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THE IMPACT OF COVID-19 ON PHYSICAL ACTIVITY LEVELS OF PHYSICAL EDUCATION TEACHER CANDIDATES

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ABSTRACT

The goal of this study was to compare the levels of physical activity during leisure time of physical education teacher candidates by gender and grade level, and to see if the level of leisure time physical activity differed before and after the COVID-19 outbreak. A total of 168 teacher candidates, consisting of 100 females and 68 males, who were selected based on a convenient sampling method, participated in the study. The Demographic Information Form, which was prepared by researchers and included questions on gender, grade, and age variables, and the Leisure-time Physical Activity Questionnaire, were used to collect data in the research. The Mann-Whitney U, Kruskal-Wallis, and Wilcoxon Signed-Rank tests were used to analyze the data. As a result of the research, it was found that there was no statistically significant difference between the scores of the first, second, third, and fourth grade female and male teacher candidates with respect to the level of physical activity in their leisure time physical activity level before and during the COVID-19 outbreak. However, there is a statistically significant difference between the levels of physical activity in the leisure time of the physical education teacher candidates before and during the COVID-19 outbreak, and the levels of physical activity of the teacher candidates' declined during the COVID-19 outbreak. Research findings revealed a negative impact of the COVID-19 outbreak on physical activity, and various suggestions were presented to policymakers in this direction.

Keywords: Physical education, physical activity, COVID-19, teacher candidate

INTRODUCTION

Studies have shown that physical education teachers, like all field teachers, have an impact on their students' lives throughout the education process and are adopted as role models by students after graduation (Cheung, 2020; Hooper, 2013; Parkinson & Burrows, 2020). Furthermore, physical education teachers set a model not only for their students but also for all segments of society (school staff, student parents, etc.) with their movement and healthy living skills, and physical fitness characteristics inside and outside the school (Kajanus, 2016; Spencer, 1998). Parallel to these features, there are two main learning dimensions in the Ministry of National Education [MoNE], Primary School Physical Education and Play (MoNE, 2018a), Secondary School (MoNE, 2018b), and High School (MoNE, 2018c) Physical Education and Sports curriculum: 'movement competence' and 'active and healthy life. In addition to the acquisition of active and healthy living skills that students can use throughout their life, the special aims and learning outcomes of these curricula emphasize the acquisition of knowledge, active participation in activities, and the development of positive attitudes with the aim of improving physical fitness. It has been reported in studies that physical education teachers set a good example for students, parents, and society in terms of being physically active and applying healthy living skills, and reflecting physical fitness, which is emphasized in physical education curriculums at all levels (Bradford, Hickson, & Evaniew, 2014; Faber, Hodges-Kulinna, & Darst, 2007; Haywood, 1991; Stern, Johnson, Spaziani, & James, 2001).

The World Health Organization (WHO) has defined physical activity as "any bodily movement produced by skeletal muscles that require energy expenditure and contribute to improving physical fitness and health"; and has defined physical fitness, as consisting of components of cardiovascular endurance, muscular strength, muscular endurance, flexibility, and body composition, as "a measure of the body's ability to function efficiently and effectively in work and leisure activities" (WHO, 2020). Because of its contribution to physical fitness, WHO (2020) has recommended regular physical activity for adults and has stated that physical activity should include moderate-intensity aerobic (endurance) activities for at least 150-300 minutes or include high-intensity aerobic activities for at least 75-150 minutes throughout the week. When the literature on physical activity and physical education is examined together, it is striking that there are numerous studies that reveal the physical activity levels of physical education teachers (Arabacı & Çankaya, 2007; Demir & Çankaya, 2019; Durukan, Şahin, & Durukan, 2016) and teacher candidates (Baghurst, Bounds, Boolani, & Betts, 2018; Yalız-Solmaz & Aydın, 2016). In one of these studies, Arabacı and Çankaya (2007) revealed that the physical activity levels of physical education teachers' were low and inactivity was common among teachers. In the American sample, it was determined that the physical activity level of physical education teacher candidates is above the recommended (150 minutes per week) for moderate and high-intensity physical activity (Baghurst et al., 2018). Although the studies on determining the physical activity levels of physical education teachers or teacher candidates have revealed various findings that are parallel or not, it is a worldwide accepted phenomenon that the global COVID-19 epidemic has restricted the participation of individuals of all ages in physical activity (Jakobsson, Malm, Furberg, Ekelund, & Svensson, 2020; Robinson et al., 2021; Shahidi, Stewart Williams, & Hassani, 2020). COVID-19, which emerged in Wuhan, China, in December 2019 and was accepted as a global epidemic by the WHO in March 2020, has been transmitted to approximately 453 million people around the world since its inception and

has caused the deaths of more than 6 million people (WHO, 2022). In this process, especially in order to reduce the rate of transmission, countries closed their borders to entrances and exits, travel bans within and between countries were imposed, and measures were taken for individuals to stay at home, called "confinement restrictions," in order to reduce their daily contact with each other (Ritchie et al., 2020; Robinson et al., 2021).

It has been demonstrated by many national and international studies that the measures and restrictions against the COVID-19 pandemic negatively affected the physical activity levels of individuals of all ages and that the physical activity levels of individuals have decreased significantly during the outbreak (Haşıl-Korkmaz, Öztürk, Rodoslu, & Uğur, 2020; McCarthy, Potts & Fisher, 2020; Robinson et al., 2021; Stockwell et al., 2021; Tison et al., 2020; Ünlü, Öztürk, Aktaş, & Büyüктаş, 2020). However, when examined more specifically, physical activity, which is of great importance, especially due to its positive contribution to a healthy life, is spread by physical education teachers in all segments of society by creating physical activity opportunities in school and out-of-school environments, and physical education teachers have the responsibility of being a model for society in this regard. The number of studies conducted to reveal the physical activity experiences of physical education teachers who assume such an important responsibility and pre-service teachers who are physical education teachers of the future before and during the COVID-19 epidemic is limited (Erdogan et al., 2021; Hall-Lopez, 2020; Rink, Hall, & Williams, 2010). Based on this information, with the thought that it will contribute to the related literature, this study aimed to compare the levels of physical activity during leisure time of female and male physical education teacher candidates studying in the 1st, 2nd, 3rd, and 4th grades before and during the COVID-19 outbreak.

METHOD

Research Design

In this study, the descriptive comparative research design, which is a research design that defines the population, situation, or event studied, aims to draw a conclusion about two variables, to identify and analyze the similarities and differences between the groups, and to determine the relationship between variables, was used (Fraenkel, Wallen, & Hyun, 2011).

Participants

A total of 168 teacher candidates studying in the Department of Physical Education and Sports Education in the 2020–2021 academic year participated in the research. The average age for female teacher candidates was 20.86 (SD= 2.67) and for male candidates was 21.02 (SD= 2.42). Among the 168 candidates, 59.5% were women, and 40.5% were men. Of the preservice teachers participating in the research, 27.4% were in the 1st, 23.2% were in the 2nd, 24.4% were in the 3rd, and 25.0% were in the 4th grade.

Data Collection Instruments

Demographic Information Form

In this study, the "Personal Information Form" prepared by the researchers was used to obtain information about the gender, age, and grade of the preservice teachers.

Godin-Shephard Leisure-Time Physical Activity Questionnaire

In the study, the *Godin-Shephard* Leisure-Time Physical Activity Questionnaire (GSLTPAQ) was used to examine the level of physical activity that teacher candidates participate in their leisure-time (Godin, 2011; Godin & Shephard, 1985, 1997). The original GSLTPAQ was culturally and linguistically adapted into Turkish by Yerlisu-Lapa and Yağar (2015). The scale includes questions about at least 15 minutes of physical activity that individuals do in their leisure time within a week. GSLTPAQ has a single factor structure, consisting of 3 questions in total. As a result of the answers given by the participants to these 3 questions, their leisure-time physical activity levels are determined into 3 categories: "strenuous", "moderate", and "mild". The scores obtained from the three questions in the scale are multiplied by a formula for strenuous activities by 9, for moderate activities by 5, and for mild activities by 3, and the obtained scores are added together to calculate the total score (Formula 1). The total score obtained as a result of these calculations reveals the activity level of the individual in leisure-time. Those who score 24 and above on the total score obtained from the scale are classified as 'active', those with 14-24 points as 'moderately active', and those with 13 points or less are classified as 'not active enough'.

$$\text{GSLTPAQ score} = (9 \times 3 \text{ "strenuous"}) + (5 \times 6 \text{ "moderate"}) + (3 \times 3 \text{ "mild"})$$

Formula 1. *GSLTPAQ Score Calculation Formula*

Prior research has demonstrated the test-retest reliability coefficient alpha for the GSLTPAQ to be .74, and .94, .46, and .48 for each question, respectively (Godin & Shephard, 1985). The internal consistency of the Turkish version of the scale as measured by Cronbach's alpha was .84 for the GSLTPAQ, and .80, .76, and .72 for each question, respectively (Yerlisu-Lapa & Yağar, 2015).

Data Collection Process

Before starting the study, ethical approval was obtained from the Ethics Committee of the Social and Human Sciences of the university where the data will be collected. The Demographic Information Form and GSLTPAQ were applied to 1st, 2nd, 3rd, and 4th grade female and male teacher candidates studying at the Faculty of Sport Sciences, Department of Physical Education, in the Fall Semester of the 2020-2021 academic year. Due to the fact that face-to-face classes were not held due to the measures taken due to the COVID-19 epidemic, the Demographic Information Form and GSLTPAQ were transferred to an application that allows the preparation of questionnaires/scales in the digital environment, and a message containing information about the study was added to the prepared data collection tools and was delivered to pre-service teachers via various digital communication applications (e-mail, message, chat, etc.).

Data Analysis

Descriptive statistics (number, percentage) were used in the data analysis. The Mann-Whitney-U test and the Kruskal-Wallis test were used to determine whether the level of physical activity in the leisure time of the participants before and during the COVID-19 epidemic differed according to their gender and the grade level they studied. A Wilcoxon Signed-Ranks test was applied to determine whether there was a difference between the physical activity levels of the participants before and during the COVID-19 outbreak. Data was analyzed using the Statistical Package for the Social Sciences (SPSS) version 21.0.

FINDINGS

The results of the Mann-Whitney U test, which was conducted to determine whether there was a statistically significant difference between the scores of male and female physical education teacher candidates who participated in the study, with respect to the GSLTPAQ scores before the COVID-19 outbreak, did not show a statistically significant difference between the GSLTPAQ scores of female and male teacher candidates, $U=3052.00, p=.26$. According to these findings, the mean GSLTPAQ scores of female ($\bar{x}=53.87$) and male ($\bar{x}=51.68$) participants before the COVID-19 outbreak were similar (Table 1). The results of the Mann-Whitney U test, which was conducted to determine whether there is a statistically significant difference between the scores of the female and male teacher candidates regarding the GSLTPAQ scores during the COVID-19 outbreak, revealed that there is no statistically significant difference between the GSLTPAQ scores of the female and male teacher candidates, $U=3089.50, p=.31$. These findings showed that the female participants ($\bar{x}=40.97$) and the male participants ($\bar{x}=38.10$) had similar mean GSLTPAQ scores during the COVID-19 outbreak (Table 1).

Table 1. Mean and standard deviation of GSLTPAQ scores by gender before and during the COVID-19 outbreak

Cinsiyet	N	\bar{x}	SD	Med.
Before COVID-19 outbreak				
Female	100	53.87	20.97	55.00
Male	68	51.68	23.15	53.00
Total	168	52.98	21.84	54.00
During COVID-19 outbreak				
Female	100	40.97	22.60	39.00
Male	68	38.10	22.78	34.50
Total	168	39.81	22.65	35.00

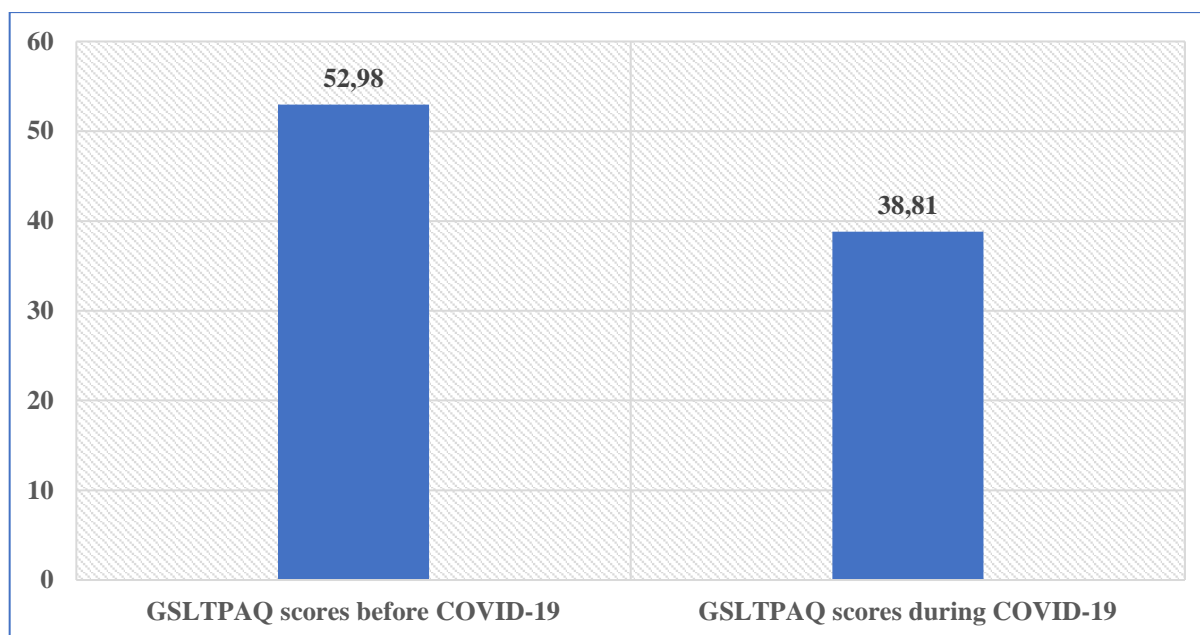
The results of the Kruskal-Wallis test, which was applied to determine whether there is a statistically significant difference between the scores of the 1st, 2nd, 3rd, and 4th grade pre-service students who participated in the research on the GSLTPAQ mean scores of GSLTPAQ before the COVID-19 outbreak, revealed statistically no significant difference between the mean scores of GSLTPAQ of the students. According to these findings, the GSLTPAQ mean scores of 1st ($\bar{x}=53.24$), 2nd ($\bar{x}=59.74$), 3rd ($\bar{x}=47.54$) and 4th grade ($\bar{x}=51.74$) students before the

COVID-19 outbreak were similar, $\chi^2= 5.83, p= .12$ (Table 2). Similarly, the results of the Kruskal-Wallis test, which was applied to determine whether there is a statistically significant difference between the scores of the 1st, 2nd, 3rd, and 4th grade students regarding the GSLTPAQ mean scores during the COVID-19 process, showed that there was statistically no significant difference between the GSLTPAQ mean scores of the 1st, 2nd, 3rd, and 4th grade students. The mean scores of GSLTPAQ of 1st ($\bar{x}= 32.54$), 2nd ($\bar{x}= 47.82$), 3rd ($\bar{x}= 43.56$) and 4th grade ($\bar{x}= 36.67$) students during the COVID-19 outbreak were similar, $\chi^2= 5.51, p= .14$ (Table 2).

Table 2. Mean and standard deviation of the GSLTPAQ scores by grade before and during the COVID-19 outbreak

Grade	N	\bar{x}	SD	Mean Rank
Before COVID-19 outbreak				
1 st grade	46	53.24	18.17	91.62
2 nd grade	39	59.74	26.08	95.74
3 rd grade	41	47.54	17.10	71.67
4 th grade	42	51.74	24.29	78.79
Total	168	52.98	21.84	
During COVID-19 outbreak				
1 st grade	46	32.54	18.68	68.24
2 nd grade	39	47.82	29.36	95.46
3 rd grade	41	43.56	19.19	97.59
4 th grade	42	36.67	20.08	79.36
Total	168	39.81	22.65	

The Wilcoxon Signed-Rank test results, which were applied to determine whether there was a statistically significant difference between the scores of the physical education teacher candidates participating in the study on their leisure-time physical activity levels before and during the COVID-19 epidemic, were found to be statistically significant between the GSLTPAQ scores of female and male teacher candidates, $Z= -7.691, p= .001$. These findings revealed that the physical education teacher candidates' GSLTPAQ scores before the COVID-19 epidemic ($\bar{x}= 52.98, SD= 21.84$) were higher than their leisure physical activity scores during the COVID-19 period ($\bar{x}= 38.81, SD= 22.65$) (Figure 1). In addition, 87.5% of the female and male participants were in the "active" category before the COVID-19 outbreak, while 12.5% were in the "moderately active" category; also during the COVID-19 outbreak, the percentage of participants in the "active" category decreased to 67.9, and the percentage of participants in the "moderately active" category decreased to 32.1.



Şekil 1. Mean values of participants for SLEA before and during the COVID-19 outbreak

DISCUSSION AND CONCLUSIONS

In the findings obtained in this study, it was revealed that the physical education levels of male and female physical education teacher candidates studying in the 1st, 2nd, 3rd, and 4th grades were similar before and during the COVID-19 outbreak. However, a difference was found in the level of physical activity during leisure time of teacher candidates before and during the COVID-19 outbreak; the level of physical activity prior to the COVID-19 outbreak of pre-service teachers was found to be high when compared to the level during the COVID-19 outbreak. Parallel to this decrease in physical activity level due to social isolation and restrictions in the COVID-19 process, many studies conducted in various countries around the world have reported a decrease in physical activity level (Farah et al., 2021; Paçenha, Goessler, Roschel, & Gualano, 2020; Prete et al., 2021; Rahman, Islam, Bishwas, Moonajilin, & Gozal, 2020). In one of these studies, in the period when the home confinement due to the COVID-19 outbreak began and the teaching at universities was carried out remotely and mostly from home, the physical activity level of third-year university students in the Australian sample was examined and compared to the physical activity level of the students in the 2-year period pre-COVID-19 outbreak, it was revealed that regardless of gender, 30% of the students did not reach the level of "adequate" physical activity (Gallo, Gallo, Young, Moritz, & Akison, 2020). According to the research report of the United Nations International Children's Emergency Fund (UNICEF), it was emphasized that there was a decrease in the level of physical activity of adolescents and young people around the world before and during the COVID-19 outbreak, and 52% of the study participants were physically inactive compared to the pre-pandemic period, 33% reported not doing physical activity, and 25% reported being physically active for less than an hour per week (UNICEF, 2021). Similarly, it was revealed that the physical activity levels of the adolescents who participated in the study conducted in the samples of Italy, Spain, Brazil, Chile, and Colombia were low during the COVID-19 outbreak (Ruiz-Roso et al., 2020). Zaccagni, Toselli, and Barbieri (2021) examined 23 full-text studies that revealed the effects of restrictions

on physical activity in Italy, one of the countries most affected by the COVID-19 epidemic in the world, especially at the beginning stage. In contrast to the pre-COVID-19 outbreak in the reviewed studies, individuals reported that the rate of physical activity decreased during the restrictions applied due to COVID-19. The levels of physical activity of the participants were examined in a large-scale study conducted with the participation of 13,503 adult individuals from Australia, Austria, Argentina, Brazil, Chile, France, Germany, Italy, Netherlands, South Africa, Singapore, Switzerland, Spain, and the United States. As a result of the research, it was determined that the moderate to vigorous and vigorous physical activity levels of the participants decreased and two-thirds of the participants were unable to maintain their previous physical activity level during the COVID-19 outbreak (Wilke et al., 2021).

Studies that reveal the change in physical activity level before and during the COVID-19 epidemic, in particular among university students, have also revealed results in parallel with this research and studies conducted with the participation of the general population. Studies on this subject have shown a decrease in university students' levels of walking, moderate-intensity, vigorous physical activity, and general physical activity (Lopez-Valenciano, Suarez-Iglesias, Sanchez-Lastra, & Ayan, 2020; Puccinelli et al., 2021; Wilson, Holland, Elliot, Duffey, & Bopp, 2021). Due to the COVID-19 restrictions in Canada, 54% of university students have been reported to have met the criteria of the physical activity recommendations prepared for adults before the outbreak, but this rate decreased during the COVID-19 outbreak. In the same study, it was also stated that 16% of university students followed the recommended moderate and vigorous physical activity for at least 150 minutes a week for adults before the COVID-19 outbreak, but this rate decreased to 9.6% during the COVID-19 period (Bertrand, Shaw, Ko, Deprez, Chilibeck, & Zello, 2021). A study was conducted with the participation of 455,404 students from 187 countries using a step-counting smartphone application in order to reveal the effect of the measures related to the COVID-19 outbreak on the level of physical activity of university students around the world. As a result of this research, a decrease of 5.5% (287 steps) in the number of steps taken in the first 10-day period when the epidemic was announced throughout the world, and 27.3% (1432 steps) in the 30-day period was determined (Tison et al., 2020). Osipov, Ratmanskaya, Zemba, Potop, Kudryavtsev, and Nagovitsyn (2021) examined the physical activity level of university students, who were adversely affected by the transition of universities to distance education, especially within the scope of the measures taken against the COVID-19 outbreak, in the sample of Russia. As a result of the research, the researchers revealed that physical activity and sports participation of male and female university students decreased during the COVID-19 outbreak compared to the pre-COVID-19 outbreak. In various studies conducted in Turkey, it was revealed that the regular physical activity and exercise habits of university students decreased and sitting habits increased during the COVID-19 epidemic (Bulguroğlu, Bulguroğlu, & Özaslan, 2021; Dinler, Badat, Kocamaz, & Yakut, 2020; Ercan & Keklicek, 2020).

Research on the effects of measures related to the COVID-19 outbreak on the level of physical activity of individuals in the fields of physical education and sports also showed that the COVID-19 outbreak negatively affected the participation of physical educators in physical activity. In one of these studies, Erdoğan (2021) examined the physical activity levels of physical education and sports field students during the outbreak and found that the physical activity levels of the participating students decreased in general, 67.5% did not do

physical activity regularly, 45.1% increased their body weight, and 68.8% did physical activities at home. Examining the levels of physical activity of university students studying in the field of sports sciences living in provinces with and without home confinement restrictions during the COVID-19 outbreak, Öncen, Aydın, and Molla (2020) reported that students living in provinces with restrictions had a significant difference in physical activity levels compared to students living in provinces without restrictions. When comparing the physical activity levels of physical education teachers before and during the COVID-19 outbreak, Erdogan et al. (2021) emphasized that the physical activity levels of teachers were low before and during the outbreak, they stated that teachers did not participate in physical activity during the outbreak and the level of physical activity before the outbreak was higher than the level of physical activity during the outbreak. Erdogan et al. (2021) also revealed that, before the outbreak, 42.3% of physical education teachers participated in regular physical activity, 35.3% participated in physical activity 3 times a week, and 34% engaged in outdoor physical activity; 37.2% of the teachers participated in physical activity regularly, 34.6% of them participated in physical activity 2 days a week, and 66% of them participated in physical activity in their home. Hall-Lopez (2020), who examined the physical activity levels of physical education teachers in Mexico before and during the COVID-19 restrictions, also stated that the physical activity levels of teachers, in general, decreased during the restrictions, 25.2% of teachers were low before the restrictions, 37.8% were moderate, and 37 of them also stated that they participated in a high level of physical activity, and these rates decreased to 49.8%, 25.5%, and 24.7%, respectively, during the restriction process. In another study examining the physical activity levels of university students studying in the field of sports sciences during the COVID-19 outbreak, Akyol, Başkan ve Başkan (2020) reported that the majority of the participating students decreased their participation in physical activity due to the home confinement; accordingly, the physical strength of the students decreased, and they stopped participating in a physical activity completely in these restrictions.

Studies with the participation of the general population, university students, and more specifically, individuals in the field of sports sciences, in parallel with these research findings, reveal a difference in physical activity levels before and during the COVID-19 epidemic, and a decrease in the physical activity levels of individuals during the COVID-19 period. Among the various reasons for this decline in the literature, quarantine practices within the scope of the measures taken against the COVID-19 epidemic, social distance restrictions, termination of social activities, schools, gyms, swimming pools, parks, etc. (Amini, Habibi, Islamoglu, Isanejad, Uz, & Daniyari, 2021; Barkley et al., 2020; Papaioannou, Schinke, Chang, Kim, and Duda, 2020).

RECOMMENDATIONS

Depending on the results obtained from this research and literature related to the COVID-19 and physical activity, it is suggested that future research should cover different occupational groups (health personnel, security personnel, etc.), where physical activity and physical fitness are the basic requirements; should examine in depth the factors that cause the decrease in physical activity level during the COVID-19 outbreak in the light of quantitative and qualitative data with a mixed design, and it should be designed in a way that will deal with the

cognitive and affective dimensions as well as the physical dimension discussed in this study. In addition, it is recommended that health policymakers take measures to minimize the transmission rate during the COVID-19 outbreak while taking decisions to provide the necessary opportunities for the sustainability of other factors that contribute to the health of society. Furthermore, it is recommended to develop projects to enable access to all segments of the society by preparing telephone, tablet, computer applications, and television programs containing various physical activity programs, where social isolation is ensured on the one hand and healthy and active life can be maintained on the other.

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