

Comparison of COVID-19 Fear and COVID-19-Related Behaviors of Intern Physiotherapy Students With and Without COVID-19

Raziye Erkan¹, Emine Aslan Telci², Sebahat Yaprak Çetin³

¹ Burdur Mehmet Akif Ersoy University, Rectorate Physical Education and Sports Department, Burdur, Turkey

² Pamukkale University, Physiotherapy and Rehabilitation Faculty, Physiotherapy and Rehabilitation, Denizli, Turkey

³ Akdeniz University Health Sciences Faculty, Physiotherapy and Rehabilitation, Antalya, Turkey

Raziye ERKAN
0000-0001-7403-3962

Emine ASLAN TELCİ
0000-0003-2749-295X

Sebahat Yaprak ÇETİN
0000-0002-7467-1398

Correspondence: Raziye Erkan
Burdur Mehmet Akif Ersoy University,
Rectorate Physical Education
and Sports Department,
Burdur, Turkey
Phone: +90 507 841 46 55
E-mail: rerkan@mehmetakif.edu.tr

Received: 11.05.2024

Accepted: 24.01.2025

ABSTRACT

Purpose: This study aims to compare the coronavirus fear status, physical activity levels, coronavirus behaviors, and mental states of physiotherapy and rehabilitation intern students according to whether they have had COVID-19 or not and to determine the factors associated with coronavirus fear in students who have and have not had coronavirus.

Methods: The study included 103 students, with an average age of 22.95 ± 1.93 years for those who had contracted COVID-19 and 22.57 ± 1.4 years for those who had not. The evaluation utilized the COVID-19 Fear Scale, the Hospital Anxiety and Depression Scale, and the Physical Activity Questionnaire. Additionally, individuals' COVID-19 protective behaviors were assessed.

Results: When comparing the groups on COVID-19 fear levels, anxiety, depression, physical activity parameters, and COVID-19 protection behaviors, no significant differences were found between them. The fear scale and body mass index showed a moderately positive association in all participants without COVID-19; however, there was a weak positive relationship with gender, a weak positive relationship with HAD anxiety, and a negative relationship with vigorous activity in the COVID-19 group. ($p < 0.05$).

Conclusion: The presence or absence of COVID-19 did not impact COVID-19 fear levels, mental health status, physical activity levels, or protective behaviors. The study concluded that a higher BMI, intense physical activity, elevated anxiety levels, and being female were associated with increased COVID-19 fear.

Keywords: COVID-19, fear, health behavior, physiotherapy, students

ÖZET

Amaç: Çalışmanın amacı, hastane ortamında staj yapan COVID-19 hastalığını geçiren ve geçirmeyen, fizyoterapi ve rehabilitasyon son sınıf öğrencilerinin COVID-19 korku durumlarını, fiziksel aktivite düzeylerini, COVID-19 davranışlarını ve ruhsal durumlarının COVID-19 geçirip geçirmeme durumuna göre karşılaştırılması ve COVID-19 geçiren ve geçirmeyen öğrencilerin COVID-19 korkusu ile ilişkili faktörleri belirlenmesidir.

Yöntem: Çalışmaya yaş ortalaması $22,95 \pm 1,93$ yıl olan COVID-19 geçiren, yaş ortalaması $22,57 \pm 1,4$ yıl olan COVID-19 geçirmemiş toplam 103 öğrenci dahil edilmiştir. Değerlendirmede COVID-19 Korkusu Ölçeği, Hastane Anksiyete ve Depresyon Ölçeği ve Fiziksel Aktivite anketi kullanılmıştır. Ayrıca bireylerin COVID-19 korunma davranışları sorgulanmıştır.

Bulgular: Gruplar COVID-19 korku düzeyi, anksiyete, depresyon ve fiziksel aktivite parametreleri ve COVID-19 korunma davranışları açısından karşılaştırıldığında gruplar arasında fark olmadığı belirlenmiştir ($p < 0.05$). COVID-19 geçirmeyen katılımcılarda korku ölçeği ile VKİ arasında orta düzeyde; cinsiyet ve HAD anksiyete ile zayıf düzeyde pozitif bir ilişki bulunmuştur. COVID-19 geçiren grupta ise şiddetli fiziksel aktivite ile negatif bir ilişki tespit edilmiştir ($p < 0.05$).

Sonuç: Çalışmanın sonuçlarına göre, klinik stajlarını sürdüren son sınıf fizyoterapi öğrencilerinin COVID-19 geçirip geçirmemelerinin, COVID-19 korku düzeyleri, ruhsal durumları, fiziksel aktivite seviyeleri ve koronavirüsle ilgili davranışları üzerinde etkisinin olmadığı belirlenmiştir. Yüksek VKİ, şiddetli fiziksel aktivite ve yüksek anksiyete düzeyinin yanı sıra kadın cinsiyetinin de COVID-19 korkusunu artırdığı sonucuna ulaşılmıştır.

Anahtar Kelimeler: COVID-19, korku, sağlık davranışı, fizyoterapi, öğrenciler.

The World Health Organization (WHO) declared the COVID-19 outbreak, which originated in Wuhan, China, in late 2019, a global pandemic. COVID-19 has significantly negatively impacted health, economy, society, and individuals (1). Treatment options include infection control, vaccination, and pharmacological interventions (2). However, preventing the spread of the virus remains the most effective approach, with measures like regular hand washing, respiratory hygiene, and avoiding crowded places helping to reduce transmission risks. In our country, 14 rules were implemented to control the spread of the pandemic (3).

Maintaining physical activity and boosting the immune system is also vital for protection (4). Psychological effects, such as anxiety and depression caused by the pandemic, should also be addressed (5). The COVID-19 pandemic is leading to widespread concern, fear, and anxiety among the general population, and uncertainty is a crucial factor in the emergence of mental health issues (6). This process triggers fear for oneself and loved ones and increases feelings of anxiety and immobility towards the unknown (7).

Healthcare workers are a very high-risk group for COVID-19 infection (8). Pandemic conditions cause psychological effects such as stress, fear, anxiety, and depression in healthcare workers (9). This is especially valid for students enrolled in programs connected to health. Students may be exposed to COVID-19 as a result of their practice in a hospital setting, which might result in unfavorable feelings, including stress and anxiety (10). Since health science students will be future health professionals, their attitudes and behaviors toward COVID-19 are increasingly important. Although there are studies on nursing, midwifery, and medical students, no study has been found on physiotherapy students.

The COVID-19 pandemic has been associated with an increased prevalence of depression and anxiety in the general population, with a particularly high incidence observed among healthcare workers. Physical activity levels have been identified as a potential factor influencing health outcomes, particularly concerning pandemic-related restrictions and social isolation. Therefore, it is important to examine physiotherapy students' depression, anxiety, and physical activity levels, with a specific focus on COVID-19 situations. This information may allow us to understand how students respond to the pandemic and develop strategies for similar conditions.

This study examined physiotherapy students' experiences during the COVID-19 pandemic and its effects. The study's primary aim was to compare the fear status, physical activity levels, behaviors, and mood of intern physiotherapy and rehabilitation students who had or had not had COVID-19 during their hospital internship. As a secondary aim, it sought to identify factors associated with the fear of COVID-19 among both groups of students. This research was expected to significantly contribute to the field by providing a new perspective on the challenges faced by health sciences students and enabling a more thorough understanding of their encounters amidst the COVID-19 pandemic, focusing specifically on physiotherapy students.

2. Material and Method

2.1. Design: This descriptive research was carried out in 2021 at the Pamukkale University (PAU) Physical Therapy and Rehabilitation Department, involving 4th-year students in internship programs at PAU Hospitals.

2.2. Participants: The study employed a previously prepared form comprising sociodemographic data and questionnaires administered through face-to-face interviews. The study enrolled intern physiotherapy and rehabilitation students who volunteered and completed their internships at Pamukkale University Hospitals. All students were duly briefed on the study's objectives and provided consent by signing an informed consent document. In total, 136 internship students were invited to participate in the study; 19 declined. Fourteen students who had received the COVID-19 vaccination and had incompletely completed the questionnaires were excluded. The remaining 103 students (70 female and 33 male) were categorized into two groups based on their responses to the question "Have you had COVID-19?". The study was conducted on two groups of students: those who had had COVID-19 (n=19; 13 females, six males) and those who had not had COVID-19 (n=84; 57 females, 27 males).

2.3. Data Collection Tools

2.3.1 Sociodemographic Form: The information on the participants' age, gender, and body mass index (kg/m²) was recorded on a previously prepared form.

2.3.2. The Fear of COVID-19 Scale, adapted into Turkish by Satici et al., was assessed to measure fear of the virus. Its reliability was established with a Cronbach's alpha coefficient of $\alpha = .82$. This 7-item questionnaire employs a 5-point Likert scale (1: strongly disagree; 5: strongly agree). Higher total scores on the questionnaire signify elevated levels of fear (11).

2.3.3. Assessment of COVID-19 behaviors: Based on current recommendations from "the Centers for Disease Control and Prevention (CDC)", eight behaviors were selected to mitigate susceptibility to and spread of COVID-19: "Avoiding crowded areas, Washing hands with soap and water for at least 20 seconds, Using hand sanitizer, Staying home if feeling sick, Cleaning frequently touched surfaces, Covering coughs and sneezes with a handkerchief or elbow, Limiting close contact, Wearing a face mask."

Participants were asked to rate the likelihood of engaging in these actions over the current week, using a scale ranging from 1 = "very unlikely" to 5 = "very likely." (12).

2.3.4. Assessment of mental status: Participants' mental status was evaluated using the Hospital Anxiety and Depression Scale (HAD-S). The Turkish validity and reliability of the questionnaire were established by Aydemir et al. in 1997. This questionnaire comprises 14 questions, divided into two subscales assessing depression (7) and anxiety (7). Responses to the questionnaire range from "not at all" (0 points) to "severely" (3 points). The cut-off points for the Turkish version of the HAD scale were determined to be 10 for the anxiety subscale (HAD-A) and 7 for the depression subscale (HAD-D) (13).

2.3.5. Determination of physical activity level: Physical Activity Questionnaire was used to determine the level of physical activity. The Turkish validity and reliability of the questionnaire were established by Sağlam et al. The questionnaire evaluates physical activities, such as the time spent walking and moderate and vigorous activities in the last 7 days [14]. A "MET-minutes/week" score is calculated by multiplying the duration in minutes, frequency in days, and MET values. To estimate energy expended during physical activities, the weekly minutes of each activity are multiplied by the MET values assigned in the International Physical Activity Questionnaire. This calculation provides energy expenditures for all participants' vigorous, moderate, walking, sitting, and

total physical activities, measured in MET minutes per week (15).

2.4. Statistical Analysis: Data were analyzed using SPSS 22.0 software. The demographic characteristics of the participants were analyzed using percentage distributions, means, and standard deviations. Data normality was assessed using the Shapiro-Wilk test. The data showed a normal distribution, while the data did not. Based on this, parametric tests (independent samples t-test) were used for normally distributed data, and non-parametric tests (Mann-Whitney U test) were used for non-normally distributed data. A significant level of $p < 0.05$ was used. Correlation analyses were performed using Pearson correlation analysis for normally distributed data and Spearman correlation analysis for non-normally distributed data.

2.5. Ethical Considerations

In this study, we affirm that we have adhered to all regulations outlined in the "Directive on Scientific Research and Publication Ethics of Higher Education Institutions." We confirm that none of the activities prohibited under this directive's section "Actions Contrary to Scientific Research and Publication Ethics" have been conducted. The Pamukkale University Non-Interventional Clinical Research Ethics Committee granted approval for this study under decision number E-60116787-020-39771 on March 30, 2021. The principles of the Declaration of Helsinki conducted this study.

3. Results

The two groups had no significant differences regarding age, height, weight, BMI, and gender distribution ($p = 0.65-0.96$, Table 1). Similarly, no differences were observed between the groups in terms of COVID-19 fear level, anxiety, depression, and physical activity parameters ($p > 0.05$, Table 2). When comparing the groups based on anxiety and depression cutoff scores, no significant difference was found in terms of anxiety ($p > 0.05$). However, an important difference was observed in depression scores, with those who had experienced COVID-19 showing higher levels of depression ($p < 0.05$, Table 3). Finally, no significant difference was detected when the groups were compared regarding COVID-19-related behaviors ($p > 0.05$, Table 2).

Table 1. Comparison of demographic data of the groups

Sociodemographic Characteristics	With COVID-19(n=19) Mean±SD	Without COVID-19 (n=84) Mean±SD	p ¹
Age (years)	22.95 ± 1.93	22.57 ± 1.4	0.655
Height (cm)	168.89± 7.51	169.31 ± 9,64	0.919
Body weight (kg)	63.42± 11.81	65.08 ± 13,47	0.73
BMI (kg/m) ²	22.08 ± 2.78	22.54 ± 3,18	0.711
Gender	n (%)	n (%)	p ²
Woman	13 (%68.42)	57 (%67.86)	
Male	6 (%31.58)	27 (%32.14)	0.962

1: Mann Whitney U test, 2: chi-square test, test, BMI: body mass index

Table 2: Comparison of the groups in terms of COVID-19 fear level, anxiety, depression, physical activity parameters and COVID-19 behaviors

	With COVID-19(n=19) Mean±SD	Without COVID-19 (n=84) Mean±SD	p(z/t)
COVID-19 fear scale	14.89 ± 5.6	15.7 ± 6.2	0.603 (t=-0.521)
HAD anxiety	6.63 ± 3.24	8.37 ± 4.4	0.099 (z=-1.651)
HAD depression	5.89 ± 3.0	7.24 ± 3.9	0.106 (t=-1.662)
Walking (min/hf)	1406.89± 990.7	1610.17 ± 1065.63	0.417 (z=-0.812)
Moderate activity (min/hf)	444.21± 651.41	419.76 ± 877.97	0.562 (z=-0.58)
Severe activity (min/hf)	875.79± 1349.8	1354.29 ± 4391.48	0.407 (z=-0.83)
COVID-19 behaviors			
1. Avoiding crowded areas	3.37 ± 1.21	3.75 ± 1.27	0.18 (z=-1.339)
2. Washing your hands	4.84 ± 0.55	4.86 ± 0.44	0.909(z=0.115)
3. Using hand sanitizer	4.89 ± 0.32	4.68 ± 0.7	0.246 (z=-1.16)
4. Staying at home if ill	3.74 ± 1.52	3.75 ± 1.52	0.891(z=0.137)
5. Cleaning surfaces	4.32 ± 0.82	4.21 ± 0.98	0.83(z=-0.205)
6. Covering coughs and sneezes	4.89 ± 0.32	4.65 ± 0.86	0.29(z=-1.052)
7. Limiting close contact	3.95 ± 1.08	4.02 ± 1.14	0.673(z=-0.422)
8. Wearing a face mask	5.00 ± 0.00	4.96 ± 0.19	0.405(z=0.832)

t: Independent samples t-test z: Mann Whitney U test, p< 0.05 statistically significant difference HAD: Hospital anxiety depression scale, min: minute, hf: week, MET: metabolic rate value.

Table 3. Mental status of students with and without COVID-19

HAD	With COVID n(%)	Without COVID n(%)	All participants n(%)	p
Anxiety score > 10	2 (%10.5)	27 (%32.1)	29(%28.2)	0.058
Anxiety score< 10	17(%89.5)	57(%67.9)	74(%71.8)	
Depression score > 7	5 (%26.3)	43(%51.2)	48(%46.6)	0.045
Depression score<7	14 (%73.7)	41(%48.8)	55(%53.4)	

HAD: Hospital anxiety depression scale, p< 0.05

Table 4: BMI, mental status, gender and physical activity, COVID-19 Behaviors with COVID Fear Scale Relationship Table

	With COVID-19 (n=19)		Without COVID-19 (n=84)		All participants (n=103)	
	r	p	r	p	r	p
Body mass index	-0.336	0.160	-0.323**	0.003	-0.304**	0.002
HAD anxiety	0.201	0.408	0.234*	0.032	0.250*	0.011
HAD depression	-0.020	0.934	0.053	0.634	0.035	0.728
Walking (min/hf)	-0.022	0.930	0.053	0.629	0.043	0.667
Moderate activity (dk/hf)	-0.032	0.034	0.042	0.704	0.037	0.714
Severe activity (dk/hf)	-0.489*	0.897	-0.013	0.909	-0.098	0.326
Total Physical activity (MET-dk/hf)	-0.308	0.130	0.001	0.990	-0.035	0.723
Gender					-0.242*	0.014
Avoiding crowded areas	0.253	0.296	0.051	0.647	0.082	0.411
Washing your hands	-0.268	0.267	-0.066	0.553	-0.107	0.280
Using hand sanitizer	-0.252	0.298	-0.065	0.556	-0.097	0.328
Staying at home if ill	-0.173	0.480	0.163	0.138	0.098	0.323
Cleaning surfaces	0.176	0.471	0.236*	0.030	0.218*	0.027
Covering coughs and sneezes	-0.252	0.298	0.203	0.063	0.131	0.187
Wearing a face mask	-0.252	0.298	0.204	0.062	0.182	0.062
Limiting close contact	-0.106	0.666	0.099	0.370	0.065	0.517

$p < 0.05$ statistically significant difference * weak relationship, ** moderate relationship

The relationship between COVID-19 fear level, BMI, mental status, physical activity parameters, and fear levels was compared in all participants who had COVID-19 and those who did not have COVID-19. There was a moderate ($p = 0.003$), weak ($p = 0.014$), and weak positive correlation with gender ($p = 0.014$) and HAD anxiety ($p = 0.011$) between the fear scale and BMI in non-Covid and all participants. The COVID group had a negative correlation with vigorous activity, while no significant difference was found between the other parameters ($p = 0.16-0.99$, Table 4). When COVID-19 behaviors and fear levels of both groups and all participants were compared, no significant difference was found between the two groups ($p = 0.18-0.66$, Table 4).

4. Discussion

In this study, we aimed to explore the impact of COVID-19 on physiotherapy students' fear levels, mental health, physical activity, and protective behaviors during their hospital internships. The key findings of this study were that the presence or absence of COVID-19 did not significantly affect the students' levels of COVID-19 fear, anxiety, depression, or physical activity. Additionally, no notable differences were observed in COVID-19 protective behaviors between students who had contracted the

virus and those who had not. However, we found that higher BMI, intense physical activity, higher anxiety levels, and being female were associated with increased fear of COVID-19. These results provide important insights into how physiotherapy students, as future healthcare professionals, experienced the pandemic and the factors influencing their responses to the ongoing health crisis.

Previous research has identified healthcare workers and health science students as high-risk groups significantly impacted by the psychological toll of the COVID-19 pandemic (8,9,10,16). As future healthcare professionals, these individuals face unique challenges and stressors during such crises. Intern physiotherapy students have actively integrated their theoretical knowledge with practical experiences throughout the pandemic. This study aimed to evaluate the levels of fear, mental well-being, physical activity, and behaviors associated with the COVID-19 pandemic among intern physiotherapy students, a group significantly impacted by the global health crisis. By comparing those who had contracted COVID-19 with those who had not, the study aimed to identify factors contributing to the fear of COVID-19 among this population.

This current study is the first to examine the relationship between trainee physiotherapists' coronavirus behaviors, physical activity, and mental health and their fear of COVID-19. Studies have been conducted on people in different occupational groups. Işıklı et al. (17) found no difference between the COVID-19 fear levels of nurses with and without COVID-19 diagnosis and that the COVID-19 fears of the nurses participating in the study were below average. In a different study conducted on healthcare workers, it was again reported that healthcare workers mostly had a low fear of COVID-19. It was reported that laboratory technicians had the highest mean fear scores, followed by X-ray technicians, nurses, and physicians, respectively (18). Labrague et al. (19) suggested that COVID-19 fears of nurses working on the front lines increased during the pandemic. Individuals may adapt to the negative emotional state they initially experienced over time. In the recent study, no significant difference was found between the COVID-19 fear levels of the groups who had and did not have COVID-19. It is thought that the lack of a significant difference between the fear levels of students who have and have not had COVID-19 may be related to the pandemic that has been ongoing since December 2019 and that physiotherapy interns work in relatively less risky environments.

Anxiety is characterized as a reaction to remote, uncertain, and undefined threats. While no studies in the literature directly compare infected and uninfected groups, research among healthcare workers has consistently documented elevated levels of anxiety and depression (8, 20). In a study conducted among healthcare workers during COVID-19, half of the respondents defined at least mild depression (21). A study of health students reported that participants described themselves as being at the center of the risk of infection during the pandemic and that this situation led to an increase in depression (22). The study observed no disparity in anxiety levels between the groups; however, there was a notable advantage among those who had contracted COVID-19. It's possible that uninfected students felt more anxious than other students because they hadn't caught the disease and were still uncertain. The ongoing pandemic may have heightened students' stress and anxiety levels, potentially increasing their vulnerability to developing depression.

Studies have shown that the physical activity levels of university students decreased even more during the pandemic (23, 24). The recent comparison of COVID-19 exposure in terms of physical activity parameters found no statistically significant difference between the groups.

It was observed that COVID-19 did not affect the level of physical activity. This situation may be related to the fact that both groups were active in the hospital last week. It may also be related to the fact that the physiotherapy students know the importance of maintaining or increasing physical activity during the COVID-19 pandemic.

Although there are no studies in the literature regarding infection status, it was reported that health science students practiced personal protective measures (25). Similarly, in a study of dental students, students were found to practice preventive behaviors (26). A recent study compared COVID-19 prevention behaviors and COVID-19 status and found no difference between the groups. According to the study's results, having COVID-19 is not effective in implementing pandemic preparedness measures.

Fear is characterized as a distressing emotional state that arises from perceiving stimuli as threatening. Exceptional circumstances like disease outbreaks and epidemics can provoke fear in numerous individuals (27). According to the literature findings, individuals tend to adopt preventive behaviors more readily when perceiving the threat as severe. Regarding COVID-19, it has been proposed that the perceived threat is a motivating factor for embracing behaviors that help prevent the spread of the virus (28). Recently, no relationship was found between COVID-19 behaviors and fear levels of COVID-19 and non-COVID-19 in all participants. This result can be interpreted as the fact that the students were from the health sciences and did not see COVID-19 as a threat because they worked in the hospital during the pandemic.

Studies have shown that a high BMI is a risk factor for COVID-19 (29). In the current study, a relationship was found between BMI and fear levels in all participants who did not have COVID-19 and in all participants. Therefore, it can be concluded that the higher the BMI of the participants, the more anxious they were about COVID-19. Physical activity is also considered a risk factor (30). When examining the relationship between physical activity, which is also considered a risk factor, and fear of COVID-19, it was found that there was a relationship between the level of vigorous activity and fear of COVID-19 in participants who had COVID-19. In addition, being female was associated with fear of COVID-19 in our study. Shehada et al. (18) also found that women in their study had a higher fear of COVID-19 than men. The study found an association between anxiety and fear levels in both non-COVID-19 and all participants. This finding suggests that fear of contracting COVID-19 can lead to anxiety.

According to the study's results, the status of physiotherapy students attending clinical placements, whether they had COVID-19 or not, did not affect their mental state, level of physical activity, and coronavirus-related behavior. However, it was found that not having COVID-19, high BMI, intense physical activity, high anxiety levels, and female gender increased fear of COVID-19.

The results obtained can guide planning aimed at understanding the attitudes and behaviors of healthcare students in risky situations and supporting them in coping with similar situations. Limitations include the small number of students who contracted COVID-19 and the single-center nature of the study. Future research can ensure the generalisability of these findings by including larger groups of participants and students from different healthcare fields undergoing placements.

Declarations

Funding

This study had no external funding

Conflicts of Interest

No conflict of interest was declared by the authors.

Ethics Committee Approval

In this study, we hereby undertake that all the rules required to be followed within the scope of the "Directive on Scientific Research and Publication Ethics of Higher Education Institutions" have been complied with and that none of the actions specified under the heading "Actions Contrary to Scientific Research and Publication Ethics" of the said directive have been carried out. Approval was obtained from the Pamukkale University Non-Interventional Clinical Research Ethics Committee with the decision numbered E-60116787-020-39771 on 30.03.2021. This study was conducted in accordance with the principles of the Declaration of Helsinki.

Availability of Data and Material

The materials used in this study are also available from the corresponding author upon reasonable request. Due to privacy and ethical restrictions, some data may not be publicly shared but are available from the authors under

conditions that ensure participant confidentiality. For further information, please contact.

Author Contributions

Conceptualization; Design: [RE, EAS]; Writing: [RE, SYÇ]; Investigation/Data collection: [EAS, SYÇ]

References

1. World Health Organisation (WHO). WHO Timeline - COVID-19. 2020. 11 March. Available at <https://www.who.int/news-room/detail/27-04-2020-whotimeline>
2. Dong L, Hu S, Gao J. Discovering drugs to treat coronavirus disease 2019 (COVID-19). *Drug Discov Ther.* 2020;14(1):58-60. doi: 10.5582/ddt.2020.01012. PMID: 32147628.
3. Güner R, Hasanoğlu I, Aktaş F. COVID-19: Prevention and control measures in the community. *Turk J Med Sci.* 2020 Apr; 50(1):571-577. <https://doi.org/10.3906/sag-2004-146>
4. da Silveira MP, da Silva Fagundes KK, Bizuti MR, Starck É, Rossi RC, de Resende E Silva DT. Physical exercise as a tool to help the immune system against COVID-19: an integrative review of the current literature. *Clin Exp Med.* 2021 Feb;21(1):15-28. doi: 10.1007/s10238-020-00650-3. Epub 2020 Jul 29. PMID: 32728975; PMCID: PMC7387807.
5. Lei L, Huang X, Zhang S, Yang J, Yang L, Xu M. Comparison of Prevalence and Associated Factors of Anxiety and Depression Among People Affected by versus People Unaffected by Quarantine During the COVID-19 Epidemic in Southwestern China. *Med Sci Monit.* 2020 Apr 26;26:e924609. doi: 10.12659/MSM.924609. PMID: 32335579; PMCID: PMC7199435.
6. Ahorsu DK, Lin CY, Imani V, Saffari M, Griffiths MD, Pakpour AH. The Fear of COVID-19 Scale: Development and Initial Validation. *Int J Ment Health Addict.* 2022;20(3):1537-1545. doi: 10.1007/s11469-020-00270-8. Epub 2020 Mar 27. PMID: 32226353; PMCID: PMC7100496.
7. Schimmenti A, Billieux J, Starcevic V. The Four Horsemen of Fear: An Integrated Model of Understanding Fear Experiences During the COVID-19 Pandemic. *Clin Neuropsychiatry.* 2020 Apr;17(2):41-45. doi: 10.36131/CN20200202. PMID: 34908966; PMCID: PMC8629088.
8. Pappa S, Ntella V, Giannakas T, Giannakoulis VG, Papoutsis E, Katsaounou P. Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: A systematic review and meta-analysis. *Brain Behav Immun.* 2020 Aug;88:901-907. doi: 10.1016/j.bbi.2020.05.026. Epub 2020 May 8. Erratum in: *Brain Behav Immun.* 2021 Feb;92:247. PMID: 32437915; PMCID: PMC7206431.
9. Pan R, Zhang L, Pan J. The Anxiety Status of Chinese Medical Workers During the Epidemic of COVID-19: A Meta-Analysis. *Psychiatry Investig.* 2020 May;17(5):475-480. doi: 10.30773/pi.2020.0127. Epub 2020 May 15. PMID: 32403209; PMCID: PMC7265026.
10. Kim JS, Choi JS. Middle East respiratory syndrome-related knowledge, preventive behaviors, and risk perception among nursing students during an outbreak. *J Clin Nurs.* 2016 Sep;25(17-18):2542-9. doi: 10.1111/jocn.13295. Epub 2016 Jun 7. PMID: 27273475; PMCID: PMC7166634.
11. Satici B, Gocet-Tekin E, Deniz ME, Satici SA. Adaptation of the Fear of COVID-19 Scale: Its Association with Psychological Distress and Life Satisfaction in Turkey. *Int J Ment Health Addict.* 2021;19(6):1980-1988. doi: 10.1007/s11469-020-00294-0. Epub 2020 May 8. PMID: 32395095; PMCID: PMC7207987.

12. Centers for Disease Control and Prevention. Coronavirus disease 2019 (COVID-19): Protect yourself. March 31, 2020. Available at <https://www.cdc.gov/coronavirus/2019-ncov/prevent-gettingsick/prevention.html>. Accessibility verified March 31, 2020.
13. Aydemir Ö, Güvenir T, Küey L, Kültür S. Hastane anksiyete ve depresyon ölçeği Türkçe formunun geçerlilik ve güvenilirliği. *T Psikiyat Derg.* 1997; 8(4):280-287.
14. Öztürk, M. Üniversitede Eğitim – Öğretim Gören Öğrencilerde Uluslar Arası Fiziksel Aktivite Anketinin Geçerliliği ve Güvenilirliği ve Fiziksel Aktivite Düzeyinin Belirlenmesi (master's thesis). (Ankara): Hacettepe Üniversitesi;2005.102p.
15. Craig CL, Marshall AL, Sjöström M, Bauman AE, Booth ML, Ainsworth BE, Pratt M, Ekelund U, Yngve A, Sallis JF, Oja P. International physical activity questionnaire: 12-country reliability and validity. *Med Sci Sports Exerc.* 2003 Aug;35(8):1381-95. doi: 10.1249/01.MSS.0000078924.61453.FB. PMID: 12900694.
16. Nguyen LH, Drew DA, Graham MS, et al. Coronavirus Pandemic Epidemiology Consortium. Risk of COVID-19 among front-line health-care workers and the general community: a prospective cohort study. *Lancet Public Health.* 2020 Sep;5(9):e475-e483. doi: 10.1016/S2468-2667(20)30164-X. Epub 2020 Jul 31. PMID: 32745512; PMCID: PMC7491202.
17. IşıklıAG,ŞenH,SoydaşD.COVID-19tanısıalanvealmayanhemşirelerin psikolojik dayanıklılık, mesleki doyum ve korku düzeylerinin değerlendirilmesi. *J Psychiatric Nurs.* 2021;12(4):281-287.
18. Shehada AK, Albelbeisi AH, Albelbeisi A, El Bilbeisi AH, El Afifi A. The fear of COVID-19 outbreak among health care professionals in Gaza Strip, Palestine. *SAGE Open Med.* 2021 Jun 3;9:20503121211022987. doi: 10.1177/20503121211022987. PMID: 34158939; PMCID: PMC8182173.
19. Labrague LJ, de Los Santos JAA. Fear of COVID-19, psychological distress, work satisfaction and turnover intention among frontline nurses. *J Nurs Manag.* 2021 Apr;29(3):395-403. doi: 10.1111/ jonm.13168. Epub 2020 Oct 11. PMID: 32985046; PMCID: PMC7537256.
20. Vindegaard N, Benros ME. COVID-19 pandemic and mental health consequences: Systematic review of the current evidence. *Brain Behav Immun.* 2020 Oct;89:531-542. doi: 10.1016/j.bbi.2020.05.048. Epub 2020 May 30. PMID: 32485289; PMCID: PMC7260522.
21. Lai J, Ma S, Wang Y, Cai Z, Hu J, Wei N. Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. *JAMA Netw Open* 2020;3:e203976-e203976.
22. Reger MA, Piccirillo ML, Buchman-Schmitt JM. COVID-19, Mental Health, and Suicide Risk Among Health Care Workers: Looking Beyond the Crisis. *J Clin Psychiatry.* 2020 Aug 4;81(5):20com13381. doi: 10.4088/JCP.20com13381. PMID: 32757506.
23. Stockwell S, Trott M, Tully M, Shin J, Barnett Y, Butler L, McDermott D, Schuch F, Smith L. Changes in physical activity and sedentary behaviors from before to during the COVID-19 pandemic lockdown: a systematic review. *BMJ Open Sport Exerc Med.* 2021 Feb 1;7(1):e000960. doi: 10.1136/bmjsem-2020-000960. PMID: 34192010; PMCID: PMC7852071.
24. Bertrand L, Shaw KA, Ko J, Deprez D, Chilibeck PD, Zello GA. The impact of the coronavirus disease 2019 (COVID-19) pandemic on university students' dietary intake, physical activity, and sedentary behavior. *Appl Physiol Nutr Metab.* 2021 Mar;46(3):265-272. doi: 10.1139/apnm-2020-0990. Epub 2021 Jan 15. PMID: 33449864.
25. Salman M, Mustafa ZU, Asif N, et al. Knowledge, attitude and preventive practices related to COVID-19: a cross-sectional study in two Pakistani university populations. *Drugs Ther Perspect.* 2020;36(7):319-325. doi: 10.1007/s40267-020-00737-7. Epub 2020 May 9. PMID: 32395069; PMCID: PMC7210795.
26. Umeizudike KA, Isiekwe IG, Fadeju AD, Akinboboye BO, Aladenika ET. Nigerian undergraduate dental students' knowledge, perception, and attitude to COVID-19 and infection control practices. *J Dent Educ.* 2021 Feb;85(2):187-196. doi: 10.1002/jdd.12423. Epub 2020 Sep 21. PMID: 32959382; PMCID: PMC7537088.
27. Goyal K, Chauhan P, Chhikara K, Gupta P, Singh MP. Fear of COVID 2019: First suicidal case in India! *Asian J Psychiatr.* 2020 Mar; 49:101989. doi: 10.1016/j.ajp.2020.101989. Epub 2020 Feb 27. PMID: 32143142; PMCID: PMC7130010.
28. Harper CA, Satchell LP, Fido D, Latzman RD. Functional Fear Predicts Public Health Compliance in the COVID-19 Pandemic. *Int J Ment Health Addict.* 2021;19(5):1875-1888. doi: 10.1007/s11469-020-00281-5. Epub 2020 Apr 27. PMID: 32346359; PMCID: PMC7185265.
29. Albashir AAD. The potential impacts of obesity on COVID-19. *Clin Med (Lond).* 2020 Jul;20(4):e109-e113. doi: 10.7861/clinmed.2020-0239. Epub 2020 Jun 22. PMID: 32571783; PMCID: PMC7385759.
30. Delbressine JM, Machado FVC, Goërtz YMJ, et al. The Impact of Post-COVID-19 Syndrome on Self-Reported Physical Activity. *Int J Environ Res Public Health.* 2021 Jun 3;18(11):6017. doi: 10.3390/ijerph18116017. PMID: 34205086; PMCID: PMC8199934