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INVESTIGATION OF THE EFFECT OF COVID-19 OUTBREAK ON PHYSICAL ACTIVITY, PERCEIVED STRESS, PHYSICAL ACTIVITY AWARENESS AND EXERCISE BARRIERS: A NATIONAL STUDY

ORIGINAL ARTICLE

ABSTRACT

Purpose: The aim of this study was to investigate the effect of COVID-19 on physical activity (PA), perceived stress, awareness of physical activity, and exercise barriers nationally.

Methods: The survey was sent online and data were collected from 1087 volunteers between May 8-31, 2020. The physical activity levels of the respondents were evaluated with the International Physical Activity Questionnaire-Short Form (IPAQ-SF) and stress levels with the Perceived Stress Scale. The awareness of exercise and barriers to exercise were questioned with qualitative questions. One-way ANOVA, the Chi-squared test, and Pearson Correlation analysis were used to evaluate the data.

Results: During the COVID-19 pandemic, 70% of adults had inadequate PA. It was observed that the stress level was different in terms of PA levels ($p<0.001$), and individuals with low-intensity PA levels had higher stress levels. The stress levels and inactivity levels of females were higher than those of males, and the 18-29 age group had a higher stress level ($p<0.001$).

Conclusion: The precautions taken during the COVID-19 outbreak in Turkey were seen to have a negative effect on physical activity and stress levels, and the most affected groups in this outbreak were females and young adults. Home-based exercises can support the protection of physical and mental health, and avoid the risk of inactivity-related health problems during the COVID-19 outbreak.

Key Words: Awareness, COVID-19, Psychological Stress, Physical activity.

COVİD-19'UN FİZİKSEL AKTİVİTE, ALGILANAN STRES, FİZİKSEL AKTİVİTE FARKINDALIĞI VE EGZERSİZ YAPMAMA NEDENLERİ ÜZERİNE ETKİSİNİN ARAŞTIRILMASI

ARAŞTIRMA MAKALESİ

ÖZ

Amaç: Çalışmamızda COVID-19'un ulusal düzeyde fiziksel aktivite (FA), algılanan stres, fiziksel aktivite farkındalığı ve egzersiz yapmama nedenleri üzerindeki etkisini araştırmak amaçlandı.

Yöntem: Anket online olarak gönderildi ve veriler 8-31 Mayıs 2020 tarihleri arasında 1087 gönüllünün katılımı ile toplandı. Katılımcıların fiziksel aktivite düzeyleri Uluslararası Fiziksel Aktivite Anketi (UFAA)-Kısa Formu ile, stres düzeyleri Algılanan Stres Ölçeği ile değerlendirildi. Egzersiz farkındalığı ve egzersiz yapmama nedenleri ise nitel sorularla sorgulandı. Verilerin değerlendirilmesinde tek yönlü ANOVA, Ki-kare testi ve Pearson Korelasyon analizi kullanıldı.

Sonuçlar: COVID-19 salgını sırasında, yetişkinlerin %70'inin yetersiz FA değerlerine sahip olduğu saptandı. Farklı FA düzeylerine sahip bireylerin stres düzeyinin de farklılık gösterdiği ($p <0.001$) ve düşük şiddetli FA düzeyine sahip bireylerin daha yüksek stres düzeylerine sahip olduğu bulundu. Kadınların erkeklere göre daha yüksek stres ve inaktivite düzeyine, 18-29 yaşları arasındaki bireylerin ise diğer yaş gruplarına göre daha yüksek stres düzeyine sahip olduğu saptandı ($p <0.001$).

Tartışma: Türkiye'de COVID-19 salgını sırasında alınan önlemlerin fiziksel aktivite ve stres düzeylerini olumsuz etkilediği görüldü ve bu salgından en çok etkilenen grupların kadınlar ve genç yetişkinler olduğu saptandı. COVID-19 salgını sırasında uygulanabilecek ev egzersiz programları, fiziksel ve zihinsel sağlığın korunmasını destekleyebilir ve hareketsizlikle ilişkili sağlık sorunlarının oluşma riskini önleyebilir.

Anahtar Kelimeler: Farkındalık, COVID-19, Psikolojik Stres, Fiziksel Aktivite.

INTRODUCTION

Coronavirus disease 2019 (COVID-19) appeared in China, in December 2019, rapidly spread worldwide and the World Health Organization (WHO) declared this outbreak a pandemic on March 11, 2020 (1,2). The first COVID-19 cases in Turkey were recorded on March 11, 2020, and as in many other countries measures were taken to prevent the spread of the outbreak. Thus, concepts such as "social distance, staying at home, and quarantine" also became an important part of our daily life.

In a study by Qin et al, the measures taken were seen to seriously change daily routine activities and it was reported that more than half of Chinese adults temporarily lived a sedentary lifestyle with insufficient PA, more sitting time, and poor emotional states during the COVID-19 outbreak (3). Many other researchers have emphasized the importance of PA in the COVID-19 outbreak and have published studies presenting various recommendations and exercise guidance (4,5).

In societies that have experienced previous outbreaks, negative psychological symptoms have been recorded and recent studies have indicated that the COVID-19 pandemic also has a negative impact not only on physical health but also on mental health (4-6). PA has been shown to significantly improve the risk of viral infection, stress, and anxiety, and it is well known that inadequate PA is an important risk factor for many diseases (8,9).

Physical inactivity has also been defined as a pandemic and approximately 3.2 million deaths per year are associated with insufficient PA (10). The world is therefore currently experiencing two pandemics together. Hall et al. warned that the world would recover from the COVID-19 pandemic, normal activities would continue, and then more troublingly, the world would be at risk of an inactivity pandemic (11). Therefore, it is important to determine whether the level of PA has been affected nationally and internationally during the pandemic.

The aim of this study was to investigate the effect of COVID-19 pandemic on PA, perceived stress, PA awareness, and exercise barriers. This investigation will provide information on the PA level impact during the pandemic and may be a resource for the development of outbreak strategies and policies.

METHODS

The study was approved by the IRB and was conducted in compliance with the Helsinki Declaration. Informed consent was obtained from all participants online. Individuals who were having been diagnosed with COVID-19 and went out of the house for more than ten days to go to work in the last one month were not included in the study. Inclusion criteria were age ≥18 years and willing to participate.

The sample size of the study was calculated with G-Power software (Version 3.1.9.2, University of Dusseldorf, Dusseldorf, Germany). According to the unknown prevalence formula, the number of individuals in the population was 384 at a 95% confidence interval and 50% prevalence. The sample size envisaged for the current study was reached and more was achieved.

Between May 8 and May 31, 2020, the survey was sent online to 1110 individuals. Of these, 23 did not wish to participate, so the study included 1087 respondents, comprising 329 males and 758 females (mean:31.30±12.55, range:18-76 years).

The demographic characteristics of the participants, duration of staying at home were questioned. The age data was divided into 11 groups, and the cities where the participants lived were divided into two groups, as those with and without restrictions.

PA level and sitting time were evaluated using the Turkish version of the International Physical Activity Questionnaire-Short Form (IPAQ-SF) (12). IPAQ-SF includes items about severe and moderate PA, walking time, and sitting time over the last 7 days. The scoring of the form is calculated by multiplication of the metabolic equivalent task (MET) level of the activity performed, the number of days per week, and for how many minutes per day. In the interpretation of the results a PA level behavior of <600 MET-min/week is low, PA level behavior of 600-3000 MET-min/week is moderate and PA level behavior of >3000 MET-min/week is high (13).

The perceived stress was evaluated with the Turkish version of the Perceived Stress Scale (PSS)

(14). This scale consists of 14 items to evaluate stressful situations experienced in the past month with 5-point Likert-type responses. High scores obtained from the scale indicate a high level of stress (15).

In order to evaluate the awareness of the participants about their PA, the level of PA before and during COVID-19 pandemic, the effect of COVID-19 pandemic on PA, and the level of exercise requirement were questioned. During the pandemic, participants were asked how they obtained the information they needed about exercise, whether they found this information useful, whether they did the exercises, and how they changed their PA. To evaluate the barriers to exercise, the respondents were also asked to select the exercise barriers that suited them with ten reasons given.

Statistical analysis

Data obtained in the study were analyzed statistically using IBM SPSS Statistic software for Windows (Version 23.0. Armonk, NY: IBM Corp). Descriptive statistics were used for qualitative data. Prior to the statistical evaluation, conformity of the data to normal distribution for all continuous measurements in all groups was assessed with the Kolmogorov Smirnov test. The Chi-square test was used to examine the relationships between categorical variables, and the one-way ANOVA was used to compare more than two independent groups. Pearson Analysis was used in the evaluation of the relationship between continuous variables. The level of $p<0.05$ was defined as statistical significance.

RESULTS

The distribution of the participants by age ranges, cities with restrictions, and educational status are given in Table 1. The presence and distribution of diseases of the participants are shown in Figure 1.

It was seen that the participants were able to access information about PA and exercise practices during the COVID-19 pandemic from social media (47.8%), websites (39.2%), news (8%), television programs (4.3%), and advertisements (0.6%). When

Table 1. Demographic characteristics of the participants.

	Females n (%)	**Males n (%)**	**TOTAL n (%)**
Gender	758 (69.70)	329 (30.30)	1087 (100)
Age (years)			31.30±12.55
< 20	108 (9.90)	33 (3.00)	141 (13.00)
20-24	223 (20.50)	75 (6.90)	298 (27.40)
25-29	117 (10.80)	64 (5.90)	181 (16.70)
30-34	67 (6.20)	42 (3.90)	109 (10.00)
35-39	58 (5.30)	28 (2.60)	86 (7.90)
40-44	66 (6.10)	28 (2.60)	94 (8.60)
45-49	46 (4.20)	18 (1.70)	64 (5.90)
50-54	19 (1.70)	16 (1.50)	35 (3.20)
55-59	25 (2.30)	9 (0.80)	34 (3.10)
60-64	19 (1.70)	11 (1.00)	30 (2.80)
>64	10 (0.90)	5 (0.50)	15 (1.40)
Cities with Restrictions	679 (62.50)	288 (26.50)	967 (89.00)
Cities without Restrictions	79 (7.30)	41 (3.80)	120 (11.00)
Education Status			
Primary school	8 (0.70)	3 (0.30)	11 (1.00)
Middle school	24 (2.20)	8 (0.70)	32 (2.90)
High school	269 (24.70)	104 (9.60)	373 (34.30)
Associate degree	64 (5.90)	18 (1.70)	82 (7.50)
University	244 (22.40)	138 (12.70)	382 (35.10)
Master of Degree	94 (8.60)	34 (3.10)	128 (11.80)
Doctor of Philosophy	55 (5.10)	24 (2.20)	79 (7.30)

%: Percentage

Table 2. The distribution of the responses about staying at home, and awareness of physical activity.

	0 days (d)	**0-5 d**	**5-10 d**	**10-15 d**	**15-20 d**
How many days have you been out of the house to go to work in the last month? (%)	67.40	13.20	5.40	5.70	8.30
	0-2 wk	**2-4 wk**	**4-6 wk**	**6-8 wk**	**> 8 wk**
How many weeks have you been at home because of COVID-19? (%)	10.7	4.10	21.00	43.70	20.50
	1-I Agree	**2**	**3**	**4**	**5- I don't Agree**
I think I should exercise regularly during this period when I have to stay home because of COVID-19. (%)	1.70	2.80	12.20	18.80	64.60
I think I was physically active during my stay at home due to COVID-19. (%)	18.10	21.30	30.10	14.40	16.10
I think I was physically active BEFORE I HAD TO STAY AT HOME because of COVID-19. (%)	3.80	9.90	21.70	25.90	38.70
Physical activity makes me feel good and I feel motivated to exercise. (%)	5.10	9.80	21.90	24.10	39.20
I think that my physical activity level has decreased during this time that I have been at home because of COVID-19. (%)	11.00	8.70	14.70	17.50	48.00
I think that the decrease in my physical activity level during this time I have been at home due to COVID-19 has affected me psychologically. (%)	13.80	10.00	18.30	21.50	36.30

d: days, wk: week, %: percentage

the participants evaluated the level of knowledge they gained about PA and exercise, they stated that they had very good (10.90%), good (28.3%), medium (40.1%), low level (15%) of knowledge and no knowledge (5.6%). While some participants stated that they found the information they gained about PA and exercise applications very useful (12%) and useful (56.9%), there were also those who were undecided (25.5%) and those who did not find it useful (4%). Only 22.4% of the participants said that they did these exercises regularly and stated that exercises increased their PA levels well (13.40%) and moderately (28.7%). The distribution of the responses about staying at home, and awareness of PA is given in Table 2.

When the participants were asked the reasons for not exercising during quarantine, the responses given in order were; being too lazy to exercise (45.6%), preferring other activities instead of exercising (30.2%), being bored (28.8%), not finding the appropriate physical environment (25.2%), do not like exercising (20%), not having time for housework and children (17.6%), not knowing where to start (14.4%), in these conditions, the last thing that comes to mind is exercise (12.2%), tried before and failed as a result (10.9%), and too tired (8.6%).

The PA MET values during quarantine were lower in females than in males ($p<0.001$) (Table 4). While the proportion of females with low-intensity PA level was higher, the proportion of females with moderate-intensity PA level was lower than males, and the proportion of males and females with a vigorous-intensity PA level was similar. A significant difference was determined between the PA levels in terms of age, and the physical inactivity was found to be highest in the 18-34 years and over 64 years age groups (Table 3) ($F=2.114$, $p=0.021$). No significant difference was observed between the PA MET values according to cities ($p=0.078$) (Table 4).

The sitting time of 61.2% of the participants was over 5 hours. The difference in sitting time was found to be statistically significant between the age groups ($X2=108.301$, $p<0.001$) and was particularly higher in aged 18-29 years. There was no statistically significant difference in sitting time for more than 5 hours by gender ($X2=9.559$, $p=0.089$) and city ($X2=10.590$, $p=0.06$). The sitting time values were divided into groups (0-1 hours (h), 1-2 h, 2-3 h, 3-4 h, 4-5 h, 5 h and above), and there was a

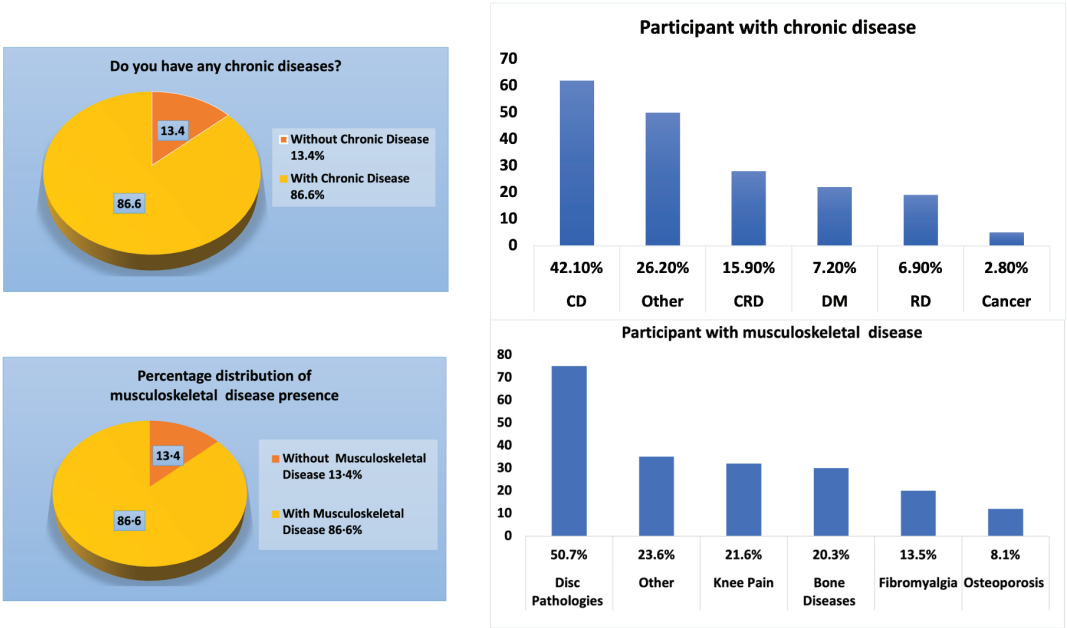

Figure 1. Distribution of chronic and musculoskeletal diseases of the participants.

CD: Cardiovascular Disease, CRD: Chronic Respiratory Diseases, DM: Diabetus Mellitus, RD: Rheumatic Diseases

Table 3. Distribution of physical activity intensity levels in terms of gender, age, city and perceived stress during the COVID-19 outbreak.

	Vigorous -Intensity PA (Mean±SD, %)	Moderate – Intensity PA (Mean±SD, %)	Low - Intensity PA (Mean±SD, %)	P
Gender				***p<0.001****
Female	2.60	23.10	74.30	
Male	2.10	35.30	62.60	
Age (Years)				***p=0.021****
< 20	0.00	24.10	75.90	
20-24	1.70	28.90	69.50	
25-29	1.70	23.80	74.60	
30-34	2.80	24.80	72.50	
35-39	3.50	30.20	66.30	
40-44	2.10	27.70	70.20	
45-49	4.7	21.90	73.40	
50-54	2.90	28.60	68.60	
55-59	11.80	32.40	55.90	
60-64	11.80	32.40	50.00	
>64	6.70	6.70	86.70	
All Ages	4148.31±975.86 2.50	1185.53±557.49 26.80	217.8±181.45 70.70	
Quarantined Cities	2.80	26.30	70.90	
Not Quarantined Cities	0.00	30.80	69.20	
Perceived Stress	21.29±7.12 [bc]	26.26±8.02 [ac]	28.82±7.15 [ab]	***p<0.001****

SD: Standard Deviation, * : p<0.05,** : p<0.001, [a]: p<0.05 versus Vigorous-intensity PA, [b]: p<0.05 versus Moderate-intensity PA, [c]: p<0.05 versus Low- intensity PA

Table 4. Distribution of physical activity MET and perceived stress values in terms of gender, age, city and sitting time during the COVID-19 outbreak.

	Physical Activity MeT values (min/wk)	Perceived Stress
Gender	***p<0.001*****	***p<0.001*****
Female	518.39±735.01	28.63±7.60
Male	703.89±915.02	26.38±7.20
Age (years)	*p=0.077*	***p<0.001*****
< 20	438.96±538.56	30.84±7.70
20-24	573.66±758.00	30.03±7.20
25-29	536.90±685.54	28.35±7.69
30-34	580.12±814.83	26.55±6.28 [ab]
35-39	625.27±858.25	27.04±6.48 [ab]
40-44	553.79±713.49	24.60±7.14 [abc]
45-49	644.71±1184.75	25.56±6.70 [ab]
50-54	548.17±712.18	25.62±6.49 [ab]
55-59	931.25±1279.39	23.61±6.76 [abc]
60-64	877.88±1082.88	21.96±6.76 [abc]
>64	466.00±822.37	28.40±10.55
All Ages	574.54±797.95	27.95±7.55
	p=0.077	*p=0.173*
Quarantined cities	576.85±819.58	27.84±7.33
Not Quarantined cities	555.87±598.09	28.84±7.33
Sitting Time	***p< 0.001*****	***p< 0.001*****
1-1 Hours	972.05±1203.96	23.73±8.02 [y]
1-2 Hours	693.79±818.81	26.24±5.85
2-3 Hours	724.21±681.80	25.95±6.86 [y]
3-4 Hours	772.55±1000.47 [y]	25.95±7.58 [y]
4-5 Hours	708.70±972.88 [y]	27.09±7.84 [y]
> 5 Hours	469.57±671.82	28.95±7.42

MET: metabolic equivalent task, **min/wk:** Minute/week, All values were presented as Mean ±

Standard deviation, *** :** p<0.05, **** :** p<0.001, **[a]:** p<0.05 versus < 20 years age group, **[b]:** p<0.05 versus 20-24 years age groupPA, **[c]:** p<0.05 versus 25-29 years age group, **[y]:** p<0.05 versus > 5 hours sitting time.

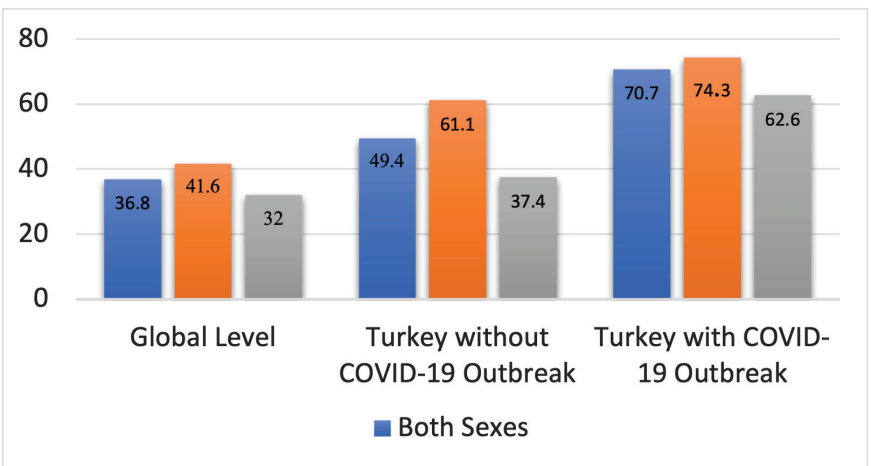

Figure 2. Distribution of percentile levels of insufficient physical activity (PA) by gender during the COVID-19 outbreak, and national level before COVID-19 (19) and average global level (WHO data (20))

statistically significant difference between groups in terms of PA MET values (F=6.539, p<0.001), and stress levels (F=7.150, p<0.001) (Table 4).

While females had higher stress (F=20.818, p<0.001), there was no statistically significant difference in terms of city (F=1.862, p=0.173). The stress level showed a statistically significant difference between the age groups (F=11.776, p<0.001) and was particularly higher in participants aged 18-29 years and over 64 years. It was also observed that the stress level was different in terms of PA (F=23.948, p<0.001); individuals with vigorous-intensity PA levels had lower stress, and those with low-intensity PA levels had higher stress (Table 3).

A weak negative correlation was determined between stress and PA (r=-0.203, p<0.001), and between PA and sitting time (r=-0.147, p<0.001). A weak positive correlation was found between stress and sitting time (r=0.166, p<0.001).

DISCUSSION

These national research data provided four main findings. First, 70% of the participants were found to have insufficient PA levels and the inactivity rate increased dramatically due to the COVID-19 pandemic and this PA percentage is twice the global value. The second finding was that the stress levels of the respondents increased as the PA level decreased, and a negative correlation was found between PA level and stress level. Third, females and young adults were seen to be most affected by the COVID-19 outbreak in terms of PA and stress level. Finally, a large proportion of the participants were aware that their level of PA was low and they needed to exercise, but the rate of exercising was low and exercise barriers were detected. These findings demonstrate the importance of early awareness and a need for publicity strategies for the development of PA during the stay at home.

International and intercity travel restrictions were imposed on April 3, 2020 in Turkey. Subsequently, those with chronic disease, individuals over the age of 65 and under 18 years were isolated. Environmental preventative measures were taken to reduce spread of the virus and restrictions were imposed on public places. These precautions were applied according to the process of the COVID-19 pandemic and as of June 1, 2020, the restrictions have been largely removed (16). Therefore, data were collected between May 8 and May 31,2020, and this time frame can be considered to be the best time to see lifestyle changes due to the COVID-19 pandemic.

The WHO has stated that regular and adequate PA improves muscle, bone, cardiovascular fitness, and reduces the risk of hypertension, coronary heart disease, stroke, diabetes, cancer and depression and many studies have supported these benefits (17, 8, 9). Recent studies have stated that the COVID-19 pandemic has had a negative impact on physical and mental health, due to having to stay at home, less social interaction and inactivity (4, 7). Therefore, studies have emphasized the importance of PA during the COVID-19 pandemic, and have offered suggestions and exercise guidance (4, 5, 7, 18).

In the current study, more than half of the participants thought that they were more active before COVID-19 pandemic, and that their PA were negatively affected and decreased with this outbreak. Participants declared that their knowledge level was not sufficient for exercise, they accessed the information mostly from social media and found this information useful, but did not perform the new exercises they regularly acquired. In line with these results, although participants had high PA awareness during the outbreak, it was observed that the awareness did not result in these individuals exercising. New strategies need to be developed to guide individuals to exercise.

When the national pre-pandemic values and the values of this study were compared; it was found that during the outbreak low-intensity PA level increased (pre-pandemic:49.40%, during- pandemic:70.70%), moderate-intensity PA level did not change (pre-pandemic:26.00%, during-COVID-19 pandemic:26.40%) and vigorous-intensity PA level decreased (pre-pandemic:24.60%, during-COVID-19 pandemic:2.50%) (19). In addition, when the global data are examined, it can be seen that the COVID-19 pandemic has affected the PA rate in Turkey two-fold (Figure 2) (20).

While the low-intensity PA level was higher in females, the moderate-intensity PA level rate was

higher in males. Although the pre-pandemic values were similar in both gender for moderate-intensity PA level, a decrease in the moderate-intensity PA level of females was observed in the pandemic process (19). Qin et al. reported an increase in females with low-intensity PA levels, and the current study results showed that the rate of females with low-intensity PA levels was higher than the rate in the Qin et al study (3). Previous studies have indicated that females tend to do low-intensity activity (21,22) and the current study findings demonstrate that females have been more affected by COVID-19 pandemic.

In terms of age groups in this study, the lowest PA was determined in young adults aged 18-34 years and in those aged over 64 during the COVID-19 pandemic and these findings were similar to those in the study by Qin et al (3). Compared to the pre-pandemic values, an increase in low-intensity PA level was seen in all age groups with the COVID-19 pandemic. There was a higher rate of low-intensity PA level in the 60-64 years age group before COVID-19 pandemic, whereas this changed to the 18-34 years and over 64 years age groups during the COVID-19 pandemic (19). It was expected that the over 65 years age group would have a high level of inactivity because leaving the home was prohibited. The high level of inactivity of young adults may be due to the fact that some of this age group were students and their courses continued at home and others were working at home rather than in an office. However, the state of inactivity, which is evident especially in females and young adults, may pose a high health risk in terms of a sedentary lifestyle and various precautions should be taken to prevent the occurrence of various health problems.

Qin et al. found that the level of inactivity differed between cities in China (3) whereas there was no difference in the current study. These results can be interpreted as the participants taking individual measures irrespective of the city restrictions.

Regardless of leisure PA, a long sitting time has been reported to show a dose-response relationship between all causes, deaths, cardiovascular diseases, and cancer associated with physical inactivity (23). In this study, while sitting time did not differ in terms of gender and city, higher differences were observed between age groups, especially with the age group of 18-29 years. It was also found that the MET values of PA decreased as the sitting time increased. Qin et al. reported similar results and stated that PA could be used as an effective way to reduce sitting time, especially for young adults (3).

While 83.30% of the participants stated that they knew that they should exercise during the quarantine and PA could make them feel good, they listed the exercise barriers during the pandemic as being too lazy to exercise, preferring other activities instead of exercising, and being bored. In pre-pandemic studies, exercise barriers have been noted as lack of time and facilities having inconvenient schedules and exercise not fitting around study or placement schedules (24). Therefore, this study demonstrates that exercise barriers may change due to the pandemic. In addition to emphasizing the importance of PA for health during the pandemic, it may be necessary to develop health strategies to overcome the barriers to exercise.

Recent studies have stated that the COVID-19 pandemic has caused psychological distress since the start of the outbreak and there has been no change in stress level over time (7,25). Sareen et al concluded that females are more likely to develop post-traumatic stress disorders and are more vulnerable to stress (26) and other studies have shown that the COVID-19 pandemic affects females psychologically more than males (3,27), and the current study results are consistent with these findings. Although the precautions taken due to the COVID-19 pandemic differed according to the cities, it was found in this study that the presence of restrictions in the cities did not affect the stress level, which was similar to other studies (3). In addition, the stress level varied by age, and individuals aged 18-29 and over 64 years were found to have high stress levels. In a study by Çalışkan et al., the average of stress values between the ages of 17-28 years in the Turkish population was stated to be 19.07, while in the current study, this rate was remarkably higher (28). Recent studies in other populations have also shown that the stress associated with pandemics was more common in the young population (3, 27). Cheng et al. suggested that greater anxiety among the young population could be a result of greater access to information

through social media (29).

Finally, there was determined to be a negative correlation between stress and PA, and a positive correlation between stress and daily sitting time. It has been stated in studies before COVID-19 pandemic and during the COVID-19 pandemic that individuals have better emotional status as the level of PA increases (3,30).

Despite the importance of the findings, this study had several limitations. First, as the study was in the form of an online survey, a small number of elderly respondents was reached, and the response from a young population, who use the internet much more, was much greater. In subsequent studies, the tele-survey method could be used to reach the elderly population. Second, although more participants were targeted, the study was terminated due to the substantial removal of restrictions on May 31. Third, the study included participants from 65 different cities, but most participants were from the big cities so the results may not reflect the overall situation in Turkey. Another limitation of our study was that demographic characteristics of the participants, such as chronic diseases, the environment they live in, and their socioeconomic level affecting their physical activity level were not compared. Despite the limitations mentioned above, the strength of this study is that it is the first national study covering 65 different provinces, to examine exercise barriers, and PA awareness during the COVID-19 pandemic. Most importantly, the findings show that early and preventive health promotion and PA guidance are required during a period of quarantine. It can guide the development of preventive health strategies in case of disease outbreaks at the national and international level.

The results of this national research demonstrated that 70% of the respondents had insufficient PA levels and the inactivity rate increased dramatically during the COVID-19 pandemic. Stress levels were seen to increase as PA level decreased, and females and young adults were observed to be the most affected by the COVID-19 pandemic in terms of PA and stress level. Although the study participants had high PA awareness, this awareness did not lead these individuals to exercise, and the barriers to exercise were seen to change during the pandemic. Therefore, timely preventive measures should be taken to avoid the risk of many diseases that may result from inactivity.

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Ethical Approval: Ethical approval was received from Bandırma Onyedi Eylül University, ethics committee of non-interventional research in health sciences (Date: 08.05.2020, number: 2020-21).

Informed Consent: Informed Consent was at the top of the online form. After the participants approved the informed consent form, they were able to access the answer to the questions page. Thus, informed consent was obtained from all participants.

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