

## HOW DID ONLINE LEARNING AFFECT PHYSIOTHERAPY STUDENTS DURING THE COVID-19 PANDEMIC?

### COVID-19 SALGINI SIRASINDA ÇEVİRİMİÇİ ÖĞRENME FİZYOTERAPİ ÖĞRENCİLERİNİ NASIL ETKİLEDİ?

Muhammet Fatih BULUT<sup>1</sup>, Aybüke Cansu KALKAN<sup>1</sup>, Arzu GENÇ<sup>2</sup>, Seher ÖZYÜREK<sup>2</sup>

<sup>1</sup> Dokuz Eylül University, Institute of Health Sciences, Izmir, TÜRKİYE

<sup>2</sup> Dokuz Eylül University, Faculty of Physical Therapy and Rehabilitation, Izmir, TÜRKİYE

**Cite this article as:** Bulut MF, Kalkan AC, Genç A, Özyürek S. How Did Online Learning Affect Physiotherapy Students During the COVID-19 Pandemic? Med J SDU 2023; 30(4): 652-660.

#### Öz

##### Amaç

Hayatın hemen her alanını etkisi altına alan COVID-19 salgınının eğitim üzerinde de ciddi etkileri olmuştur. Bu çalışma, COVID-19 salgını sırasında fizyoterapi lisans öğrencilerinde çevrimiçi eğitim sürecinin fiziksel aktivite, azim ve koronafobi üzerine etkilerini araştırmayı amaçladı.

##### Gereç ve Yöntem

Çalışmaya toplam 185 fizyoterapi lisans öğrencisi dahil edildi. Fiziksel aktivite düzeyi Uluslararası Fiziksel Aktivite Anketi-Kısa Formu (IPAQ-SF), azim Kısa Azim (Sebat) Ölçeği (Grit-S) ve koronafobi ise COVID-19 Korkusu Ölçeği ile değerlendirildi. Ek olarak, salgın döneminde fiziksel aktivite ve azim düzeylerinde algılanan değişiklikler değerlendirildi. Akademik performans, genel not ortalaması (GPA) ile belirlendi.

##### Bulgular

Öğrencilerin çoğunun fiziksel aktivite (%82,7) ve azim (%69,2) düzeylerinde azalma algıladıkları belirlendi. GPA ile COVID-19 Korkusu Ölçeği skoru arasında orta düzeyde pozitif korelasyon ( $\rho:0,407$ ,  $p<0,001$ ), GPA ile Grit-S skoru arasında ise düşük düzeyde negatif korelasyon vardı ( $\rho:-0,318$ ,  $p<0,001$ ).

##### Sonuç

COVID-19 salgını sırasında çevrimiçi eğitim alan fizyoterapi öğrencileri, fiziksel aktivite ve azim düzeylerinde bir azalma algılayabilirler. Bu çalışma, daha yüksek akademik performansın daha yüksek koronafobi ve daha düşük azim düzeyleriyle ilişkili olabileceğine dair ilginç sonuçlar ortaya çıkardı. Bu sonucun çevrimiçi değerlendirme yöntemlerinin kalitesinin yetersiz olması, bilgi teknolojilerinin eksikliği ve çevrimiçi sınavların kontrol edilemezliği ile ilgili olabileceğini düşünmekteyiz.

**Anahtar Kelimeler:** COVID-19, Çevrimiçi Öğrenme, Fizyoterapi, Öğrenci

##### Abstract

##### Objective

The COVID-19 pandemic, which affected almost all areas of life, has had serious effects on education as well. This study aimed to investigate the effects of the online education process on physical activity, perseverance, and coronaphobia among undergraduate physiotherapy students during COVID-19 pandemic.

**Sorumlu yazar ve iletişim adresi / Corresponding author and contact address:** S.Ö. / seherozyurek@gmail.com

**Müracaat tarihi/Application Date:** 04.09.2023 • **Kabul tarihi/Accepted Date:** 25.10.2023

**ORCID IDs of the authors:** M.F.B: 0000-0002-6945-7194; A.C.K: 0000-0003-1329-7870;

A.G: 0000-0001-9481-6083; S.Ö: 0000-0002-8586-7214

## Material and Method

A total of 185 undergraduate physiotherapy students were included in the study. Physical activity level was assessed with the International Physical Activity Questionnaire-Short Form (IPAQ-SF), perseverance with the Short Perseverance Scale (Grit-S), and coronaphobia with the COVID-19 Fear Scale. In addition, the perceived changes in physical activity and perseverance levels during the pandemic were evaluated. The academic performance was determined with the grade point average (GPA).

## Results

It was determined that most of the students perceived a decrease in their physical activity (82.7%) and perseverance (69.2%) levels. There was a moderate positive correlation between GPA and COVID-19 Fear Scale score ( $\rho:0.407$ ,  $p<0.001$ ) and a negative

low correlation between GPA and Grit-S score ( $\rho:-0.318$ ,  $p<0.001$ ).

## Conclusion

Physiotherapy students who received online learning during the COVID-19 pandemic could perceive a decrease in their physical activity and perseverance levels. This study has revealed interesting results that higher academic performance may be related to higher coronaphobia and lower perseverance levels. We think that this result may be attributed to the inadequate quality of online assessment methods, lack of information technologies and the uncontrollability of online examinations.

**Keywords:** COVID-19, Online Learning, Physiotherapy, Student

## Introduction

After a viral pneumonia of unknown origin emerged in China in December 2019, it spread rapidly, increased globally, and was declared a pandemic by the World Health Organization (WHO) (1). Infection from the virus was expressed as coronavirus disease 2019 (COVID-19) (1). According to WHO data, COVID-19 has infected more than 770 million people worldwide since the beginning of the pandemic (as of 30 August 2023), and more than 6.9 million of these cases resulted in death (2).

As a result of the changes in the viral genome due to the effect of different mutagens in the process, many variants have emerged. Recently, the Omicron variant has been identified, which has a high contagiousness and re-infection probability due to some of its mutations (3). The infection caused by this variant is milder than the others (4). However, the Omicron variant has a structure that tends to mutate, and it has remained the risk for unvaccinated people (5).

The pandemic process, which affected almost all areas of life, has also had serious effects on education. Following the outbreak of the epidemic, educational institutions were closed indefinitely, and the education system changed. During this process, traditional education was replaced by online learning and teaching, where learning and teaching activities were carried out remotely and on digital platforms (6). As a result of these changes, an alarming increase of cases was found in some mental problems such as depression, anxiety and/or suicidal thoughts in

university students due to academic, health and lifestyle concerns (7).

The COVID-19 pandemic has caused physical as well as psychological effects on the population. One of the most important physical effects is the decrease in physical activity resulting from the change in lifestyle (8). Quarantine and isolation precautions reduce the interaction of people with each other and cause movement restrictions, especially during this pandemic. Decreased physical activity also has negative effects on mental health (9).

Turkey is one of the countries that rapidly transitioned to distance education by closing educational institutions during the COVID-19 pandemic. However, according to literature, it is noteworthy that studies examining the effects of distance education in Turkey and in physiotherapy education are insufficient (10,11). Physiotherapists are health professionals, who encourage physical activity and improve individuals' physical activity level (12). In a study conducted before the outbreak of the pandemic, it was determined that physiotherapists were physically active (13). However, a recent study conducted in Turkey showed that physiotherapy students had a low level of physical activity during the pandemic (14). Still, it is not fully known how the COVID-19 pandemic affected physiotherapy students in terms of academic success, perseverance, coronaphobia, and physical activity levels in Turkey.

In light of all this information, the primary aim of this study was to examine the perceived change in physical

activity and perseverance levels of physiotherapy students compared to the pre-pandemic period, and also to investigate whether academic performance is related to perseverance, coronaphobia, and physical activity. The secondary aim was to examine the effect of physical activity levels on academic performance and perseverance in the online education period during the COVID-19 pandemic. Therefore, this study proposes to test the following hypotheses: H1. The perceived physical activity and perseverance levels will decrease compared to the pre-pandemic period in physiotherapy students, and H2. The academic performance will be positively related to perseverance and negatively related with coronaphobia and physical activity level during the online learning.

## Material and Method

### Research Design and Data Collection

This cross-sectional study was conducted with undergraduate students at Dokuz Eylül University Faculty of Physical Therapy and Rehabilitation. The data were collected through an online survey in the 2020-2021 academic year, which is one of the periods when online education was compulsory within the scope of the COVID-19 pandemic.

The contact information of the students was obtained from the Student Affairs Unit of the Faculty of Physical Therapy and Rehabilitation. Necessary information about the research and Google Form link containing the surveys in the research were sent by e-mail to the students. All students participated in the study on a voluntary basis.

### Participants

An invitation form to participate was sent out to 350 students in total via multiple channels (e-mail, sms, WhatsApp). Of these, 185 students who volunteered to participate in the study met the inclusion criteria, filled out the form completely, and were included in the study. The survey received 185 responses from a total of 350 students, resulting in a response rate of 52.86%.

Being 18 years of age or older, volunteering to participate in the research, continuing undergraduate education with online learning were the inclusion criteria of the study. Exclusion criteria were the presence of any cardiopulmonary, neurological or musculoskeletal disease that could affect the physical activity level, a current diagnosis of COVID-19, or incomplete responses to the online questionnaire.

The study was approved by Non-Invasive Research Ethics Committee of Dokuz Eylül University on

18.01.2021 with decision number 2021/02-26 (No: 5981-GOA). The data was collected through an online form created via Google Forms. Informed consent was obtained from each participant. Before starting to answer the survey questions, the participants were asked to mark their voluntary consent on the form in order to participate in the research.

The sample size calculation was performed using SurveyMonkey Online Calculator (<https://www.surveymonkey.com/mp/sample-size-calculator/>). The total population under consideration was 350 (with a 95% confidence level,  $\alpha$  is 0.05). Based on these inputs, the estimated sample size was 184.

### Data Collection Tools

Data was collected via Google Form. The survey consisted of the following 5 topics:

#### Sociodemographic Data

Age, gender, height, and body weight of the participants, which year they were in, and whether they had COVID-19 or not were obtained.

#### Physical Activity Level

The physical activity level of the participants was evaluated with the International Physical Activity Questionnaire-Short Form (IPAQ-SF). The validity and reliability of the Turkish version of the questionnaire have been demonstrated (15). The average time spent sitting in a day was recorded in addition to the frequency and duration of vigorous activities, moderate-intensity activities, and walking in the last week was filled into the questionnaire. Average energy expenditure during all activities was calculated in metabolic equivalent (MET). Multiplying the frequency of activity (days/week) and duration of activity (in min/day) based on 8.0 METs for vigorous physical activities, 4.0 METs for moderate-intensity activities, and 3.3 METs for walking. The subject's overall physical activity using IPAQ-SF (total physical activity MET-min/week) was the sum of (walking + moderate + vigorous) MET-min/week scores. According to the total MET values spent weekly, three levels of physical activity were identified: low physical activity level (<599 MET-min/week), moderate physical activity level (at least 600 MET-min/week) and high physical activity level (at least 3000 MET-min/week) (16,17).

In addition, a 5-point Likert scale was used to examine the perceived change in physical activity level compared to the pre-pandemic period. Perceived responses were reported on a 5-point Likert scale ranging from a "much less physically active as

compared to pre-COVID-19 period," to "much more physically active compared to pre-COVID-19 period".

### Perseverance

Students' perseverance, also known as grit, was evaluated using the valid and reliable Turkish version of Short Grit Scale (Grit-S). The scale consists of two parts, "Consistency of Interest" and "Perseverance of Effort", and 8 questions. The questions are rated on a 5-point Likert scale. After reverse scoring (for items 1, 3, 5, and 6), the total score was determined by sum of the scores received from each question. Higher scores indicate higher level of perseverance (18).

In addition, a 5-point Likert scale was used to examine the perceived change in perseverance compared to the pre-pandemic period. Perceived responses were reported on a 5-point Likert scale ranging from a "much lower grit level as compared to pre-COVID-19 period," to "much higher grit level compared to pre-COVID-19 period".

### Academic Performance

Academic performances of the students were evaluated with the grade point average (GPA) of the education semester in which the data were collected. The end-of-term GPA in the transcripts was taken from the Student Affairs Unit of the Faculty of Physical

Therapy Rehabilitation. The GPA was recorded according to the 0-100 points ranking system included in the transcript of the relevant university. Higher points indicate higher academic achievement level.

### Coronaphobia

The Fear of COVID-19 Scale was used to assess coronaphobia. A validity and reliability of the Turkish version of the scale have been demonstrated. The scale consists of 7 questions in total and the questions are graded as a 5-point Likert scale. The total score ranges from 7 to 35, and high scores indicate higher coronaphobia level (19).

### Statistical Analysis

Statistical analysis was performed using the IBM SPSS Statistics program (Version 24.0. Armonk, NY: IBM Corp.). The normality of the distribution of data was evaluated with the Kolmogorov-Smirnov test. Non-parametric analyses were used because most of the variables examined did not fit the normal distribution. Descriptive statistics were presented as frequency (percentage) and median (minimum-maximum). Spearman correlation analysis was used to determine the relationships between the evaluated parameters. Correlation coefficients were interpreted as .00-.19 - "very low"; .20-.39 - "low"; .40-.59 - "moderate"; .60-.79 - "strong"; .80-1.0 - interpreted as "very strong"

Table 1

Sociodemographic characteristics of the participants

Variable	Frequency (%) Median (Min-Max)
Age (years)	21.00 (18.00-30.00)
Gender	
Female	143 (77.3)
Male	42 (22.7)
Height (cm)	167.00 (150.00-194.00)
Weight (kg)	59.00 (38.00-125.00)
BMI (kg/m <sup>2</sup> )	21.23 (16.23-43.25)
Study year	
1st	37 (20.0)
2nd	48 (25.9)
3rd	53 (28.6)
4th	47 (25.5)
History of COVID-19 infection	
Yes	12 (6.5)
No	150 (81.1)
Do not know	23 (12.4)

BMI: body mass index.

(20). Perceived changes in physical activity level and perseverance compared to the pre-pandemic period were presented as frequency (percentage). The effect of physical activity levels, which is divided into 3 groups as low, moderate, and high, on academic performance and perseverance was examined by Kruskal-Wallis analysis of variance. The significance level was determined as  $p < 0.05$ .

## Results

Most of the participants were female and did not have a history of COVID-19 infection. The participation rates of students in the study were similar in terms of their study year. The sociodemographic data of the participants are presented in Table 1. Descriptive statistics on physical activity level, perseverance, academic performance, and coronaphobia are shown in Table 2. Overall, the decrease in perceived physical activity and grit levels

was reported by most participants. About 82.7% of students (54.1% much less and 28.6% somewhat less) reported they had done less physical activity during the pandemic period as compared to the pre-COVID-19 period. Similarly, 69.2% of students (30.8% much lower and 38.4% somewhat lower) perceived lower grit level during the pandemic period as compared to the pre-COVID-19 period.

A positive moderate correlation ( $\rho = 0.407$ ,  $p < 0.001$ ) between the COVID-19 Fear Scale score and GPA of the students, and a negative low correlation between the Grit-S score and their GPA ( $\rho = -0.318$ ,  $p < 0.001$ ) were detected (Table 3).

There was no statistically significant difference between groups with low, moderate, and high physical activity levels (according to the weekly total MET values in IPAQ-SF) in terms of GPA and Grit-S results ( $p > 0.05$ , Table 4).

Table 2

Descriptive data of participants' physical activity level, grit, academic performance and coronaphobia

Variable	Frequency (%) Median (Min-Max)
<b>Physical activity level</b>	
IPAQ-SF (MET-min/week)	1320.00 (66.00-11016.00)
Classification of physical activity according to IPAQ-SF total score	
Low physical activity level	38 (20.5)
Moderate physical activity level	108 (58.4)
High physical activity level	39 (21.1)
Perceived change in physical activity level compared to the pre-COVID-19 period	
Much less	100 (54.1)
Somewhat less	53 (28.6)
About the same	17 (9.2)
Somewhat more	11 (5.9)
Much more	4 (2.2)
<b>Grit</b>	
Grit-S score	2.50 (1.00-4.38)
Perceived change in grit compared to the pre-COVID-19 period	
Much lower	57 (30.8)
Somewhat lower	71 (38.4)
About the same	34 (18.4)
Somewhat higher	19 (10.3)
Much higher	4 (2.1)
<b>Academic performance</b>	
GPA (0-100 points)	83.43 (52.83-94.27)
<b>Coronaphobia</b>	
The Fear of COVID-19 Scale	17.00 (7.00-31.00)

IPAQ-SF: The International Physical Activity Questionnaire-Short Form, Grit-S: The Short Grit Scale, GPA: Grade point average.

**Table 3** The relationship between academic performance, coronaphobia, grit, and physical activity level

	rho	p
GPA - The Fear of COVID-19 Scale	0.407	<0.001*
GPA - Grit-S	-0.318	<0.001*
GPA - IPAQ-SF	0.056	0.446

rho: Spearman correlation coefficient, GPA: Grade point average, Grit-S: The Short Grit Scale, IPAQ-SF: The International Physical Activity Questionnaire-Short Form, \*p<0.05.

**Table 4** The effect of physical activity levels on academic performance and grit during the COVID-19 pandemic

Variables	Low physical activity level (n=38) Median (Min-Max)	Moderate physical activity level (n=108) Median (Min-Max)	High physical activity level (n=39) Median (Min-Max)	p
GPA	83.43 (62.89-93.18)	83.43 (52.83-93.23)	83.43 (56.95-94.27)	0.748
Grit-S	2.56 (1.25-4.25)	2.50 (1.00-4.38)	2.37 (1.38-3.75)	0.549

GPA: Grade point average, Grit-S: The Short Grit Scale.

## Discussion

The study presented a remarkable decrease in the perceived physical activity and perseverance levels by the majority of the physiotherapy students who received online learning during the COVID-19 pandemic compared to the pre-pandemic period. Academic performance and perseverance did not differ between the students with low, medium, and high physical activity levels. Interestingly enough, this study has found unexpected results that higher academic performance may be related to higher coronaphobia and lower perseverance levels.

In a study, it was determined that the physical activity level of university students decreased in the period of restrictions compared to the “unfreezing” period (21). In another study, it was found that approximately 60% of the students in health-related departments in Croatia, had insufficient physical activity levels during the second partial closure period of the pandemic (22). Moreover, it was stated that university students who had higher quality of life had lower burnout scores, better perception of online learning, and higher frequency of physical activity (23). Topcu-Güçhan et al. (14) reported that most of the physiotherapy students had low physical activity levels during the

distance education period. In our study, more than half of the students stated that the level of physical activity they perceived decreased compared to the pre-pandemic period. It is not surprising that we achieved this result within the scope of the precautions taken during the pandemic period. However, unlike their results, more than half of the students (58.4%) are at the level of moderate physical activity. Although students perceived a decrease in their physical activity level, they were not inactive during the online learning period according to the IPAQ-SF assessment (14). This result suggests that the physiotherapy students in the current study may have a higher level of physical activity in their routine life, except during the pandemic period.

Although distance education offers an alternative way for the continuity of education and training activities in the pandemic period, it minimizes the contact between students and academicians, as well as many students cannot access online education due to economic problems, technical struggles, and lack of tools/equipment (24). In another study, it was shown that the COVID-19 lockdown affected participants to varying degrees academic performance of most participants including veterinary medical students and researchers at 96.7%. Although the distance

education process offers students the opportunity to study on their own, it is thought that the practical lessons make online learning difficult (24). The study conducted in Korea reported that medical school students continuing their educational activities online during the pandemic period led to a decrease in their academic performance (25). On the contrary, a study conducted in Nigeria revealed that online learning platforms positively affect the academic success of students in practical-related courses (26). In a retrospective case-control study conducted in Italy aimed to compare the students' performances as evaluated with an oral exam and satisfaction shown in an online course to a control group of students who underwent the same course delivered face-to-face teaching in the previous five years. While there was no difference between the groups in terms of participants' course satisfaction, it was determined that the course performance of students who took the online course was higher (27). It was shown that many factors such as anxiety, social problems, and internet connection negatively affected the motivation of students and academics in different Turkish universities during the pandemic (28).

One of the factors that affects success and performance is perseverance (29). Social support was emphasized as the key point of perseverance in nursing students during the COVID-19 pandemic (30). In a study examining the relationship between perseverance and lifestyle behaviors during the first quarantine in the pandemic, it was reported that individuals with more perseverance are more physically active and spend less sedentary time (31). In our study, more than 65% of students reported a decrease in perseverance perception during the pandemic compared to the pre-pandemic period. We think that the uncertainty of the pandemic process supports this result. In addition, a negative relationship was found between perseverance and GPA. During the pandemic process, the academic performance of students is frequently evaluated with assignments or online written exams. However, monitoring whether the students perform this evaluation process authentically and fully with their own knowledge is very difficult. For example, although the GPA of the students may be high, it might not be a true reflection of their genuine academic performance.

The exaggerated response to the spread of COVID-19 and the state of fear in the populace may be more harmful than the disease itself (32). In a study conducted with undergraduate students living in regions where the epidemic was intense in the United States, it was determined that students

had fears related to both viral transmission and social isolation (33). In a study including students enrolled in any university's online course, it was found that the severity of depression and anxiety symptoms, which are common during the COVID-19 pandemic, had a significant effect on perceptions of students' academic performance (34). Another study revealed that physically inactive individuals have more coronaphobia than active individuals (35). In our study, a positive relationship was found between coronaphobia and academic performance. The loading stress that occurs during the pandemic may show differently between individuals. Although stress has negative effects, it also makes us think that increased stress with fear of COVID-19 may positively affect academic performance, by leading to a person's ability to eliminate stress and use better stress management skills. Surprisingly, no differences were found between groups with low, moderate, and high physical activity levels in terms of academic performance and perseverance in the current study. The majority of the students participating in our study stated that there was a decrease in the perceived level of physical activity compared to the pre-pandemic period. However, when physical activity level was classified according to the weekly MET value in the IPAQ-SF, it was determined that only 20.5% of the students were at low physical activity levels and the majority of them still have moderate and high physical activity levels. This may be one reason why there were any differences in academic performance and perseverance between different physical activity groups. Moreover, it is thought that the inhomogeneity in the number of students and genders in the analyzed group distribution, may have affected the results.

To the best of our knowledge, this is the first study to evaluate the impact of COVID-19 pandemic on academic performance, perseverance, and coronaphobia in physiotherapy students. However, there are some limitations in the current study. First and foremost, our results may not fully reflect the changes, as pre-pandemic data of students is not available for the variables we assessed. Secondly, the data of the current study is based on a single university. These results may not be applicable to other universities. Lastly, self-report questionnaires were used that raises the possibility of response bias. In the future, there is a need for comprehensive studies in which many universities are included, with gender homogeneous participation with larger samples.

According to our results, physiotherapy students receiving online learning perceived a decrease in their physical activity and perseverance levels

during the COVID-19 pandemic period compared to the traditional face-to-face learning period. In this context, we think that if students are faced with a similar process, the level of physical activity, which is known to be important for mental health, may be maintained with aerobic exercises performed outdoors and various basic exercises carried out at home. In order to increase students' perseverance levels in a process like COVID-19, family support and professional support, including school counseling services or psychological support may be used. In addition, this study found interesting results that contradict our second hypothesis. According to these results, increased coronaphobia and decreased perseverance may be associated with higher academic performance. This result may be related to the inadequate quality of online assessment methods, lack of information technologies, the uncontrollability of online examinations, and increased likelihood of cheating. Universities and lecturers quickly adapted the contents of face-to-face examination methods to online modalities, without specific instructional and technical design based on e-learning. If online courses in physiotherapy education will be implemented in the future, universities will need specialized and more controlled online examinations system enhance the quality of online tests and to evaluate the academic performance of student more objectively.

Although after a long school break has returned to face-to-face education, it should not be forgotten that a process similar to the COVID-19 pandemic may occur suddenly. Therefore, it is very important always to be prepared for situations that are not fully known what the process will bring. In accordance with our results, we think that by making the necessary plans regarding the online learning process in advance, the academic performance of the students may be improved. Although the level of physical activity was not found to be associated with perseverance and academic performance in this study, considering the perceived low level of physical activity, strategies that may increase physical activity levels during online learning may also positively affect academic achievement. Moreover, raising awareness of physiotherapy students regarding increasing their physical activity, who will work to increase the physical activity level of society, may significantly contribute to both their current academic and future professional performances.

### Acknowledgment

The authors thank all physiotherapy students who participated in our study.

### Conflict of Interest Statement

The authors have no conflicts of interest to declare.

### Ethical Approval

The study was approved by Non-Invasive Research Ethics Committee of Dokuz Eylül University on 18.01.2021 with decision number 2021/02-26 (No: 5981-GOA). The research was conducted in accordance with the Helsinki Declaration.

### Consent to Participate and Publish

The data was collected through an online form created via Google Forms. Informed consent was obtained from each participant. Before starting to answer the survey questions, the participants were asked to mark their voluntary consent on the form in order to participate in the research.

### Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

### Availability of Data and Materials

Data sharing not applicable

### Authors Contributions

MFB: Conceptualization; Data curation; Investigation; Methodology; Writing-original draft.

ACK: Data curation; Formal analysis; Investigation; Writing-original draft.

AG: Investigation; Methodology; Supervision; Writing-review & editing.

SÖ: Conceptualization; Data curation; Formal analysis; Investigation; Methodology; Project administration; Resources; Supervision; Writing-review & editing.

### References

1. Kakodkar P, Kaka N, Baig MNA. Comprehensive literature review on the clinical presentation, and management of the pandemic coronavirus disease 2019 (COVID-19). *Cureus* 2020;12(4):e7560.
2. World Health Organization. Coronavirus disease (COVID-19) Situation dashboard [Internet]. WHO. Available from <https://covid19.who.int/>
3. Khan NA, Al-Thani H, El-Menyar A. The emergence of new SARS-CoV-2 variant (Omicron) and increasing calls for COVID-19 vaccine boosters-The debate continues. *Travel Med Infect Dis*. 2022;45:102246.
4. Thiruvengadam R, Rizvi ZA, Raghavan S, Murugesan DR, Gosain M, Dandotiya J, et al. Clinical and experimental evidence suggest omicron SARS-CoV-2 is inherently less pathogenic than delta independent of previous immunity. *Eur J Med Res*. 2023 Oct 11;28(1):421. doi: 10.1186/s40001-023-01373-3.



5. Fan Y, Li X, Zhang L, Wan S, Zhang L, Zhou F. SARS-CoV-2 Omicron variant: recent progress and future perspectives. *Signal Transduct Target Ther*. 2022;7(1):1-11.
6. Kumar K, Pande BP. Rise of Online Teaching and Learning Processes During COVID-19 Pandemic. In *Predictive and Preventive Measures for Covid-19 Pandemic*. Springer, Singapore; 2021:251-71.
7. Wang X, Hegde S, Son C, Keller B, Smith A, Sasangohar F. Investigating mental health of US college students during the COVID-19 pandemic: Cross-sectional survey study. *J Med Internet Res*. 2020;22(9):e22817.
8. López-Moreno M, López MTI, Miguel M, Garcés-Rimón M. Physical and psychological effects related to food habits and lifestyle changes derived from COVID-19 home confinement in the Spanish population. *Nutrients* 2020;12(11):3445.
9. Chtourou H, Trabelsi K, H'mida C, Boukhris O, Glenn JM, Braich M, et al. Staying physically active during the quarantine and self-isolation period for controlling and mitigating the COVID-19 pandemic: a systematic overview of the literature. *Front Psychol*. 2020; 11:1708.
10. Özdede M, Şahin SC. Views and anxiety levels of Turkish dental students during the COVID-19 pandemic. *J Stomatol*. 2020;73(3):123-28.
11. Soylu Y. The psychophysiological effects of the COVID-19 quarantine in the college students. *Phys Educ Stud*. 2021;25(3):158-63.
12. Kunstler BE, Cook JL, Freene N, Finch CF, Caroline F, Kemp JL, et al. Physiotherapist-led physical activity interventions are efficacious at increasing physical activity levels: a systematic review and meta-analysis. *Clin J Sport Med*. 2018;28(2):304-15.
13. Neil-Sztramko SE, Ghayyur A, Edwards J, Campbell KL. Physical activity levels of physiotherapists across practice settings: a cross-sectional comparison using self-report questionnaire and accelerometer measures. *Physiother Can*. 2017;69(2):152-60.
14. Topcu-Güçhan Z, Kaygısız-Belgen B, Demiralp C. How are the physical activity and anxiety levels of the university students affected during the coronavirus (Covid-19) pandemic? *Balt J Health Phys Act*. 2020;12(6):4.
15. Sağlam M, Arıkan H, Savcı S, Inal-Ince D, Bosnak-Guclu M, Krabulut E, et al. International physical activity questionnaire: reliability and validity of the Turkish version. *Percept Mot Skills*. 2010;111(1):278-84.
16. IPAQ Research Committee. Guidelines for data processing and analysis of the International Physical Activity Questionnaire (IPAQ)-short and long forms [Internet]. 2005. Available from <http://www.ipaq.ki.se/scoring.pdf>
17. Silva-Batista C, Urso RP, Silva AEL, Bertuzzi R. Associations between fitness tests and the International Physical Activity Questionnaire—Short form in healthy men. *J Strength Cond Res*. 2013;27(12):3481-87.
18. Sarıçam H, Çelik İ, Ayunga O. Kısa Azim (Sebat) Ölçeğinin Türkçeye Uyarlanması: Geçerlik ve Güvenirlilik Çalışması. *Uluslararası Türkçe Edebiyat Kültür Eğitimi (TEKE) Dergisi* 2016;5(2):927-35.
19. Bakioğlu F, Korkmaz O, Ercan H. Fear of COVID-19 and positivity: Mediating role of intolerance of uncertainty, depression, anxiety, and stress. *Int J Ment Health Addict*. 2021;19(6):2369-82.
20. Evans JD. *Straightforward statistics for the behavioral sciences*. Thomson Brooks/Cole Publishing Co; 1996.
21. Rutkowska A, Kacperak K, Rutkowski S, Cacciante L, Kiper P, Szczegielniak J. The impact of isolation due to COVID-19 on physical activity levels in adult students. *Sustain* 2021;13(2):446.
22. Talapko J, Perić I, Vulić P, Pustijanac E, Jukić M, Bekić S, et al. Mental health and physical activity in health-related university students during the COVID-19 pandemic. *Healthcare* 2021;9(7):801.
23. Azzi DV, Melo J, Neto ADAC, Castelo PM, Andrade EF, Pereira LJ. Quality of life, physical activity and burnout syndrome during online learning period in Brazilian university students during the COVID-19 pandemic: A cluster analysis. *Psychol Health Med*. 2022;27(2):466-80.
24. Mahdy MA. The impact of COVID-19 pandemic on the academic performance of veterinary medical students. *Front Vet Sci*. 2020;7:732.
25. Kim DH, Lee HJ, Lin Y, Kang YJ. Changes in academic performance in the online, integrated system-based curriculum implemented due to the COVID-19 pandemic in a medical school in Korea. *J Educ Eval Health Prof*. 2021;18:24.
26. Adeyeye B, Ojih SE, Bello D, Adesina E, Yartey D, Ben-Enukora CA, et al. Online Learning Platforms and Covenant University Students' Academic Performance in Practical Related Courses during COVID-19 Pandemic. *Sustain* 2022;14:878.
27. Rossetini G, Geri T, Turolla A, Viceconti A, Scum C, Mirandola M, et al. Online teaching in physiotherapy education during COVID-19 pandemic in Italy: a retrospective case-control study on students' satisfaction and performance. *BMC Med Educ*. 2021;21(1):1-7.
28. Elhadary T, Elhady IA, Mohamed AA, Alawna M. Evaluation of academic performance of science and social science students in Turkish Universities during COVID-19 crisis. *J Crit Rev*. 2020;7:1740-51.
29. Bono G, Reil K, Hescocox J. Stress and wellbeing in urban college students in the US during the COVID-19 pandemic: Can grit and gratitude help? *Int J Wellbeing*. 2020;10(3).
30. Thomas LMB. Stress and depression in undergraduate students during the COVID-19 pandemic: Nursing students compared to undergraduate students in non-nursing majors. *J Prof Nurs*. 2022;38:89-96.
31. de Zepetnek JT, Martin J, Cortes N, Caswell S, Boolani A. Influence of grit on lifestyle factors during the COVID-19 pandemic in a sample of adults in the United States. *Pers Individ Dif*. 2021;175:110705.
32. Elsharkawy NB, Abdelaziz EM. Levels of fear and uncertainty regarding the spread of coronavirus disease (COVID-19) among university students. *Perspect Psychiatr Care* 2021;57(3):1356-64.
33. Fedorenko EJ, Kibbey MM, Contrada RJ, Farris SG. Psychosocial predictors of virus and social distancing fears in undergraduate students living in a US COVID-19 "hotspot". *Cogn Behav Ther*. 2021;50(3):217-33.
34. Barbosa-Camacho FJ, Romero-Limón OM, Ibarrola-Peña JC, Almanza-Mena YL, Pintor-Belmontes KJ, Sánchez-López VA, et al. Depression, anxiety, and academic performance in COVID-19: a cross-sectional study. *BMC Psychiatry* 2022;22(1):443.
35. Kuśniercz C, Rogowska AM, Kwaśnicka A, Ochnik D. The Mediating Role of Orthorexia in the Relationship between Physical Activity and Fear of COVID-19 among University Students in Poland. *J Clin Med*. 2021;10(21):5061.