The COVID-19 pandemic and perceived exercise benefits and barriers

A cross-sectional study on Turkish society perceptions of physical activity

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Background and objective
With the emergence of a global pandemic, new challenges have arisen. Among them are issues relating to exercising, and perceived benefits of and barriers to exercising, particularly when many people find their opportunities for exercise limited by lockdowns. The aim of this study was to investigate how COVID-19 has affected Turkish society's perceptions of exercise and physical activity levels.

Methods
This descriptive and cross-sectional study of 410 eligible participants used an online demographic background survey, the International Physical Activity Questionnaire and the Exercise Benefits/Barriers Scale.

Results
The isolation period affects individuals' physical activity levels, with results indicating minimal activity levels in the general population. Higher levels of physical activity were associated with increases in the perception of exercise benefits and decreases in perceived barriers to exercise.

Discussion
Reducing the perception of barriers related to exercise can increase the feasibility and promote both physical and mental health through physical activity.

COVID-19 has been the world's leading health problem since January 2020. In March 2020, the World Health Organization (WHO) announced that COVID-19 was an alarming international public health problem and categorised the outbreak as a global pandemic. Health organisations worldwide advised the public to reduce travel and stay at home to prevent infection and transmission.[1]

Countries took action to reduce virus transmission risk. Measures and restrictions to ensure social isolation were implemented gradually in Turkey. The restrictions applied during the period of this study included closing most shops; some, such as markets, bakery and grocery stores, remained open only for certain hours of the weekends. Restaurants were permitted to provide only take-away services. Individuals over the age of 65 years and under the age of 18 years were restricted from going out except for needs such as visiting a doctor or shopping for food. In some weeks, travel between cities was restricted. A partial curfew was introduced, affecting everyone except health professionals and media representatives.

Understanding why individuals do not engage in sufficient levels of physical activity is complex and requires examining people's perspectives, environmental conditions and the practices of policymakers in encouraging and enabling health-related behaviours.

The literature consistently reports positive effects associated with physical activity.[2] This, together with studies that attempted to explain the underlying reasons for individuals' attitudes toward physical activity, have the potential to guide the development of better-planned physical activity interventions that result in favourable physiological and psychological public health outcomes.[3] While studies focusing on physical activity interventions to make individuals more active and participative in exercising are available in the literature, further efforts should be put towards understanding the pandemic's challenges.

Suggestions and practices need to focus on preventing the transmission of the virus while improving health outcomes as new conditions force people to stay at home.[4] At-risk groups include older people with health conditions including cardiovascular disease, diabetes, respiratory diseases, cancer, obesity and smoking.[5,6]

The importance of exercise as a therapeutic stimulant against the mental and physical side effects of social isolation, especially for at-risk groups, is increasingly recognised.[7]

To the best of our knowledge, COVID-19 is in an early period globally. The science on COVID-19 is comparatively new, and the risk is understood to affect everyone.[8] Improving the overall health of a society may be an important component in preventing and controlling COVID-19 transmission. Exercise is one of the cheapest, most accessible and practical options to achieve this aim.[9] However, the new normal introduced by COVID-19 can make exercise more challenging in different ways.[10]

The current study aimed to determine individuals' physical activity levels during this period, reveal the perceived benefit and barriers to exercise, and shed light on the relationship between activity levels and perceptions of individuals.

Methods

Study design and sampling

Study design

This descriptive and cross-sectional study was conducted between 11 and 20 June 2020, three months after COVID-19 was recognised as a pandemic by the WHO.[1]

Ethical approval

This study was approved by the Istanbul Okan University's Health Sciences Research Ethics Committee, decision 56665618-204.01.07, dated 11 June 2020.

Selection criteria

As a result of a partial curfew in the study period, the study recruited participants using the internet. The study was conducted using the Google Forms web survey platform. The first forms were shared using WhatsApp, Instagram and Facebook in the researchers' community and university. The link to the survey was shared via social media, including Facebook, Instagram and WhatsApp. People were asked to share the study link to reach as many potential participants as possible in Turkey using the method known as snowball sampling.[11]

At the beginning of the study, participants were given a brief description of the study, its aim, and a declaration of anonymity and confidentiality. Written consent was obtained from participants.

The following criteria were used to select participants for the study: being a Turkish citizen and living in Turkey, age 15–65 years, being literate and having access to the internet. People diagnosed with a disability that prevented them from exercising were excluded from the study; also excluded were individuals with a missing value or who gave incomprehensible answers.

Sample calculation

The population of individuals aged 15–65 in Turkey is 56,391,925,[12] and 42,463,119 of them met the eligibility criteria for this study. The minimum sample size required for the study was calculated by the power analysis with an error margin of 5% and a 95% confidence interval. The minimum number of participants for a representative sample was determined as 385 individuals.

Instruments and procedure

Volunteer individuals were enrolled in the study after completing an online informed consent form. They were asked to complete three different questionnaires, relating to demographic details, physical activity levels, and perceived exercise benefits and barriers.

Demographic data

Participants were asked to report their age, sex, educational status, height, weight, working status, and whether they had a chronic disease or were diagnosed with COVID-19.

International Physical Activity Questionnaire – Short Form (IPAQ-SF)

The instrument is a self-reported, standardised global physical activity assessment form for adults.[13] The questionnaire asks about participants' activity levels in the past seven days. Additionally, participants are asked to report the time spent sitting, along with different types of physical activities. A metabolic equivalent (MET) is used to report the total physical activity, reflecting the total minutes of activity in a week. Saglam et al[14] conducted the reliability and validation study for the Turkish language.

Exercise Benefits/Barriers Scale (EBBS)

The instrument was developed by Sechrist et al[15] to explore perceived benefits and barriers to exercise. It was validated for the Turkish language by Bebis et al.[16] There are five categories of perceived benefits and four categories of barriers. A total of 43 items are rated on a 4-point Likert scale ranging from 'strongly agree' to 'strongly disagree'.

Statistical analysis

The Statistical Package for the Social Sciences (SPSS; version 22) was used for statistical analysis. The distribution of the data was determined by Shapiro–Wilk and Kolmogorov–Smirnov tests. Parametric tests, Mann Whitney U and Kruskal Wallis, were used to determine the significance levels. Correlations were calculated with the Spearman correlation test. Last, chi-square analysis for demographic features and independent t-test analyses for outcomes were conducted.

Results

A total of 1100 people were invited to participate in the study. As a result of the nature of the snowball sampling method, it was not possible to compare the characteristics of non-respondents to respondents. The questionnaire was completed by 431 respondents initially, resulting in a response rate of 39%.

Table 1 shows the sociodemographic characteristics of participants.

The gender distribution in Turkish society is 50.2% males and 49.8% females. However, the gender distribution in the present study was 17.9% males and 82.1% females. Similarly, while 15.7% of individuals in Turkish society have undertaken higher education, this figure was 82.7% for the participants in the present study. Although these two factors are therefore not strongly representative of Turkish society, the median age of participants (36.08 years) is close to the median age of Turkish society (32.00 years).

Four people decided that they did not wish to participate at the very beginning, 11 reported that they could not exercise, and six were above the age of 65 years, exceeding the age range. The final analyses included 410 participants (337 females and 73 males) with a mean age of 36.08 ± 13.15 years. Most of the participants (62.9%) had normal body mass index (ie in range 18–25 kg/m^2), whereas 2.2% were severely obese (n = 9). A majority (65.9%) were university graduates (n = 270). In terms of working status, 25.6% worked from home, 29.5% travelled to work, 18.5% were students and 14.5% were

Table 1. Distribution of participants according to their sociodemographic characteristics

	Female (n = 337, 82.2%)	Male (n = 73, 17.8%)	Total (n = 410)	*P* value
Age (years)*	36.07 ± 13.24	36.13 ± 12.79	36.08 ± 13.15	0.29
15–24	100 (29.7%)	16 (21.9%)	116 (28.3%)	
25–34	70 (20.8%)	23 (31.5%)	93 (22.7%)	
35–44	59 (17.5%)	11 (15.1%)	70 (17.1%)	
45–54	82 (24.3%)	16 (21.9%)	98 (23.9%)	
55–65	26 (7.7%)	7 (9.6%)	33 (8%)	
Body mass index (kg/m²)*	23.52 ± 4.37	25.81 ± 3.31	23.92 ± 4.29	0.001†
<18	12 (3.6%)	0	12 (2.9%)	
18–25	226 (67.1%)	32 (43.8%)	258 (62.9%)	
25–30	70 (20.8%)	32 (43.8%)	102 (24.9%)	
30–35	21 (6.2%)	8 (11%)	29 (7.1%)	
>35	8 (2.4%)	1 (1.4%)	9 (2.2%)	
Education				0.001†
Primary school	0	10 (3%)	10 (24%)	
High school	21 (28.8%)	40 (11.9%)	61 (14.9%)	
Undergraduate	45 (61.6%)	225 (66.8%)	270 (65.9%)	
Graduate	7 (9.6%)	62 (18.4%)	69 (16.8%)	
Working status				0.001†
Student	62 (18.4%)	14 (19.2%)	76 (18.5%)	
Homemaker	44 (13.1%)	3 (4.1 %)	47 (13.8%)	
Working at home	111 (32.9%)	18 (24.6%)	129 (31.5%)	
Travel to work	69 (19.5%)	28 (38.4%)	97 (57.9%)	
Unemployed	51 (15%)	10 (613.6%)	61 (14.5%)	
Chronic disease				0.58
No	229 (68%)	52 (71.2%)	281 (68.5%)	
Yes	108 (32%)	21 (28.8%)	129 (31.5%)	
COVID-19 diagnosis				0.38
Yes	11 (3.3%)	72 (98.6%)	12 (2.9%)	
No	326 (96.7%)	1 (1.4%)	398 (97.1%)	

**Data shown in this row are mean ± standard deviation; all other data are number (frequency)*
†P <0.001

unemployed. A majority (68.5%) reported having chronic diseases, while 2.9% (n = 12) reported a COVID-19 diagnosis (Table 1).

The total physical activity MET score for females was 835.50 ± 1068 and 1072.4 ± 1447.68 for males. Additionally, the sitting time per day was 2.49 ± 6.05 hours and 3.44 ± 3.76 hours, respectively. These numbers are considered indicators of minimal activity. Sitting time for females (2.49 ± 6.05 hours) was significantly less than for males (3.44 ± 3.76 hours; Table 2).

The perceived exercise benefit score of highly active participants was found to be 97.28 ± 11.10 and 89.47 ± 10.72 for inactive participants. Perceived barrier scores were found to be 26.38 ± 4.35 and 30.07 ± 4.51, respectively. The difference between active and inactive groups was found to be significant (*P* = 0.001). Increased levels of activity were associated with a more favourable perception of exercise benefits and reduced perception of barriers (Table 3).

The perceived exercise benefit score for females was 90.58 ± 10.55, 91.31 ± 11.63 for males and 90.71 ± 10.74 overall. Perceived barrier scores were 29.07 ± 4.68, 28.54 ± 3.91 and 28.98 ± 4.55, respectively. The total score of EBBS was 119.65 ± 9.84 for females, 119.86 ± 10.48 for males and 119.69 ± 9.94 overall. There was no significant difference (*P* ≥0.05).

When the scores of EBBS were correlated with physical activity levels from IPAQ-SF, the total perceived barrier score had a significant negative correlation with minimally active (r –0.45) and active (r –0.49) participants. Moreover, the total perceived benefit score correlated strongly with all participants from all physical activity levels while being statistically significant (r ≥0.90; Table 4).

Table 2. Differences in International Physical Activity Questionnaire – Short Form items between males and females

	Female (n = 337)	Male (n = 73)	*P* value
Sitting	2.49 ± 6.05 (hours)	3.44 ± 3.76 (hours)	0.01*
Walking MET minute/week	411.85 ± 517.87	481.75 ± 724.52	0.05*
Moderate MET minute/week	137.67 ± 296.20	144.65 ± 368.30	0.001†
Vigorous MET minute/week	285.97 ± 716.50	446.02 ± 1033.47	0.01*
Total MET minute/week	835.50 ± 1068.72	1072.43 ± 1447.68	0.01*

**P ≤0.05*
†P ≤0.001
Data presented as mean ± standard deviation (Mann Whitney U test)
MET, metabolic equivalent

Discussion

Although isolation is the best option to stop the spread of the COVID-19,[1] the side effects of being isolated should be a concern for health policymakers and governments. The ‘radical lifestyle change’ of isolation was introduced in many countries without regard for individuals’ risk levels. Isolation may act as a potential threat to all populations by causing physical and psychological health to deteriorate. Even for an active population, isolation at home can restrict daily physical activity. Identifying the perceived benefits and barriers for exercise can help experts and the public to be more prepared for lockdowns and associated concerns.

The results of this study indicated minimal activity in the general population in the first three months of COVID-19. The groups at the most significant risk were the 31.5% of the sample with a chronic disease and 9.3% who were obese. When participants were compared by sex, females were significantly less active than males.

Within the guidelines released by the WHO,[17] it was recommended that moderately intense aerobic physical activity be performed for at least 150 minutes per week by adults to minimise the prevalence of diseases and improve the general health of the worldwide population.[7,18,19] The physical activity guidelines for Turkey include the same recommendation.[20] Dixit et al[21] reported that exercise could be used to prevent and control COVID-19. Weak immunity results in more morbidity and mortality, and a large number of studies show the benefits of exercise on immunity.[21] Removing barriers and explaining the potential benefits of

Table 3. Exercise Benefits/Barriers Scale according to physical activity level

	Benefits score	*P* value	Barriers score	*P* value	Total score	*P* value
Physical activity level						
Inactive (≤600 MET minute/week)	89.47 ± 10.72	0.001	30.07 ± 4.51	0.001	119.54 ± 10.41	0.14
Minimally active (600–3000 MET minute/week)	91.39 ± 10.43		27.91 ± 4.27		119.30 ± 144.00	
Active (≥3000 MET minute/week)	97.28 ± 11.10		26.38 ± 4.35		123.66 ± 9.72	

**Data presented as mean ± standard deviation (Kruskal Wallis test)*
MET, metabolic equivalent

exercise can be an easy and indispensable way to promote healthy living.

The current study was planned and conducted after the sudden emergence of the global pandemic. For this reason, a comparison of the pre- and post-pandemic results of the same sample was not feasible. However, studies from before the pandemic focused on the physical activity levels of Turkish society, including a study by Tek et al.[22] In that study, as for the present study, more participants were female. Total MET values for males were 2215.4 ± 1961.1 and for females were 1553.3 ± 1359.6. When compared with the participants in the period of isolation, these results changed for males by 1072.43 ± 1447.68 and for females by 835.50 ± 1068.72 – a substantial difference in energy consumption. In the Tek study[22] the mean age of the participants was 20.9 ± 2.05, compared to the present study, where it was 36.08 ± 13.15.

In the present study, physical activity during the isolation period was evaluated, and as expected, the post-pandemic period revealed lower physical activity levels.

The physically active population, while no different from inactive participants in terms of perceived barriers, were able to manage perceived barriers more effectively than inactive participants.[23] According to the present results, though not statistically significant, active people's perceptions of exercise benefits and barriers were more favourable compared to inactive individuals. This may be because for the active population, exercise is a component of their lifestyle, which they maintained despite the new barriers they faced because of the COVID-19 pandemic.

There was no statistically significant relationship between male and female BMIs, physical activity levels, and perceived exercise benefits and barriers. It should be noted that the pandemic is still influential, and the long-term effects should be investigated.

It is important to educate people about the benefits of exercise and how to implement exercising at home. Thomson et al[24] investigated the perceived barriers and benefits of participation in exercise for overweight and obese women with polycystic ovary syndrome. In response to lifestyle intervention, there was a decrease in perceived barriers to exercise, followed by an increase in the perception of exercise benefits.

In a study conducted in the UK of female college students, the most significant perceived barrier was found to be physical exertion followed by time expenditure, exercise milieu and family discouragement.[25] Similarly, in the present study, the most significant barriers were physical exertion and family discouragement for both females and males. Surprisingly, in the present study, exercise milieu was the least significant barrier to exercise in an isolation period. The sample reported significantly more perceived benefits than barriers to exercise. In the present study, understanding the benefits of exercise could be seen as a facilitator for exercising. However, the perception of barriers increases as the level of physical activity decreases, suggesting that approaches should focus on overcoming barriers.

One of the main strengths of the current study is that it is, to the best of the researchers' knowledge, the first cross-sectional study on perceived exercise benefits/barriers and their relationship with the physical activity level during the COVID-19 pandemic in Turkey. This study's results are expected to contribute to society's understanding of the psychological and physical impact of exercise on health. In isolation, the perception of benefits and concerns to be healthy can be sufficient to keep people motivated until the end of the pandemic.

The study has some limitations. Since the study population consisted of young adults, the results may not be generalised to people with chronic diseases or older people. The study focused on changes that may occur because of the COVID-19 outbreak measured over a short period; there is a need for studies focusing on the pandemic links with these variables in the long term. Additionally, the use of objective physical activity level evaluation instruments could strengthen future studies.

In addition to increasing the perceptions of societies regarding the benefits of physical activity, reducing the perception of barriers related to exercise can increase the feasibility of health activity. At the same time, the current study has implications for future research and policy developments to increase Turkish society's physical activity levels.

Table 4. Correlation coefficient between Exercise Benefits/Barriers Scale and physical activity level

EBBS	Benefits	Barriers	Total
Physical activity level			
Inactive (≤600 MET minute/week)	0.90†	–0.27*	0.90†
Minimally active (600–3000 MET minute/week)	0.91†	–0.45†	0.91†
Active (≥3000 MET minute/week)	0.92†	–0.49*	0.92†
Total	–0.25†	–0.32†	–0.12*

**P ≤0.05*
†P ≤0.001
Data presented as r: correlation coefficient by Spearman correlation test
EBBS, Exercise Benefits/Barriers Scale; MET, metabolic equivalent

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