9
Single	1096	68.2	1149	68.1	2245	68.1
Education status						
primary school and below	32	1.9	59	3,4	91	2.8
middle school-high school	761	47.4	889	52.7	1650	50.1
university and above	813	50.7	740	43.9	1553	47.1

Anthropometric measurements of the participants are given in Table 2. The mean BMI values of men were statistically significantly higher than women before and during the quarantine (p<0.001).

Table 2. Anthropometric measurements of the participants and their changes during the quarantine process

	Before quarantine			After quarantine			
	Male (X±SD)	Female (X±SD)	Total (X±SD)	Male (X±SD)	Female (X±SD)	Total (X±SD)	p
Body weight (kg)	79.76±13.01	61.81±11.32	70.56±15.12	81.16±13.24	62.36±11.61	71.53±15.58	<0.001
BMI (kg/m^2)	25.17±3.97	22.95±4.21	24.03±4.24	25.61±4.04	23.15±4.32	24.35±4.36	<0.001

The changes in the BMI classes of the participants before and during the quarantine are given in Figure 2. While the rate of individuals with normal BMI before the quarantine was 57.98% and the rate of obese individuals was 8.99%, the rate of individuals with normal BMI during quarantine decreased to 54.3% and the rate of obese individuals increased to 11.0%.

There was a statistically significant difference between the distribution of BMI classification before and during the quarantine (p<0.001). It was determined that 21.4% of the participants who were underweight before quarantine became normal weight, 10.3% of those who had normal BMI became overweight, and 11.5% of those who were overweight became obese during quarantine (not given in the table).

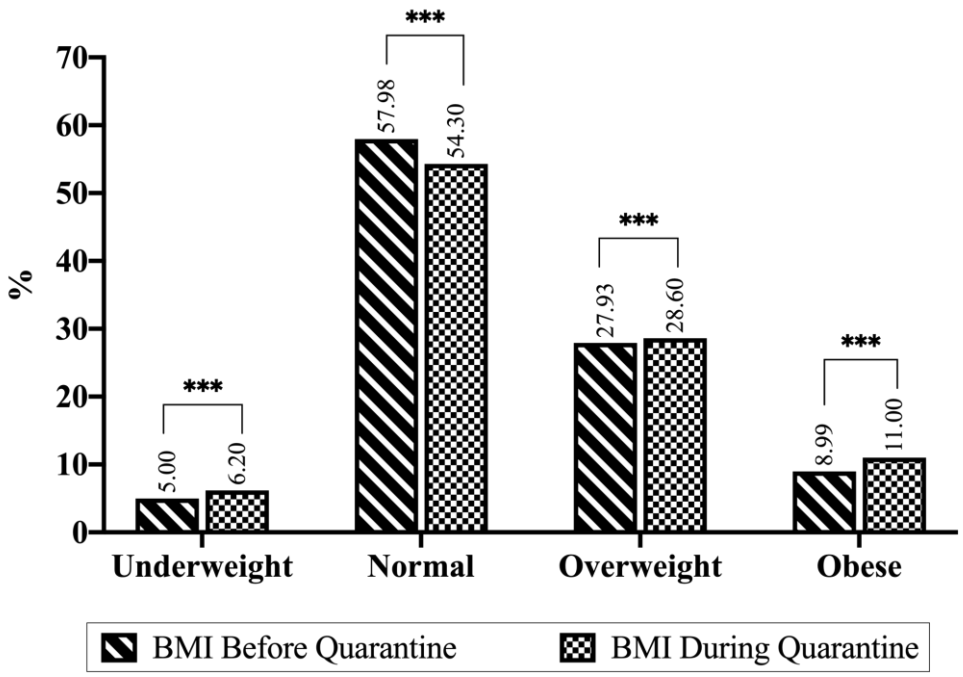

Figure 2. BMI category changes of participants before and during quarantine

Changes in the nourishment, physical activity, and sleep patterns of the participants are given in Figure 3. The main meal (46.78%) and snack (43.53%) consumption of approximately half of the participants did not change compared to pre-quarantine, but water consumption (46.72%) and sleep

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duration (44.29%) increased. The physical activity level of most of the participants (57.5%) decreased. During quarantine, there was no statistically significant difference for skipping meals between genders (p=0.116). In quarantine, men (18.5%) skipped breakfast more often (12.6%), and women (31.8%) skipped lunch and snacks more often (27.0%) (p<0.001). The difference in sleep pattern changes was statistically significant between the genders (p<0.001). While the rate of increased sleep duration was higher in women (47.7%) than men (40.7%), the rate of men and women noting a decrease in their sleep duration was similar (16.5% and 17.0%, respectively) (not given in the table).

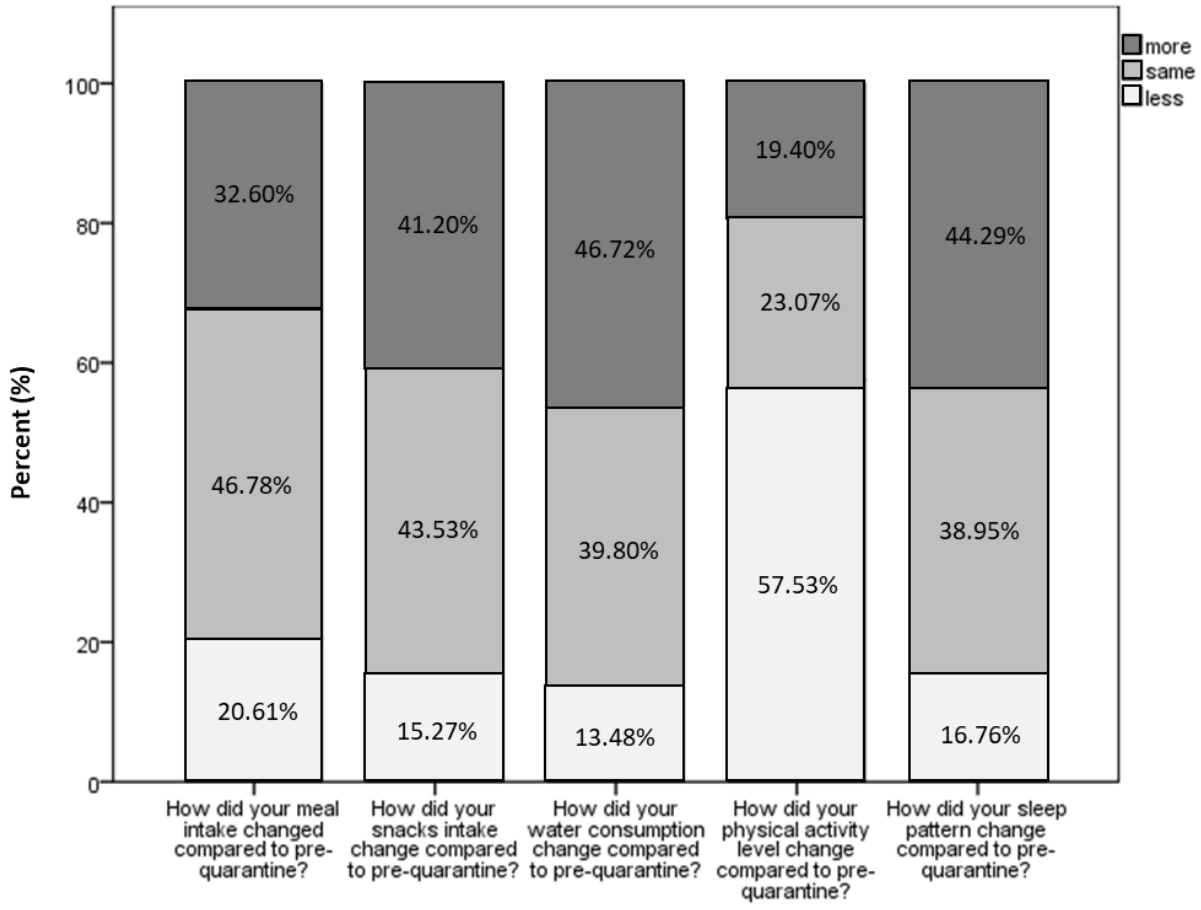

Figure 3. Changes in diet, physical activity and sleep patterns of the participants

The physical activity status of the participants during quarantine is given in Table 1. There was no statistically significant difference between physical activity status and frequency between genders during quarantine (p=0.310, p=0.358, respectively). The physical activity duration in quarantine was less than 30 minutes or 30-45 minutes in the majority of women (80.8%), and 30-45 minutes or more than 45 minutes in the majority of men (68.8%) (p<0.001) (Table 3).

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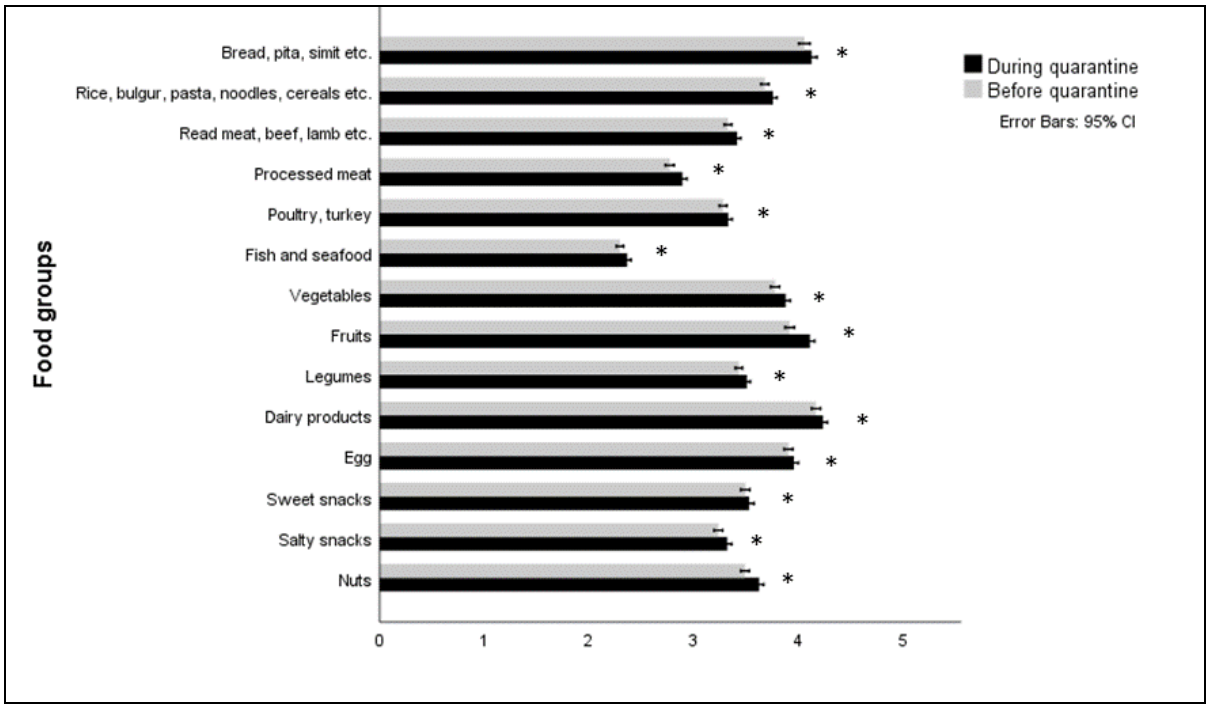
Table 3. Physical activity status of participants during quarantine

	Male (n=1606)		**Female** (n=1688)		**Total** (n=3294)		
	n	%	n	%	n	%	p
Engage in physical activity							
Yes	933	58.1	1010	59.8	1943	59.0	0.310
No	673	41.9	678	40.2	1351	41.0	
Physical activity frequency/per week							
1 time	183	19.6	214	21.2	397	20.4	
2-3 times	395	42.3	440	43.6	835	43.0	0.358
4-5 times	220	23.6	205	20.3	425	21.9	
More than 5 times	135	14.5	151	15.0	286	14.7	
Physical activity period/per week							
Less then 30 minutes	291	31.2	359	35.5	650	33.5	
30-45 minutes	350	37.5	458	45.3	808	41.6	p<0.001*
More than 45 minutes	292	31.3	193	19.1	485	25.0	

The changes in the consumption frequency of food groups compared to the pre-quarantine period are given in Figure 4. Consumption frequency of all food groups except sweet snacks increased statistically significantly during quarantine. The food groups with the highest increase in food consumption frequency score compared to pre-quarantine were the processed meat group (2.7±1.22 vs. 2.8±1.29), fruit (3.9±1.31 vs. 4.11±1.32), and nuts (3.4±1.21 vs. 3.6±1.30), respectively.



**: p≤0.001*

Figure 4. Changes in consumption frequency of food groups compared to pre-quarantine

Participants' adherence to the Mediterranean diet during the pandemic is given in Table 4. The mean MEDAS score of the participants was 7.0±2.37 (moderate adherence). The mean MEDAS score of men was statistically significantly higher than that of women (7.1±2.46 vs. 6.9±2.29, p=0.029). In terms of adherence to the Mediterranean diet, the proportion of women in the low BMI class (24.7%) was lower than men (25.3%), while the proportion of men in the high BMI class (16.4%) was higher than women (12.7%) (p=0.002). The mean MEDAS score of men with normal BMI classification was statistically significantly higher than women (p=0.031).

Table 4. The status of the participants to exhibit the Mediterranean diet pattern during the pandemic process

	Male (n=1606)		**Female** (n=1688)		**Total** (n=3294)		**p**
	n	%	n	%	n	%	
MEDAS classification							
Low compliance	406	25.3	417	24.7	823	25.0	
Medium compliance	937	58.3	1056	62.6	1993	60.5	0.007*
High compliance	263	16.4	215	12.7	478	14.5	
MEDAS score (X±SD)	7.1±2.46		6.9±2.29		7.0±2.37		0.029*
MEDAS score according to BMI classification (X±SD)							
Underweight	6.89±3.04		7.04±2.25		7.01±2.39		0.071
Normal	7.07±2.48		6.09±2.24		6.99±2.34		0.031*
Overweight	7.31±2.47		7.13±2.34		7.24±2.42		0.497
Obese	7.14±2.23		6.98±2.62		7.08±2.38		0.779

4. Discussion

This study evaluated individuals' nutritional conditions, physical activity, sleep habits, and MEDAS scores before and during the COVID-19 quarantine.

Extended quarantine period and negative mood towards the pandemic have been associated with body weight gain (Bhutani et.al., 2020, He M et.al., 2021, Pellegrini et.al., 2020). Several studies have revealed weight gain or loss during quarantine (Deschasaux-Tanguy et.al., 2021, Ghosal et.al., 2020, Pellegrini et.al., 2020, Reyes-Olavarría et.al., 2020, Rodríguez-Pérez et.al., 2020). Body weight gain after the two-month quarantine period was between 0.5 and 1.8 kg (Deschasaux-Tanguy et.al., 2021, Ghosal et.al., 2020). Statistically significant increases were observed in body weight and BMI values in both genders in this study. Mean body weights and BMI values increased statistically significantly in both genders after quarantine. Evaluation of BMI values revealed that the BMI classification of most of the participants did not change during quarantine. When the participants who experienced a change in BMI classification were assessed, it was determined that those who were underweight before quarantine became normal weight, those who had normal BMI became overweight, and those who were overweight became obese during quarantine. A study investigating the worldwide effect of COVID-19 quarantine on BMI (n=10121) reported a noted increase in BMI values but no change in BMI classifications. It has been reported that before and after the quarantine, BMI values remained

normal in women (24.3±5.27 kg/m^2, 24.3±5.26 kg/m^2, respectively), and 13.1% of total participants were obese after quarantine (Urzeala et.al., 2021).

Studies in the literature show that the mandatory decrease in physical activity levels and changes in eating habits during quarantine caused changes in the bodyweight of individuals. A recent study reported that 29.9% of participants had an increase in body weight as a result of quarantine (Sidor et.al., 2020). A study by Martinez-de Quel et al. (2021) evaluating physical activity, sleep, and eating habits before and after quarantine (n=693) determined that the average body weight of individuals increased (67.3±14.8 vs. 67.7±15.1, p=0.012), and physical activity and sleep quality decreased during quarantine. Another study conducted with adults (n=507) found that 62.5% of individuals did less physical activity during quarantine and 48.0% gained body weight (Matsungo et.al., 2020).

Although there is not enough data on the effect of regular physical activity on COVID-19 contraction, it is known that insufficient physical activity is a risk factor for severe COVID-19-related chronic diseases (Centers for Disease Control and Prevention, 2021). A large-sample study investigating the relationship between physical activity and COVID-19 (n=48440) determined that patients who were consistently inactive had a statistically significantly higher risk of hospitalization (OR 1.20), admission to intensive care unit (OR 1.10), and death due to COVID-19 (OR 1.32) than patients doing physical activity (Sallis et.al., 2021). The incidence, symptom intensity, and mortality from various viral infections have been reported to be lower in individuals physically active on a regular basis, and this has been attributed to the ability of physical activity to improve immune function (Burtscher et.al., 2021, da Silveira et.al., 2021). Moreover, regular physical activity has been found to reduce the risk of systemic inflammation contributing to COVID-19-induced lung injury (Sallis et.al., 2021). Nevertheless, immobilization due to hospitalization and physical inactivity due to constant quarantine and social distancing can reduce ability of organ systems to resist viral infection and increase the risk of damage to the immune, respiratory, cardiovascular, systems (Woods et.al., 2020).

It is thought that in addition to quarantine restrictions and work-from-home method, physical activity levels have decreased further with the closure of sports clubs. The present study found no significant difference between the genders in terms of physical activity status and frequency during quarantine. Although there was no difference in physical activity duration in quarantine, it was determined that the duration was less than 30 minutes in most women, and 30-45 minutes in most men. It was found that the level of physical activity of more than half of the participants decreased during the pandemic. An international study investigating the changes in lifestyle habits during the COVID-19 quarantine found that the weekly physical activity time decreased from 108 minutes to 71 minutes, and the daily sitting time increased from 5 hours to 8 hours (Ammar et.al., 2020). Another large-sample study (n=35915) reported that the physical activity level of 62.4% of the participants did not change, 28.6% decreased and 9.0% increased (Bu et.al., 2021). Many studies have shown that being overweight and obese increases the risk of severe COVID-19 and mortality (Peña et.al., 2021, Suresh et.al., 2021). For this reason, it is thought that measures taken in order to increase individuals' physical activity levels and develop healthy nutritional habits during the pandemic will help maintain body weight and reduce the risk of severe COVID-19.

The present study evaluating the changes in sleep duration and habits during quarantine revealed statistically significant differences in the sleep pattern changes between genders. Sleep duration increased more in women than in men during quarantine. Of the participants, 44.2% stated that they slept more during quarantine. A study comparing sleep durations with 2019 (n=163 524) showed that the average sleep duration in 2020 was higher in all groups due to COVID-19 pandemic (Rezaei et.al., 2021). An observational study evaluating sleep times before and during pandemic reported a statistically significant increase in estimated sleep duration with a statistically significant increase of 13.7 to 22.3 minutes ($p<0.001$) (Robbins et.al., 2021).

During quarantine, changes in eating habits may occur due to reduced physical activity and the stress of adapting to a new situation. The present study determined that the main meal and snack consumption of more than half of the participants changed during quarantine. Men skipped breakfast more often than women during quarantine, and women skipped lunch and snacks more often than men. Ammar et al. (2020) reported a statistically significant increase in individuals' number of main meals. Another study (n=1097) reported that 43.5% of individuals ate more food during quarantine, 51.8% consumed more snacks, approximately one-third of the participants did not consume fresh vegetables and fruits daily, 26.1% consumed sweets at least every day (Sidor et.al.,2020). These results suggest that increased stress and boredom due to longer stays at home during quarantine may be reflected in daily eating habits in the form of emotional eating.

It has been reported that the pandemic has different effects on lifestyle and food consumption patterns, and these effects can result in changes in dietary habits (Janssen et.al., 2021). A cross-sectional study (n=2680) reported a change in the frequency of food consumption during the pandemic in 15-42.0% of the participants compared to the pre-pandemic period. Foods with the highest change in consumption frequency were frozen, canned foods, cakes, and biscuits (Janssen et.al., 2021). The present study detected a statistically significant increase in the consumption frequency of all food groups (bread, Turkish bagels, rice, cracked wheat, pasta, red meat, processed meat products, chicken, fish and seafood, vegetables-fruits, milk and dairy products, sweet and salty snacks, etc.) compared to pre-quarantine, with the most significant increase in the consumption frequency of red meat, processed meat products, sweet and salty snacks. Giacalone et al. reported that, compared to the pre-pandemic period, 17.7% of the participants reduced their consumption of fried food, 19.5% vegetables, 24.9% fruit, 25.4% fast food, while 15.8% increased their consumption of fish, 21.4% carbonated beverages and 38.1% homemade pastries (Giacalone et al., 2020). Another study found that consumption of healthy foods (fruits, vegetables, nuts, and legumes) increased in 37.4% of the participants and decreased in 35.8% of the participants during quarantine, while water consumption was less than 1 liter in 26.2%, 1-2 liters in 60.4%, and more than 2 liters in 13.4% of the participants (Di Renzo et.al., 2020). In this study, the observed increase in consumption of vegetables, fruits, and legumes complied with WHO-COVID-19 nutritional guidelines and these foods are known to have an immune-supporting effect with their high nutrient content (Górska et.al., 2021).

Since the Mediterranean diet has been associated with reduced risk of comorbidities related to COVID-19, adherence to the Mediterranean diet may be negatively correlated with COVID-19

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symptoms and related deaths. This correlation is hypothesized due to the anti-inflammatory properties of this diet, possibly due to its polyphenol content (Greene et.al., 2021). Based on this hypothesis, individuals' adherence to the Mediterranean diet pattern gains importance, especially during the pandemic. In the present study, there was a low level of adherence to a Mediterranean diet pattern in 25.0%, a moderate level in 60.5%, and a high level in 14.5% of the participants, and the mean MEDAS score was 7.07±2.37. A study evaluating the Mediterranean diet pattern (n=689) found that the adherence was low in 49.0%, moderate in 42.0%, and high in 9.0% of the participants (Di Renzo et.al., 2020). In another similar study (n=2462), more than half of participants showed low adherence, with only 7.0% showing high adherence to Mediterranean diet, and the mean MEDAS score was 5.4±2.1 (Giacalone et. al., 2020). In a study evaluating the adherence to Mediterranean diet before and during quarantine (n=7514), the MEDAS score increased statistically significantly from 6.5±2.00 to 7.3±1.93 during quarantine. In addition, the consumption of fried foods, snacks, pastries, and sugary drinks decreased during quarantine, while the consumption of foods related to the Mediterranean diet such as olive oil, vegetables, fruits, and legumes increased ($p<0.05$) (Rodríguez-Pérez et.al., 2020). The moderate level of adherence to the Mediterranean diet determined in the present study is in line with the literature. The data obtained suggest that there is a trend towards healthy eating with the development of health awareness during quarantine and the COVID-19 pandemic.

5. Conclusion

The findings of this study revealed that the consumption of all food groups and BMI values increased, the rate of physical activity decreased, and sleep duration increased during COVID-19 quarantine. It seems that the anxiety of being exposed to the virus and staying at home for a long time, together with increased stress and boredom, can be reflected in daily eating habits in the form of emotional eating and reduced physical activity. However, it is acknowledged that the present study has some limitations. The restrictions applied due to the pandemic made it necessary to gather data with the online survey tool. Therefore, all components including height, body weight, physical activity, nutrition, and sleep habits were based on individuals' self-report, recall, and perception. Another limitation of the study is that dietary habits were based only on the frequency (not quantity) of food consumption. Planning and conducting more comprehensive observational studies will help fill this gap in the literature. Since physical activity, sleep duration, lifestyle behaviors, and dietary characteristics are based on self-evaluations, perceptions, and memories of individuals in this study, this relationship should be clarified with metabolism-based studies that can eliminate this limitation. As a conclusion, it is essential to raise awareness of society on adequate and balanced nutrition and a healthy lifestyle to support the immune system and reduce the risk of COVID-19 morbidity and mortality throughout the pandemic.

Authors Contributions

Topic selection: NYS, FES; Design: NYS, FES; Planning: FY, SD; Data collection: NYS, FES; Data analysis: VÖ, İA, HDS, GE; Article writing: MP, FÖ, HB; Critical review: VÖ, İA, HDS, GE.

Conflict of Interest

The authors have no conflict of interest to disclose.

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