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Research Article / Araştırma Makalesi

Physical Activity Level During COVID-19 Global Pandemic and Its Relation to Well-Being

KOVİD-19 Global Pandemisi Sırasında Fiziksel Aktivite Düzeyi ve İyilik Hali ile İlişkisi

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Abstract: Many countries implemented lockdowns to prevent the spread of novel coronavirus disease 2019 (COVID-19). Turkey is one of these countries where people were obliged to experience altered daily routines in May 2020. We aimed to identify physical activity level and well-being of people during COVID-19 outbreak and investigate the relationship among them. An on-line questionnaire was used to obtain data regarding descriptive characteristics and exercise habits. Individuals volunteered to participate in the study filled the questionnaire published in an on-line survey platform (Google Forms) in May 2020. Physical activity level was questioned and well-being of the individuals was measured by WHO-5 Well Being Index. Spearman and Kendall analyses were used. The survey was completed by 378 adults. Approximately three quarters (75.1%) of participants self-reported that they did not do any vigorous physical activity and nearly half of them (48.1%) self-reported not to do any moderate physical activity. Well Being Score was positively correlated with vigorous physical activity (days per week) ($p=0.039$, $r=0.106$). Our results showed that increased physical activity level is associated with improved well-being in adults. Effective strategies such as doing regular physical exercise should be used to decrease negative effects of pandemic on well-being and physical activity level.

Keywords: COVİD-19, Physical Activity, Well-Being, Exercise.

Öz: Birçok ülke yeni koronavirüs hastalığı 2019'un (KOVİD-19) yayılmasını önlemek için kısıtlamalar uyguladı. Türkiye, Mayıs 2020'de insanların değişen günlük rutinlerini yaşamak zorunda kaldığı bu ülkelerden biridir. Biz KOVİD-19 salgını sırasında fiziksel aktivite düzeyi ve iyilik hali arasındaki ilişkiyi araştırmayı amaçladık. Tanımlayıcı özellikler ve egzersiz alışkanlıkları ile ilgili verileri elde etmek için çevrimiçi bir anket kullanıldı. Çalışmaya katılmaya gönüllü kişiler, Mayıs 2020'de çevrimiçi bir anket platformunda (Google Formlar) yayınlanan anketi doldurdu. Bireylerin fiziksel aktivite düzeyi sorgulandı ve bireylerin iyilik hali WHO-5 İyilik Hali İndeksi ile ölçüldü. Spearman ve Kendall analizleri kullanıldı. Anket 378 erişkin tarafından tamamlandı. Katılımcıların yaklaşık dörtte üçü (% 75,1) hiç şiddetli fiziksel aktivite yapmadıklarını ve yaklaşık yarısı (% 48,1) hiç orta şiddetli fiziksel aktivite yapmadıklarını belirtti. İyilik hali skoru, şiddetli fiziksel aktivite (haftalık gün) ile pozitif korelasyon gösterdi ($p=0.039$, $r=0.106$). Sonuçlarımız, erişkinlerde artan fiziksel aktivite düzeyinin iyilik hali ile ilişkili olduğunu göstermiştir. Bu nedenle, pandeminin iyilik hali ve fiziksel aktivite düzeyleri üzerindeki olumsuz etkilerini azaltmak için düzenli olarak fiziksel egzersiz yapılması gibi etkin stratejiler kullanılmalıdır.

Anahtar Kelimeler: KOVİD-19, Fiziksel Aktivite, İyilik Hali, Egzersiz.

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Introduction

Sars-CoV-2 virus first infected the people in China in 2019 and is still being spread worldwide during mid-2020. This outbreak was declared as COVID-19 global pandemic by World Health Organization (WHO) (Sohrabi et al., 2020). Because of the negative effects of COVID-19 throughout the world, people were obliged to experience altered daily routines (Silvestri, 2020).

In order to prevent rapid spread of the outbreak and to decrease the rate of daily new cases, governments either forced or advised their citizens to stay at home and keep social distance. Schools, offices, gyms, shopping centers and indoor areas

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including restaurants and theatres were closed, social organizations like sport events, competitions and concerts were cancelled and even in many countries, nationwide curfews were imposed. Turkey is one of these countries in which social life was highly restricted throughout Spring Season 2020.

This stressful context as mandatory behavioral changing including staying home and social isolation was thought to influence both physical and mental health during COVID-19 pandemic (Burtscher et al., 2020). It is also well-known that enhanced time spent in sitting and sedentary lifestyle negatively affects physical health of an individual (Nieman and Wentz, 2019). In addition, public movement restrictions or strict quarantine situation increased some emotions such as sadness, anxiety, anger etc. and the fear of death has raised (Schuch et al., 2020).

During COVID-19 pandemic, encouragement of physical activity (PA) at home has become more essential than ever for both physical and mental health of the people (Burtscher et al., 2020; Nieman and Wentz, 2019). Lubans et al. (2016) suggested that regular PA provides benefits on immunologic responses as well as enhanced mood and coping stress. However, it is still unknown what PA level of people is and whether there is a relationship between PA level and well-being in such an extraordinary period of time caused by the global pandemic. Therefore, we aimed to identify PA level and well-being of people living in Turkey during COVID-19 outbreak and investigate the relationship among them. We hypothesized that PA level and well-being would be correlated significantly during COVID-19 pandemic.

Materials and Methods

Design

This was a cross-sectional study that was carried out in May 2020, during partial lockdown procedures implemented by the Turkish government for COVID-19 global pandemic. The study was performed in accordance with the ethical guidelines of Declaration of Helsinki. Ethics committee of local university approved the study (Protocol number: GO-2020/121).

Participants

Individuals who were volunteered to take part in the study and filled the questionnaire published in an on-line survey platform (Google Forms) were screened for eligibility. Inclusion criteria were: (i) being age between 18 and 65 years, (ii) having no COVID-19 findings or diagnosis. The exclusion criteria were: (i) hospitalization for any reasons, (ii) mental and cognitive disorders that could prevent filling out the questionnaire, (iii) not able to mobilize independently. Written informed consent was provided to individuals prior to participating and individuals were obliged to approve "Informed Consent Form" on-line to view the questionnaire in the next step.

Outcome Measures

The on-line questionnaire was used to obtain data regarding descriptive characteristics (age, gender, height, weight, educational status), home exercise habits, PA levels and well-being of the individuals.

The part of the questionnaire related to the PA level contained questions on number of days with vigorous PA per week (0-7 days), duration of vigorous PA per day (none, <15 min, 16-30 min, 31-45 min, 46-60 min, 61-90 min, 90min<), number of days with moderate PA per week (0-7 days), duration of moderate PA per day (none, <15 min, 16-30 min, 31-45 min, 46-60 min, 61-90 min, 90min<), number of days (0-7 days) with at least 10 minutes walking in the corridor, time spent sitting or lying down per day (none, <15 minutes, 16-30 minutes, 31-45 minutes, 46-60 minutes, 61-90 minutes, 90 minutes <) (Olsson et al., 2016; Matthews et al., 1997).

We used the WHO-5 Well-Being Index to measure well-being of individuals. The WHO-5 is a short self-reported measure of current mental well-being (World Health Organization Regional Office for Europe, 1998). Bech (1999) declared that this index contains five positively phrased items. The participant is asked to rate how he or she feel well each of the 5 statements during last

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14 days. Each of the 5 items is ranked between 5 (all of the time) and 0 (none of the time). The scores are summed to obtain a total raw score ranging from 0 to 25 (0 is absence of well-being and 25 is maximal well-being). Then, the raw score is multiplied by four in order to translate it to a percentage scale from 0 (absent) to 100 (maximal). The highest scores indicate a strong sense of well-being. Eser et al. (2019) indicated WHO-5 as a valid and reliable scale for Turkish population.

Statistical Analyses

All data were analyzed using SPSS 25.0 for Windows. The variables were investigated using visual (histograms, probability plots) and Kolmogorov-Smirnov test was used to determine whether the data is normally distributed. Descriptive statistics were expressed as frequencies and percentages for categorical variables. Continuous variables were presented as median (minimum-maximum) and interquartile range since they were not normally distributed. Mann-Whitney U test was used to compare of continuous variables with abnormal distribution and ordinal variables in between group analysis. The correlation coefficients and their significance were calculated using Spearman test. Kendall test was used to investigate the associations between non-normally distributed and/or ordinal variables. Strength of correlation was interpreted as very weak, weak, moderate, strong and very strong for different r values (Akoğlu, 2018). A 5% type-I error level was used to infer statistical significance ($p<0.05$).

Results

A total of 390 individuals participated in the study in May 2020, during partial lockdown procedures implemented by the Turkish government for COVID-19 global pandemic. 7 surveys were discarded due to missing item responses. Survey of 5 individuals who did not meet inclusion criteria (3 were younger than 18 years and 2 were older than 65 years) were also excluded. As a result, data obtained from 378 individuals were used for the analyses. Characteristics and distribution of demographic characteristics, and PA behavior of surveyed participants are presented in Table 1 and Table 2, respectively.

Table 1. Characteristics of surveyed participants

	Median (min-max)	**IQR**
Age, years	32 (18-65)	17
BMI, kg/m^2	24.16 (16.02-44.06)	5.81
Vigorous Physical Activity, days per week	0 (0-7)	0
Moderate Physical Activity, days per week	1 (0-7)	2
Time Spent walking in corridor, days per week	0 (0-7)	3
WHO-5 Well-Being Index Score	60 (0-100)	25

IQR Interquartile range, *BMI* body mass index, *COVID-19* Coronavirus disease 2019, *WHO-5* The 5-item World Health Organization

When the participants were divided into two groups in terms of presence/absence of doing exercise at home, between-group comparisons showed that age and BMI of the participants who do not exercise at home were significantly higher than those of the participants who do exercise at home ($p=0.001$, $p<0.001$, respectively). The number of days with vigorous and moderate PA, time spent walking in the corridor and WHO-5 Well-Being Index scores of the participants who exercise at home were significantly higher than those of the participants who do not exercise at home ($p<0.005$) (Table 3). In addition, there was no statistically significant difference between physical activity level of participants who had to go to work and those who did not ($p>0.05$).

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Table 2. Distribution of demographic characteristics and physical activity behavior of surveyed participants

n=378	Number (n)	Percent (%)
Gender		
Female	235	62.2
Male	143	37.8
Education Status		
Primary Education	12	3.2
High School	34	9.0
Associate Degree	65	17.2
Bachelor's Degree	164	43.4
Master Degree	54	14.2
Doctorate	49	13.0
Working Status During COVID-19		
Yes	119	31.5
No	259	68.5
Doing Exercise at Home		
Yes	216	57.1
No	162	42.9
Vigorous Physical Activity, min per day		
None	286	75.7
<15	16	4.2
16-30	26	6.9
31-45	29	7.7
46-60	14	3.7
61-90	5	1.3
90<	2	0.5
Moderate Physical Activity, min per day		
None	182	48.1
<15	43	11.4
16-30	80	21.2
31-45	47	12.4
46-60	19	5.0
61-90	3	0.8
90<	4	1.1
Time Spent Sitting, min per day		
<15	8	2.1
16-30	27	7.1
31-45	28	7.4
46-60	49	13.0
61-90	45	11.9
90<	221	58.5

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Table 3. The comparison of the variables in terms of presence/absence of doing exercise at home

	Doing exercise at home - Yes (n=216) Median (min - max)	**Doing exercise at home - No (n=162) Median (min - max)**	**p value**
Age, years	30 (18-65)	34.5 (18-60)	0.001*
BMI, kg/m²	23.03 (16.02-37.01)	25.16 (16.02-44.06)	<0.001*
Vigorous Physical Activity, days per week	0 (0-7)	0 (0-4)	<0.001*
Moderate Physical Activity, days per week	2 (0-7)	0 (0-7)	<0.001*
Time Spent walking in corridor, days per week	1 (0-7)	0 (0-7)	<0.001*
WHO-5 Well-Being Index Score	64 (12-100)	60 (0-100)	0.010*

BMI Body mass index, *WHO-5* The 5-item World Health Organization
* p <0.05, Mann Whitney *U* Test

Age was very weakly and negatively correlated with vigorous PA (days per week) (p<0.001, r=-0.186) and moderate PA (days per week) (p<0.001, r=-0.171). Furthermore, a weak and positive correlation was found between age and WHO-5 Well Being Index Score (p=0.030, r=0.267). While BMI was very weakly and negatively correlated with vigorous PA (days per week) (p=0.003, r=-0.111) and moderate PA (days per week) (p<0.001, r=-0.155), it was very weakly and positively correlated with WHO-5 Well Being Index Score (p<0.001, r=0.163).

We found a statistically significant very weak and positive correlation between vigorous PA (days per week) and WHO-5 Well Being Index Score (p=0.039, r=0.106). There was a very weak and positive correlation between time spent walking in corridor (days per week) and WHO-5 Well Being Index Score (p=0.041, r=0.105). No other significant correlations were found among assessed variables (Table 4).

Discussion

In this study, we aimed to determine PA level of Turkish population during the global outbreak of COVID-19 and whether it was related to well-being. In general, we found a positive correlation between PA level and well-being of the individuals.

The results showed that time spent on vigorous PA was associated with well-being. However, approximately three quarters of participants declared that they did not do any vigorous PA and nearly half of them did not do any moderate PA during the outbreak. We also found that both age and BMI were associated with vigorous and moderate PA level and well-being.

Staying at home or having to go to work during the pandemic can change the level of physical activity. In our study, it was found that the working status of the participants did not affect the physical activity level of the participants.

To date very limited data is available on PA level of nations during the global outbreak of COVID-19. Wang et al. (2020) reported that most of the Chinese people did not do any moderate or vigorous PA in early days of the COVID-19 outbreak. Stanton et al. (2020) declared that average PA of Australian participants was 312.5 minutes/week at the onset of the COVID-19 pandemic. In another study, Maugeri et al. (2020) found that Italian participants' vigorous PA level was 766 MET-min/week while moderate one was 523 MET-min/week during COVID-19 outbreak. Unlike other studies, we assessed not only PA level but also exercise habits at home. In our study, 57.1% of surveyed participants were doing exercise at home during COVID-19 pandemic.

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Table 4. Correlation matrix among variables

	Age, years	**BMI**, kg/m²	**Vigorous Physical Activity**, days per week	**Vigorous Physical Activity**, min per day	**Moderate Physical Activity**, days per week	**Moderate Physical Activity**, min per day	**Time spent walking in corridor,** days per week	**Time spent sitting**, min per day	**WHO-5 Well-Being Index Score**
Age, years	-	r=0.449 [a]	r=-0.186 [a]	r=-0.141 [b]	r=-0.171 [a]	r=-0.135 [b]	r=-0.028 [a]	r=-0.176 [b]	r=0.267 [a]
	-	p<0.001***	p<0.001***	p=0.001***	p<0.001***	p=0.001***	p= 0.594	p<0.001***	p<0.001***
BMI, kg/m²		-	r=-0.111 [a]	r=-0.082 [b]	r=-0.155 [a]	r=-0.135 [b]	r=-0.027[a]	r=-0.031 [b]	r=0.163[a]
		-	p=0.030*	p=0.041*	p=0.003**	p=0.001***	p=0.595	p=0.428	p<0.001***
Vigorous Physical Activity, days per week			-	r=0.920 [b]	r=0.345 [a]	r=-0.303 [b]	r=0.120 [a]	r=0.081 [b]	r=0.106 [a]
			-	p<0.001***	p<0.001***	p<0.001***	p=0.019*	p=0.075	p=0.039*
Vigorous Physical Activity, min per day				-	r=0.297 [b]	r=0.328 [b]	r=0.102 [b]	r=0.041 [b]	r=0.087 [b]
				-	p<0.001***	p<0.001***	p=0.023*	p=0.093	p=0.035*
Moderate Physical Activity, days per week					-	r=0.820 [b]	r=0.241 [a]	r=-0.066 [b]	r=0.056 [a]
					-	p<0.001***	p<0.001***	p=0.123	p=0.274
Moderate Physical Activity, min per day						-	r= 0.203 [b]	r=-0.059 [b]	r=0.037 [b]
						-	p<0.001***	p=0.177	p=0.354
Time spent walking in corridor, days per week							-	r=-0.079 [b]	r=0.105 [a]
							-	p=0.069	p=0.041*
Time spent sitting, min per day								-	r=-0.093 [b]
								-	p=0.020*
WHO-5 Well-Being Index Score									-
									-

[a] Spearman Correlation Analysis

[b] Kendall Rank Correlation Analysis

*p <0.05, **p <0.01, ***p <0.001

BMI body mass index, *WHO-5* The 5-item World Health Organization, *COVID-19* Coronavirus Disease 2019

However, a large amount of (75.1%) participants were not doing any vigorous PA. Besides, only 1.1% of the participants were doing moderate PA over 90 minutes per day while approximately half of them did not do any moderate PA. Although the participants declared that they did exercise at home, time spent on PA was poor during pandemic in our study. The reason of this result could be the wrong PA perception of Turkish people such as the belief that "doing exercise for a short time is equal to sufficient PA".

Social distancing during COVID-19 lockdown negatively affected PA behaviors such as decreased time spent on vigorous PA and increased sedentary lifestyle. Altered daily routines during COVID-19 outbreak affected all PA intensity levels as well as daily sitting time (Lesser and Nienhuis, 2020; Hall et al., 2020).

Well-being was claimed to be decreased during COVID-19 pandemic due to various reasons. Lack of access to gyms, outdoor sport areas or fields to do PA could be the reason of decreased sense of well-being (Hall et al., 2020). Moreover, many people experienced stress and anxiety in the face of isolation from normal social life. In addition to these, fear of getting illness, likelihood of losing a relative or a friend because of the viral infection and the negative impact of COVID-19 on economic status might have contributed to anxiety and stress levels (Hall et al., 2020).

The benefits of exercise are specified useful in terms of decreasing anxiety, stress and fear (Lubans et al., 2016; Stanton et al., 2020). Increased PA had positive impacts on neurobiological, psychosocial and behavioral mechanisms of mental health outcomes. For example, regular and sufficient PA triggers to release endogenous opioids, helps to have good physical self-perceptions and to improve coping stress, anxiety and fear of getting illness and enhances self-regulation skills (Lubans et al., 2016). However, when staying at home and social isolation are necessary during the COVID-19 pandemic, it is still unknown whether Turkish people meets the WHO recommendations for PA. It was declared that practicing PA at least 150 min per week of moderate to vigorous-intensity or 75 min of high intensity per week, or a combination of both was recommended by WHO (World Health Organization, 2010). To date, in Turkey there is no national tracking system for PA, and no studies have determined PA levels of the public in details.

There are limited number of studies examining the relationship between PA and well-being during COVID-19 outbreak in the literature. In a Brazilian study, Schuch et al. (2020) reported that there was a linear relationship between vigorous PA and depressive-anxietic symptom severity, suggesting dose-response association during this pandemic. In another study that conducted in France and Switzerland, Cheval et al. (2020) declared that increment of sedentary behaviors of French and Swiss people during COVID-19 was associated with decreased physical and mental health, as well. They pointed out that PA and sedentary behaviors during pandemic were related to physical and mental health. Maugeri et al. (2020) examined changes in the PA level and well-being and also investigated relationship between them during self-isolation days in Italy. Their results showed that there was significant positive correlation between PA and well-being. Lesser and Nienhuis (2020) conducted a survey that was utilized to measure participants' PA behavior, well-being and anxiety levels. Their results showed that PA was strongly associated with well-being outcomes in Canadians during COVID-19 outbreak. Stanton et al. (2020) investigated associations between psychological distress and changes in selected health behaviors of Australian people and they found that PA level was not associated with all aspects of psychological distress. Similarly, our results showed that reduced PA is related to decreased well-being in Turkish population. This result could be due to the radical change in everyday schedules and habits during COVID-19 outbreak. It could also be related to the phenomenon that PA triggers good physical self-perceptions, improve coping stress and decrease fear of getting illness or losing loved ones and enhances self-regulation skills (Burtscher et al., 2020).

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Our results also showed that people who did exercise at home had higher PA and well-being level than those who did not. It is well-known that regular exercise led to increased PA level and has benefits on mental health and psychological well-being (Lubans et al., 2016; Maugeri et al., 2020).

In this study, age and BMI were negatively correlated with PA level, whereas they were positively correlated with well-being. Ramirez et al. (2018) and Tittlbach et al. (2017) showed that PA declined with increased age and BMI. Nilsson et al. (2010) also showed that well-being improved with age in healthy individuals. However, one study claimed that age was only related to life satisfaction, which is a sub-parameter of well-being, not the overall well-being (Noor, 2008). Therefore, this was unsurprising that PA level and well-being were affected by age and BMI during the pandemic as in pre-pandemic times (Bhasin et al., 2020; Hussain et al., 2020; Ilardi et al. 2020).

To the best of our knowledge, ours is the first study investigating PA level with relation to well-being status in Turkish people during the COVID-19 pandemic. Moreover, this study was carried out during lockdown restrictions in Turkey. Therefore, timing of the data collection was convenient to accurately assess PA level and well-being during the global pandemic. However, there are also some limitations to consider. First, the study utilized a cross-sectional design therefore causality cannot be inferred. Second, all data was collected using a self-reported online survey. However, self-reported data is subject to some biases and limitations, such as honesty, response bias, sampling bias, etc.

In conclusion, our results showed that increased PA level is associated with improved well-being in Turkish adults during the COVID-19 pandemic. Effective strategies to improve PA levels should be helpful to combat reduced well-being. While staying at home, social distancing and complying with the rules of hygiene are fundamental steps to halt the pandemic, regular physical exercise should be used to decrease negative effects of pandemic on well-being and PA levels.

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