**Factors Affecting the Physical Activity Level and Stress Perceptions of University Students During COVID-19 Pandemic**

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|  **Abstract**The COVID-19 pandemic was first identified from an outbreak in Wuhan, China, in December 2019 (1). A decrease in physical activity and an increase in psychological distress have been an observable fact in the COVID-19 pandemic (2). 18-25 years old university students are one of the groups that have become the focus of concerns with the sudden change in their active lifestyles (3). The aim of this study was to examine the factors affecting the physical activity level of university students during the COVID-19 pandemic and investigating the relationship between physical activity level and stress perceptions. Four hundred and forty-four college students has included in this study. Physical activity level (by IPAQ) and perceived stress level (by PSS) evaluated and barriers/motivators for physical activity were asked to participants during COVID-19 pandemic. Mean age of participants were 21±2.95 years, 81.3% were women and body mass index (BMI) of 21.93±3.5 kg/m2. Results of our study showed that vigorious physical activity (r=-0.160, p<0.01), walking (r=-0.130, p<0.05) and total physical activity scores (r=-0.157, p<0.01) of IPAQ were negative relationship with perceived stress score. Participants mostly reported that insufficient time (before pandemic:42%, during pandemic:33.5%), insufficient equipment (before pandemic:26.5%, during pandemic:27%) and lack of motivation (before pandemic:50%, during pandemic:45%) were barriers for physical activity before and during COVID-19 pandemic. Participants mostly reported that weight control (before pandemic:53.2%, during pandemic:55.1%), increasing muscle strength (before pandemic:54.7%, during pandemic:57.7%) and reducing stress (before pandemic:52.8%, during pandemic:55.1%) were motivators for physical activity before and during COVID-19 pandemic. As a result of our study, it has been shown that during the pandemic the perceived stress level decreases with vigorous physical activity, walking or total physical activity level. Considering university students, increasing the level of physical activity for stress management will be an effective, accessible method without any adverse effects.  |
| Keywords: COVID-19, Physical Activity, Stress |

1. **Introduction**

The COVID-19 pandemic was first identified from an outbreak in Wuhan, China, in December 2019. The virus had spread worldwide in a short time and strict security measures including social isolation and mobility constraints had been implemented in many countries (1). Different countries applied different isolation protocols and preventive strategies for decreasing spreading rate of the virus.

During and after isolation period, the major concern of health care professionals has decreasing physical activity and increasing sedentary behaviors in general population (4). It has thought that both the direct effect of isolation process and pandemic and negative effects of decreased physical activity may cause mental disorders such as increased perceived stress, anxiety and depression symptoms (5).

It has stated that decreased physical activity and increased psychological distress are the major problems for general population during COVID-19 pandemic (2,6,7). But the young population, especially college students, may be the most risky group for lifestyle changes because of prevention strategies and isolation process and may need to encourage for different type of physical activity during pandemic (3,8).

On the light of these informations, the aim of this study was to examine the factors affecting the physical activity level of university students during the COVID-19 pandemic and investigating the relationship between physical activity level and stress perceptions.

1. **Materials and Methods**

**2.1. Participants**

Forty hundred and forty-four college student included who voluntarily agreed to participate in the study in the 2019-2020 Spring, 2020-2021 Fall and 2020-2021 Spring semesters, while online education was carried out due to the COVID-19 pandemic.

The inclusion criteria were being between the ages of 18-25, being university student, having awareness of physical activity, and maintaining education through online system during the pandemic process. The exclusion criteria were being in a department that has not switched to online education during the pandemic process, or that not being university student within the specified time frame.

**2.2. Measurements**

*Physical Activity*

The Turkish version of International Physical Activity Questionnaire- Short Form (IPAQ-SF) was used to evaluated health–related physical activity. IPAQ-SF records the activity of four intensity levels: 1) vigorous-intensity activity such as aerobics, 2) moderate-intensity activity such as leisure cycling, 3) walking, and 4) sitting time. Frequency (measured in days per week) and duration (time per day) are collected separately for each specific type of activity for last 7 days (9).

*Stress Level*

The Turkish version of Perceived Stress Scale (PSS) was used to evaluate psychological stress level. PSS items were designed to tap how unpredictable, uncontrollable, and overloaded participants find their lives. The scale also includes a number of direct queries about current levels of experienced stress. Participants evaluated each item on a 5-point Likert-type scale ranging from "Never (0)" to "Very often (4)" and were asked to take the last 1 month as a reference for evaluation (10).

*Barriers and Motivators to Physical Activity*

To identify barriers and motivators for physical activity, participants were asked to report current and 6 months before to COVID-19 Pandemic barriers and motivations using a multiple choice list. The barriers and motivators evaluated in the current study have been previously investigated and have been shown to significantly affect physical activity levels (5).

**3. Results and Discussion**

**3.1. Results**

The study included 444 university students who voluntarily agreed to participate in the research in the 2019-2020 Spring, 2020-2021 Fall and 2020-2021 Spring semesters, when online education was held due to the COVID-19 pandemic. Participants had an average age of 21±2.95 years (min=18, max=28) and an average body mass index (BMI) of 21.93±3.5 kg/m2 (min=15.42, max=39.79). The descriptive characteristics of the participants are given in Table 1.

**Table 1**. Descriptive characteristics of the participants

|  |  |  |
| --- | --- | --- |
|  | **Variables** | N (%) |
|  | **Total** | 444 (100) |
| **Gender** | Woman | 361 (81.3) |
| Man | 83 (18.7) |
| **Department** | Physiotherapy and Rehabilitation Department | 316 (71.2) |
| Other | 128 (28.8) |
| **Academic Year** | 1 | 19 (4.3) |
| 2 | 174 (39.2) |
| 3 | 151 (34) |
| 4 or + | 100 (22.5) |
| **Are the place of residence and the university in the same city?** | Yes, in same city. | 189 (42.6) |
| No, in different cities. | 255 (57.4) |
| **Have you ever been COVID-19 positive since the start of the pandemic?** | Yes, I have been COVID-19 positive. | 90 ( 20.3) |
| No, I haven't been COVID-19 positive. | 354 (79.7) |

Descriptive statistics of physical activity levels and perceived stress scale measures are given in Table 2. There was a low-level negative significant linear relationship between vigorous physical activity, walking score and total physical activity score with perceived stress while there was no significant relationship between moderate physical activity score and perceived stress (Table 3).

Table 2. Descriptive Statistics of Physical Activity and Perceived Stress Levels during COVID-19

|  | **X±SD** | **Median** | **Min-Max** |
| --- | --- | --- | --- |
| IPAQ  |  |  |  |
| Vigorous MET-min/week | 2197.24±14023.975 | 0 | 0-288000 |
| Moderate MET-min/week | 744.13±1674.070 | 2.5 | 0-13440 |
| Walking MET-min/week | 1330.63±2489.449 | 693 | 0-38280 |
| IPAQ Sitting Time (min/week) | 365.03±226.209 | 300 | 20-1200 |
| IPAQ Total MET-min/week | 4278.11±16341.501 | 1628 | 0-327960 |
| Perceived Stress Scale | 28.62±7.105 | 28 | 9-51 |

X=Mean, SD=Standard Deviation, Min=Minimum, Max=Maximum

Table 3. Relationships Between Physical Activity Level and Perceived Stress Scale Score during COVID-19

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | 1 | 2 | 3 | 4 | 5 |
| 1.IPAQ Vigorous MET-min/week | 1 |  |  |  |  |
| 2.IPAQ Moderate MET-min/week | 0.375\*\*\* | 1 |  |  |  |
| 3.IPAQ Walking MET-min/week | 0.430\*\*\* | 0.213\*\*\* | 1 |  |  |
| 4.IPAQ Total MET-min/week | 0.768\*\*\* | 0.564\*\*\* | 0.831\*\*\* | 1 |  |
| 5.Percieved Stress Scale Score | -0.160\*\* | -0.039 | -0.130\* | -0.157\*\* | 1 |

\*p<0.05, \*\*p<0.01, \*\*\*p<0.001, Spearman's rho Correlation Coefficient

It was examined whether there was a difference between the answers to the barrier and motivation items for exercise before and during COVID-19 pandemic, and the results are presented in the tables and charts below (Figure 1 and 2).

# Figure 1. Distribution of “Yes” Responses to Barriers to Exercise Items Before and During COVID-19 Pandemic

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As a result of the McNemar test, it was seen that there was a statistically significant difference between the yes answer given by the participants to the statement "insufficient finances" before (14.5%) and during COVID-19 pandemic (8.0%) (p<0.05).

# Figure 2. Distribution of “Yes” Responses to Motivators to Exercise Items Before and During COVID-19 Pandemic

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As a result of the McNemar test, it was seen that there was a statistically significant difference between the yes response given by the participants to the statement "HCP (Healthcare Professional) Recommended" before (16.2%) and during COVID-19 pandemic (21.1%) (p<0.05).

**3.2. Discussion**

Our study shows that during the COVID-19 pandemic, the "HCP (Health Care Professional) Recommendation" became more important as a motivator for physical activity than the pre-pandemic conditions and there was a negative-significant linear relationship between vigorous physical activity, walking, total physical activity, and perceived stress level.

As a result of our study, it has been shown that during the pandemic the perceived stress level decreases with vigorous physical activity, walking or total physical activity level. Considering university students, increasing the level of physical activity for stress management will be an effective, accessible method without any adverse effects.

There are limited source about the effects of the COVID-19 pandemic on barriers and motivators for physical activity, which has been shown to reduce the perceived stress level. In a self-reported study, in which individuals from all age groups participated, “weight control” and “stress reduction” were the motivation factors that directing individuals to activity (5). Our study results support previous study findings. In current study, among the motivation factors for physical activity before and after pandemic, the first three according to the number of people were “strength building”, “weight control” and “stress reduction”. It was observed that this proportional superiority did not change with the pandemic process and the three reported motivation items were still valid during the COVID-19.

It is known that the physical activity levels of university students decreased during the COVID-19 pandemic (11). In previous studies it was reported that taking person specific physical activity recommendations increase physical activity level (12). Similarly in multiple liner regression model, it was seen that the effect of the “HCP recommendation” statement on the level of physical activity was statistically significant and the physical activity score of the students who answered yes to the statement was higher than the students who said no. It is an indicator that determining a goal for reaching the physical activity level determined by a HCP may be an effective method for increasing physical activity level of the college students.

Our results and the results of previous studies show that physical activity counseling by HCP is important and the benefit from physical activity counseling increases significantly with the pandemic process. It can be predicted that the use of physical activity counseling by HCP in the young population studying at university, whose inactivity rate has increased during the pandemic process, will also prevent long-term negative effects.

It is known that this is neither the first, nor be the last pandemic It has clearly known that problems caused by physical inactivity are critical and the young adults were the most affected group by complications caused by COVID-19 pandemic (13,14). Our study results point that while increasing the level of physical activity reduces the perceived stress level, one of the strong alternatives we must increase the level of physical activity is to increase accessibility and consultation with HCP. Considering that inactivity has increased with the pandemic, study results should be considered when it is desired to increase the level of physical activity during and after the pandemic. In conclusion, the results of the current research will be key to increasing and maintaining well-being after the pandemic.

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