

The effects of social isolation measures due to the COVID-19 pandemic on education perception, anxiety, sleep, and physical activity in healthcare students

Sevil Yılmaz¹, Ayşe Göktaş² & Sevgi Özdiñç³

¹Istanbul University-Cerrahpaşa, Florence Nightingale Faculty of Nursing, Department of Mental Health and Psychiatric Nursing, Avcilar – İstanbul, Türkiye

²University of Health Sciences, Gulhane Faculty of Health Sciences, Department of Ergotherapy, Ankara, Türkiye.

³Trakya University, Faculty of Health Sciences, Department of Physical Therapy and Rehabilitation, Edirne, Türkiye.

received: 11 August 2022;

revised: 6 May 2025;

accepted: 18 July 2025

Summary

Background: The novel coronavirus disease (COVID-19) emerged at the end of 2019 and has since affected Türkiye as well as the rest of the World. The main purpose of this study is to examine the effects of social isolation measures during the COVID-19 epidemic on education perceptions, anxiety levels, sleep quality, and physical activity levels of healthcare students, as well as the relationship between anxiety with sleep quality and physical activity level.

Subjects and Methods: The cross-sectional and descriptive study was conducted between May and June 2020. The sample consisted of 457 physiotherapy, nursing, and occupational therapy students aged 18-41. Before to starting the survey, electronic consent was obtained from all participants. The data were collected through the Google Forms web survey platform using the convenience sampling method. The demographic information form, Beck Anxiety Inventory, Pittsburgh Sleep Quality Inventory, and Rapid Assessment of Physical Activity were used to collect data. The data were analyzed using the Statistical Package for Social Sciences (SPSS) for Windows 22 (IBM SPSS Inc., Chicago, IL) at a significance level of 0.05.

Results: The majority of students expressed concerns regarding the insufficiency of distance education (82.5%). Over half (53.39%) of the study participants reported experiencing mild, moderate, and severe anxiety. In addition, students exhibited poor sleep quality (67.5%) and low levels of physical activity (61.1%). A statistically significant positive correlation was found between the total scores of the Beck Anxiety Inventory and the Pittsburgh Sleep Quality Index ($r = 0.425, p < 0.001$).

Conclusion: Healthcare students were concerned about distance education during the first wave of the pandemic. Universities should provide all students with guidance on mental health and encourage them to perform more physical activity. Moreover, different methods and techniques should be developed for applied science during distance education.

Keywords: anxiety, COVID-19 pandemic, students, physical activity, sleep quality.

* * * * *

INTRODUCTION

The novel coronavirus disease (COVID-19) emerged at the end of 2019 and rapidly spread across the globe. The World Health Organization (WHO) declared COVID-19 a pandemic on March 11, 2020 (Tüzün et al., 2020). Türkiye officially confirmed its first COVID-19 case on the same day. Notably, almost all countries, including Türkiye, implemented preventive measures such as social distancing, lockdowns, school closures, and others to mitigate the virus's transmission and alleviate the strain on healthcare systems (Brooks et al., 2020; Demir et al., 2020). Furthermore, over 150 countries temporarily suspended school operations and transitioned to distance learning to contain the virus's spread (Sahu, 2020). Turkey also suspended face-to-face classes; resulting in

the displacement of over 7 million students to distance education (Çimen et al., 2020). The preventive measures adopted in response to the pandemic have had a profound impact on hundreds of millions of individuals, affecting their physical, social, economic, and mental well-being (Brooks et al., 2020). Previous research on coronavirus outbreaks including the Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS), demonstrated that epidemics significantly affect mental health and lifestyles (Su et al., 2007). Similarly, emerging evidence indicates that the COVID-19 pandemic has adversely influenced mental health and lifestyle factors, leading to increased stress, anxiety, depression, suicidal ideation, sleep disturbances, and post-traumatic stress disorder (Wang et al., 2020; Rossi et al., 2020; Zimmerman et al., 2021).

There is a well established relationship between sleep quality, physical activity, and both physical and mental health (Altena et al., 2020; Li et al., 2020; Majumdar et al., 2020; Cellini et al., 2020; Ammar et al., 2020; Kaya & Yazgan, 2020; Marelli et al., 2021). During the pandemic, people were pressured to adhere to social isolation and adopt sedentary lifestyles, which led to high levels of sleep problems and low levels of physical activity. Regular physical exercise is known to reduce the risk of depression and anxiety (Rebar et al., 2015). People who do not perform physical activity regularly for various reasons are at a higher risk for stress and related disorders, such as poor sleep quality (Altena et al., 2020; Zhang et al., 2020; Lök & Bademli, 2017).

Youth, particularly university students, were among the most affected groups by social isolation measures. With campus closures, millions of students confined to their homes or dormitories and away from their social circles. These measures have had a profound impact on young people. Firstly, they face concern about their health and the health of loved ones because they are afraid of catching the coronavirus and infecting their family members. Secondly, they are concerned about their academic performance and careers because there has been a dramatic change in the education system, imbued with technical and technological problems, since the pandemic started. Furthermore, some students have been facing additional financial and mental problems because they have lost their jobs on campus or have not been able to access counseling and psychological support services since the pandemic (Aristovnik et al., 2020; Browning et al., 2022; Zimmerman et al., 2021). Research indicates that college students are a vulnerable group who may develop mental health problems before or during the pandemic (Browning et al., 2022; Karyotaki et al., 2020; Holm Hadulla & Koutsoukou-Argyriaki, 2015; Huang & Zhao 2020; Jain et al., 2021). Zimmerman et al. (2021) reported that college students had significantly higher anxiety and depression levels during the pandemic than before the pandemic. Given this concerns, it is important to determine how students are affected by the COVID-19 pandemic. This study aims to examine the impact of social isolation measures during the COVID-19 outbreak on healthcare students' perceptions of education, anxiety levels, sleep quality, and physical activity, as well as the relationship between anxiety sleep quality and physical activity. The findings may provide valuable insights to inform interventions aimed at promoting student well-being.

The research questions are as follows:

1. How was the education perception of participants due to the isolation measures related to the pandemic affected?

2. What were the anxiety, sleep quality, and physical activity levels of the health science students during the social isolation period due to the COVID-19 pandemic?
3. Was there a relationship between the Beck Anxiety Inventory, the Pittsburgh Sleep Quality Inventory, and the Rapid Assessment of Physical Activity scores?

SUBJECTS AND METHODS

Study design and participants

This cross-sectional, descriptive study was conducted between May and June 2020 using online survey. The convenience sample method was used in this study and the sample size was not calculated. The inclusion criteria were: (1) being 18 years of age or older, (2) being a healthcare student, and (3) having access to a social media or email account. The final sample consisted of 457 students enrolled in physiotherapy, nursing, and occupational therapy programs. Participants were invited to complete the survey via a link shared through social media platforms and email. Data collection was concluded in June 2020 due to a significant decline in participant engagement.

The study was approved by the Scientific Research Ethics Committee of the Faculty of Medicine at X University (Approval No: XXXXXX, Date: XX/XX/XXXX). The study was conducted accordance with the ethical principles outlined by the World Medical Association's Declaration of Helsinki. Informed consent was obtained electronically from all participants, who agreed to participate by clicking the "I agree" button on the first page of the online questionnaire. Participation was anonymous and voluntary, and participants were informed of their right to withdraw from the study at any time without penalty.

Measures

The data were collected online using the following instruments: a Demographic Information Form, the Beck Anxiety Inventory (BAI), the Pittsburgh Sleep Quality Inventory (PSQI), and the Rapid Assessment of Physical Activity (RAPA).

Demographic Information Form collected sociodemographic data, including age, gender, place of residence, opinions on distance education, physical activity habits, social media use for pandemic-related information, and compliance with social isolation measures.

The Beck Anxiety Inventory (BAI), adapted into Turkish by Ulusoy et al. (1998), is a 21-item instrument that measures the severity of anxiety symptoms experienced over the past week. The items are rated on a four-point Likert scale ranging from 0 (“not at all”) to 3 (“severely”). The total score ranged from 0 to 63, with higher scores indicating more severe anxiety. Anxiety levels are categorized as follows: 0–7 = minimal, 8–15 = mild, 16–25 = moderate, and 26–63 = severe.

The Pittsburgh Sleep Quality Index (PSQI) developed by Buysse et al. (1989) and adapted into Turkish by Ağargün et al. (1996), assesses sleep quality over previous month. It comprises 19 items grouped into seven components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication, and daytime dysfunction. Each component score ranges from 0 to 3, yielding a global score between 0 and 21. A global score greater than 5 indicates poor sleep quality (Ağargün et al., 1996).

The Rapid Assessment of Physical Activity (RAPA) was developed by the University of Washington Health Promotion Research Center (2006) and adapted into Turkish by Çekok et al. (2017). It is a simple, valid tool for assessing physical activity levels. The scale includes a cut-off score of 6, with higher scores reflecting greater levels of physical activity (Çekok et al., 2017).

Statistical analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 22.0 (IBM Corp., Armonk, NY). Descriptive statistics included the mean, standard deviation, median, minimum, maximum, frequencies, and percentage values. The Kolmogorov-Smirnov test was used to assess the normality of data distribution. As the data were not normally distributed, the Spearman correlation coefficient was used to examine relationships between scale scores. Statistical significance was set at $p < 0.05$.

Table 1. Descriptive statistics of the healthcare students

Variables		Means±SD	Min-Max
Age		20.62±1.95	18-41
		<i>N</i>	%
Gender	Female	368	80.5
	Male	89	19.5
Marital Status	Single	454	99.3
	Married	3	0.7
Place of Residence	Metropolitan	263	57.5
	City	113	24.7
	Town	34	7.4
	Village	37	8.1
	Abroad	10	2.2
Class/grade	Preparatory Class	2	0.4
	1 st. Class	136	29.8
	2 st. Class	151	33.0
	3 st. Class	87	19.0
	4 st. Class	81	17.7
Income Level	Poor Income	30	6.6
	Middle Income	343	75.1
	Good Income	84	18.4
Number of people living together	Single	10	2.2
	2 person	13	2.8
	3 person	87	19.0
	4 and above	347	75.9
Having own room	Yes	310	67.8
	No	147	32.2

RESULTS

The participants had a mean age of 20.62 ± 1.95 years (range: 18.00- 41.00). The majority were female (80.5%; $n = 368$). More than half the participants had their own rooms in their apartments (67.7%; $n=309$). Most lived with more than three family members (75.9%; $n = 346$) (see Table 1).

The majority of participants expressed dissatisfaction with online learning (73.3%, $n = 335$). Most reported difficulties in maintaining self-discipline during classes (82.7%, $n = 378$) and concerns regarding the adequacy of distance education (82.5%, $n = 376$). In addition, more than half of the participants were concerned about not being able to participate in clinical internships (57.3%, $n = 262$) (see Table 2).

The mean value of Beck Anxiety Inventory (BAI) score was 9.64 ± 8.24 (range: 0-57), which falls within the mild anxiety range. Over half of the students (53.39%) experienced mild, moderate, and severe anxiety. More than half of the participants were found to have low sleep quality and physical activity levels (67.5%, $n = 301$; 61.1%, $n = 279$, respectively) (see Table 3).

A positive and statistically significant correlation was found between total BAI scores and total Pittsburgh Sleep Quality Index (PSQI) scores ($r = 0.425$, $p < 0.001$). No significant correlations were observed between total BAI and total Rapid Assessment of Physical Activity (RAPA) scores ($r = -0.081$, $p = 0.085$) or between total RAPA and total PSQI scores ($r = -0.049$, $p = 0.297$) (see Table 4).

DISCUSSION

This study was conducted primarily to examine the effects of social isolation measures taken due to the COVID-19 epidemic on education perceptions, anxiety levels, sleep quality, and physical activity levels of health students, as well as to examine the relationship between anxiety, sleep quality, and physical activity level.

The first result of our study showed that most participants were not satisfied with the online courses and were worried that distance education would be insufficient. The results of our study are similar to those of a study

Table 2. Descriptive statistics of students' education perceptions and social isolation measures

Variables		N	%
Are you satisfied with online (Synchronous or Asynchronous) courses?	Yes	122	26.7
	No	335	73.3
Can you provide self-discipline for your education?	Yes	79	17.3
	No	378	82.7
Worried about a insufficiency of your education?	Yes	376	82.5
	No	81	17.7
Worried about going back to school?	Yes	257	52.7
	No	200	43.8
Worried about doing internships in healthcare institutions?	Yes	262	57.3
	No	195	42.7
Do you follow the news of the epidemic in the media?	No	12	2.6
	Sometimes	123	26.9
	Everyday	322	70.5
Do you comply with the rules of the ministry of health?	Yes	450	98.5
	No	7	1.5
Do you go out and walk around?	Yes	35	7.7
	No	422	92.3

Table 3. Descriptive results of health sciences students' anxiety, sleep quality and physical activity levels

Scales	Mean±SD	Median (Min-Max)
BAI (N=457)	9.64 ±8.24	8.00 (0.00-57.00)
PSQI (n=446)	6.30±2.56	6.00 (0.00-18.00)
RAPA (n=457)	4.38 ±1.99	4.00 (0.00-57.00)
	<i>N</i>	<i>%</i>
Anxiety	Minimal	213
	Mild	160
	Moderate	62
	Severe	22
Sleep quality	Poor sleep quality (>5 point)	301
	Good sleep quality (< 5 point)	145
Physical activity	Adequate physical activity	178
	Insufficient physical activity	279

BAI – Beck Anxiety Inventory, RAPA – Rapid Assessment of Physical Activity, PSQI – Pitsburg Sleep Quality Index

Table 4. Correlation between total BAI score and PSQI, RAPA scores

	PSQI		RAPA	
	<i>rho*</i>	<i>p</i>	<i>rho*</i>	<i>p</i>
BAI score	0.425	<0.001	-0.081	0.085
RAPA score	-0.049	0.297	1	

* The Spearman correlation coefficient; BAI – Beck Anxiety Inventory; PSQI – Pitsburg Sleep Quality Inventory; RAPA – Rapid Assessment of Physical Activity

examining student views on distance education during the COVID-19 pandemic. Similarly, in a study conducted with physiotherapy students in Turkey, it has been reported that most of them are not satisfied with practical and theoretical courses (Altuntaş Yılmaz, 2020; Barğı et al., 2020).

Bdair (2021) reported that during the COVID-19 pandemic, nursing students were moderately satisfied with online learning and preferred traditional learning. It was reported that the most significant challenges of distance education were loss of motivation, insufficient sources (Internet, computers, etc.), ineffective communication and interaction, and technical problems (Özdoğan & Berkant, 2020). Borodavko et al. (2020) determined that students and teachers were displeased with distance education during the pandemic because they had difficulty reading texts and solving problems independently and had limited interaction with each other. Aristovnik et al. (2020) reported that students (n=30,383 from 62 countries) were more concerned about their academic performance and careers and suffered more from workload

since the pandemic started. Online learning affects applied education students (health, sports science, etc.) differently (Osipov et al., 2021). Our participants were also dissatisfied with online learning, probably because they studied physiotherapy, occupational therapy, and nursing, which are applied science departments. In this sense, our study results are similar to those in the literature.

The second result of our study showed that healthcare students had poor sleep quality, insufficient physical activity levels, and mild anxiety. In total, 41.81% of the students had severe anxiety, 13.57% had moderate anxiety, and 35.01% had mild anxiety. Yeni Elbay et al. (2021), in their study on medical and non-medical students in Turkey, reported that half of the students experienced anxiety of varying severity. Cao et al. (2020) determined that a quarter of medical students experienced severe (0.9%), moderate (2.7%), or mild (21.3%) anxiety during the COVID-19 pandemic. Islam et al. (2020) reported that one in five Bangladeshi college students (n = 476) experienced severe anxiety during the pandemic.

Rogowska et al. (2020) reported that more than half of the Polish university students experienced anxiety (14% severe anxiety) during the pandemic. Sañudo et al. (2020) conducted a large-scale study covering 21 countries and determined that one out of five college students had a mental disorder, mainly anxiety (11.7-14.7%). Škrlec et al. (2021) reported that during the 2nd partial COVID-19 lockdown in Horatio, 51.9% of health-related students reported anxiety, and the majority (58%) reported decreased physical activity levels. The wide range of anxiety prevalence among participants may be due to the use of different measurement tools (Cao et al., 2020; Islam et al., 2020; Rogowska et al., 2020; Yeni Elbay et al., 2021). Other reasons may be that several countries have different socioeconomic and cultural backgrounds. Therefore, some countries and governments may have established a better distance education infrastructure and taken more effective measures to reduce young people's anxiety (Lee et al., 2021). More than half of our participants had poor sleep quality during the first wave of the COVID-19 pandemic (67.5%). The findings of this study are similar to the results of other studies in the literature (Cellini et al., 2020; Marelli et al., 2021; Majumdar et al., 2020; Silva et al., 2023; Ulrich et al., 2023). Prior to the COVID-19 pandemic, studies reported that Turkish university students exhibited poor sleep quality, with prevalence rates ranging from 72.2% to 85% (Karatay et al. 2016; Ergin et al., 2018; Özdiç et al., 2020). Majumdar et al. (2020) reported that during the COVID-19 pandemic and lockdown period in India, there were changes in sleep patterns among university students; they went to bed later, woke up later, and were sleepy during the day. The pandemic was probably a significant factor behind poor sleep quality, as people had to change their lifestyles drastically and experienced more stress and anxiety due to the pandemic (Altena et al., 2020). However, the poor sleep quality of young people cannot be associated with the pandemic alone. Studies have reported that young people have different risk factors (sedentary behavior, caffeine or stimulant use, media use, stress, irregular sleep-wake patterns, etc.) associated with poor sleep quality (Garett et al., 2018; Wang & Bíró, 2021).

More than half of our participants had low physical activity levels during the social isolation measures introduced in the first wave of the pandemic (61.1%). In previous studies conducted with Turkish university students, the rate of those with insufficient physical activity or who were inactive was between 64% and 68% (Ölçücü et al., 2015; Özdiç & Turan, 2019; Pirinçci et al., 2020). Based on this, it was thought that the physical activity levels of the university students during the quarantine period were similar to those before the quarantine. The

cross-sectional planning of this study makes it insufficient to show longitudinal changes. Another limitation of the study is that changes in physical activity were not questioned before social isolation measures were introduced in this study. The main finding indicated that Turkish university students had insufficient levels of physical activity, aligning with similar results reported in the existing literature. Ammar et al. (2020) reported that the isolation process during home confinement negatively affected physical activity across all age groups, with participants engaging in 24% less physical activity, walking 35% less, and spending 28.6% more time sitting. A study of university students in Taiwan during the COVID-19 pandemic revealed significant physical activity reductions across intensity levels, particularly among male students ($p < 0.05$) (Chu & Li, 2022). A longitudinal study of Spanish university students during COVID-19 lockdowns revealed significant declines in physical activity, increased sedentary behavior, and worsened sleep quality and perceived health. While most metrics improved after one year, they remained poorer than pre-pandemic levels. Notably, men exhibited greater physical activity reductions than women during lockdown (García-García et al., 2023).

The third result of our study showed that there was a positive relationship between anxiety and sleep quality, but no statistically significant relationship with physical exercise. In other words, as students' anxiety increases, their sleep quality deteriorates. Çıtak and Pakdemir (2020) reported that people with sleep problems had higher anxiety levels during the COVID-19 pandemic. The results of our study are similar to the results of other studies investigating the relationship between anxiety and sleep quality (Çıtak & Pakdemir, 2020; Silva et al., 2023).

Regular physical activity reduces stress and anxiety (Rebar et al., 2015). Kaya and Yazgan (2020) reported that different physical activity levels affected the psychological domain of quality of life. In other words, people who did regular physical exercise had better psychological health. Rösel et al. (2022) reported that people who performed less physical exercise during the COVID-19 pandemic had higher rates of depression, anxiety, and sleep problems. A systematic review of 31 studies (Marcocin et al., 2022) revealed that higher physical activity was consistently linked to enhanced well-being, better quality of life, and lower levels of depressive symptoms, anxiety, and stress, irrespective of age. In the study conducted by Baştürk et al. (2023), which investigated the effects of the new Coronavirus disease on the anxiety, health anxiety and physical activity levels of university students, a negative moderate correlation was reported between the walking activity level and the anxiety level in

male students. Similarly, in another study conducted with college students in China during the Covid-19 pandemic, a negative relationship was reported between physical activity and both depression and anxiety levels ($t = -0.216$, $p < 0.001$; $t = -0.184$, $p < 0.01$) (Han et al. 2023). There are many studies in the literature showing that there is a negative relationship between physical activity and anxiety and depression in university students during the COVID-19 pandemic (Xiang et al., 2020; Coakley et al., 2021). However, there is also a study reporting that there is no relationship between physical exercise and anxiety symptoms (Güçhan Topçu et al., 2020). In our study, it was found that there was a negative relationship between physical activity and anxiety, but it was not statistically significant. Therefore, it is recommended to conduct studies with larger samples.

CONCLUSION

In conclusion, increasing vigorous and moderate physical activity in young students may be a more effective method for improving physical activity and reducing anxiety. With more comprehensive and more controlled studies in this area, the relationship between physical activity level and poor sleep quality and anxiety can be better clarified. This requires effective measures and interventions in universities that encourage students to be more physically active and maintain and support adequate physical activity levels. Such initiatives may include offering an attractive university sports program, providing active transport, and launching physical activity campaigns and educational activities. Such a positive impact of physical activity on mental health can be addressed through activities and programs that promote physical activity.

Healthcare students were concerned about distance education during the first wave of the pandemic. Universities should provide all students with guidance on mental health and encourage them to perform more physical activity. Moreover, different methods and techniques should be developed for applied science during distance education.

This study had some limitations. First, this was a cross-sectional study; therefore, we could not analyze the long-term effects of the COVID-19 pandemic. Second, the sample consisted only of healthcare students. Therefore, the results are sample-specific and not generalizable to the whole population. Third, the results may have been biased because most participants were women. Fourth, the data collection tools consisted of closed-ended questions, which might have limited the breadth of the participants' answers. Conclusion and recommendations: Healthcare students were displeased with online education during the COVID-19 pandemic. They have mild to moderate anxiety levels, poor sleep quality, and low physical activity levels during the COVID-19 pandemic. In addition, as the anxiety levels of healthcare students increase, their sleep quality decreases. We believe that all parties should share their experience and knowledge regarding distance education. Moreover, educators should use different methods and techniques for applied education. Universities should provide guidance and psychological counseling on mental health to all their students, especially students in risky groups, and encourage them to do more physical activity during difficult times. With the study conducted in this field, the relationship between physical activity level and sleep quality, and anxiety can be better clarified.

Acknowledgements: None.

Ethical considerations: Does this study include human subjects? YES

Authors confirmed compliance with all relevant ethical regulations.

Conflict of interest: None to declare.

Funding sources: None.

Authors' contributions: Dr. Sevil Yılmaz – Conceptualization, study design, literature search, methodology, data collection, original draft preparation, interpretation of data, manuscript writing, review & editing. Dr. Ayşe Goktas – Conceptualization, study design, methodology, data collection, original draft preparation, review, editing, supervision. Dr. Sevgi Ozdinc – Conceptualization, study design, literature search, methodology, data collection, original draft preparation, statistical analysis, interpretation of data, manuscript writing, review & editing.

References


- Ağargün, M.Y., Kara, H., Anlar, Ö. (1996). The validity and reliability of the Pittsburgh Sleep Quality Index. *Turkish Journal of Psychiatry*, 7(2), 107–115.
- Altena, E., Baglioni, C., Espie, C.A., Ellis, J., Gavriloff, D., Holzinger, B., Schlarb, A., Frase, L., Jernelöv, S., Riemann, D. (2020). Dealing with sleep problems during home confinement due to the COVID-19 outbreak: Practical recommendations from a task force of the European CBT-I Academy. *Journal of Sleep Research*, 29(4), e13052. <https://doi.org/10.1111/jsr.13052>
- Altuntaş Yılmaz, N. (2020). Investigation of students' attitudes towards applied distance education in the COVID-19 pandemic process in higher education institutions: Example of physiotherapy and rehabilitation department. *Necmettin Erbakan University Faculty of Health Science Journal*, 3(1), 15-20.
- Ammar, A., Brach, M., Trabelsi, K., Chtourou, H., Boukhris, O., Masmoudi, L., Bouaziz, B., Bentlage, E., How, D., Ahmed, M., Müller, P., Müller, N., Aloui, A., Hammouda, O., Paineiras-Domingos, L.L., Braakman-Jansen, A., Wrede, C., Bastoni, S., Pernambuco, C.S., ... On Behalf of the ECLB-COVID19 Consortium. (2020). Effects of COVID-19 home confinement on eating behaviour and physical activity: results of the ECLB-COVID19 International Online Survey. *Nutrients*, 12(6), 1583. <https://doi.org/10.3390/nu12061583> (2020).
- Aristovnik, A., Keržič, D., Ravšelj, D., Tomaževič, N., & Umek, L. (2020). Impacts of the COVID-19 pandemic on life of higher education students: A global perspective. *Sustainability*, 12(20), 8438. <https://doi.org/10.3390/su12208438>
- Barği, G., Akkaya, M., & Güney, Y. (2022). Investigation of university students' attitudes toward web-based distance education in terms of theoretical and applied courses during the COVID-19 pandemic period. *Journal of Experimental and Clinical Medicine*, 39(1), 110-116. <https://doi.org/10.52142/omujecm.39.1.22>
- Baştürk, P., Kunduracılar, Z., Yücel, H., Yılmaz, F. K., & Erim, A. (2023). The impact of the new coronavirus disease on university students: Anxiety, health anxiety, and physical activity. *Journal of Health Professions Research*, 5(3), 159-166.
- Bdair, I. A. (2021). Nursing students' and faculty members' perspectives about online learning during COVID-19 pandemic: A qualitative study. *Teaching and Learning in Nursing*, 16(3), 220-226. <https://doi.org/10.1016/j.teln.2021.02.008>
- Borodavko, L. T., Silkin, N. N., Shakhmatov, A. V., & Chelysheva, O. V. (2020). Organization of education using modern distance learning technologies in the context of the COVID-19 pandemic (on the example of Russian law schools). *Amazonia Investiga*, 9(33), 51-58. <https://doi.org/10.34069/AI/2020.33.09.6>
- Brooks, S. K., Webster, R. K., Smith, L. E., Woodland, L., Wessely, S., Greenberg, N., & Rubin, G. J. (2020 March 14). The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *The lancet*, 395(10227), 912-920. [https://doi.org/10.1016/S0140-6736\(20\)30460-8](https://doi.org/10.1016/S0140-6736(20)30460-8)
- Browning, M.H.E.M., Larson, L. R., Sharaievska, I., Rigolon, A., McAnirlin, O., Mullenbach, L., Cloutier, S., Vu, T.M., Thomsen, J., Reigner, N., Metcalf, E.C., D'Antonio, A., Helbich, M., Bratman, G.N., & Alvarez, H. O. (2022). Correction: Psychological impacts from COVID-19 among university students: Risk factors across seven states in the United States. *PloS One*, 17(8), e0273938. <https://doi.org/10.1371/journal.pone.0273938>
- Buysse, D. J., Reynolds, C. F., Monk, T. H., Berman, S. R., & Kupfer, D. J. (1989). The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. *Psychiatry Research*, 28(2), 193-213. [https://doi.org/10.1016/0165-1781\(89\)90047-4](https://doi.org/10.1016/0165-1781(89)90047-4)
- Cao, W., Fang, Z., Hou, G., Han, M., Xu, X., Dong, J., & Zheng, J. (2020). The psychological impact of the COVID-19 epidemic on college students in China. *Psychiatry Research*, 287, 112934. <https://doi.org/10.1016/j.psychres.2020.112934>
- Cellini, N., Canale, N., Mioni, G., & Costa, S. (2020). Changes in sleep pattern, sense of time and digital media use during COVID-19 lockdown in Italy. *Journal of Sleep Research*, 29(4), e13074. <https://doi.org/10.1111/jsr.13074>
- Chu, Y. H., & Li, Y. C. (2022). The impact of online learning on physical and mental health in university students during the COVID-19 pandemic. *International Journal of Environmental Research and Public Health*, 19(5), 2966. <https://doi.org/10.3390/ijerph19052966>
- Coakley, K. E., Lardier, D. T., Holladay, K. R., Amorim, F. T., & Zuhl, M. N. (2021). Physical activity behavior and mental health among university students during COVID-19 lockdown. *Frontiers in Sports and Active Living*, 3, 682175. <https://doi.org/10.3389/fspor.2021.682175>
- Çekok, F. K., Kahraman, T., Kalkışım, M., Genç, A., & Keskinoglu, P. (2017). Cross-cultural adaptation and psychometric study of the Turkish version of the Rapid Assessment of Physical activity. *Geriatrics & Gerontology International*, 17(11), 1837-1842. <https://doi.org/10.1111/ggi.12970>
- Çıtak, Ş., & Pekdemir, Ü. (2020). An analysis on sleep habits and generalized anxiety levels of individuals during the COVID-19 pandemic. *Journal of Family Counseling and Education*, 5(1), 60-73. <https://doi.org/10.32568/jfcec.742086>
- Çimen, E., Gürdal, G., Çuhadar, S., & Çanak, T. A. (2020). Turkish University libraries during novel Cronovirus (COVID-19) pandemic. *Information World*, 21(1), 167-203. <https://doi.org/10.15612/BD.2020.834>
- Demir, G. T., Cicioğlu, H. İ., & İlhan, E. L. (2020). Athlete's anxiety to catch the novel coronavirus (Covid-19) Scale (AACNCS): Validity and reliability study. *Journal of Human Sciences*, 17(2), 458-468. <https://doi.org/10.14687/jhs.v17i2.5988>
- Ergin, A., Aydemir-Acar, G., Bekar, T. (2018). Determination of sleep quality of students in faculties providing health education. *Pam Med J*, 11(3), 347-354.
- García-García, J., Mañas, A., González-Gross, M., Espin, A., Ara, I., Ruiz, J. R., Ortega, F.B., Casajus, J.A., Rodriguez-Larrad, A., & Irazusta, J. (2023). Physical activity, sleep, and mental health during the COVID-19 pandemic: A one-year longitudinal study of Spanish university stu-

- dents. *Heliyon*, 9(9), e19338. <https://doi.org/10.1016/j.heliyon.2023.e19338>
- Garett, R., Liu, S., & Young, S. D. (2018). The relationship between social media use and sleep quality among undergraduate students. *Information, Communication & Society*, 21(2), 163-173. <https://doi.org/10.1080/1369118X.2016.1266374>
- Güçhan Topcu, Z., Belgen Kaygısız, B., & Demiralp, C. (2020). How are the physical activity and anxiety levels of the university students affected during the coronavirus (Covid-19) pandemic?. *Baltic Journal of Health and Physical Activity*, 12(4), 33-40. <https://doi.org/10.29359/BJHPA.2020.Suppl.1.04>
- Han, B., Du, G., Yang, Y., Chen, J., & Sun, G. (2023). Relationships between physical activity, body image, BMI, depression and anxiety in Chinese college students during the COVID-19 pandemic. *BMC Public Health*, 23(1), 24. <https://doi.org/10.1186/s12889-022-14917-9>
- Holm-Hadulla, R. M., & Koutsoukou-Argraki, A. (2015). Mental health of students in a globalized world: Prevalence of complaints and disorders, methods and effectivity of counseling, structure of mental health services for students. *Mental Health & Prevention*, 3(1-2), 1-4. <https://doi.org/10.1016/j.mhp.2015.04.003>
- Huang, Y., & Zhao, N. (2020). Generalized anxiety disorder, depressive symptoms and sleep quality during COVID-19 outbreak in China: A web-based cross-sectional survey. *Psychiatry Research*, 288, 112954. <https://doi.org/10.1016/j.psychres.2020.112954>
- Islam, M. A., Barna, S. D., Raihan, H., Khan, M. N. A., & Hosain, M. T. (2020). Depression and anxiety among university students during the COVID-19 pandemic in Bangladesh: A web-based cross-sectional survey. *PloS One*, 15(8), e0238162. <https://doi.org/10.1371/journal.pone.0238162>
- Jain, T., Ranjan, R., Chaudhary, N., Kumar, P., & Ahmad, S. (2021). Effect on mental health among undergraduate college students of India during the COVID-19 pandemic: a cross-sectional multicentric study. *Psychiatria Danubina*, 33(suppl 13), 392-398.
- Karatay, G., Baş, G.N., Aldemir, H., Akay, M., Bayır, M., Onaylı, H. (2016). Examining the sleep habits of nursing department students and the affective factors. *HSP*, 3(1), 16-22. <https://doi.org/10.17681/hsp.34639>
- Karyotaki, E., Cuijpers, P., Albor, Y., Alonso, J., Auerbach, R. P., Bantjes, J., Bruffaerts, R., Ebert, D.D., Hasking, P., Kiekens, G., Lee, S., McLafferty, M., Mak, A., Mortier, P., Sampson, N.A., Stein, D.J., Vilagut, G., & Kessler, R. C. (2020). Sources of stress and their associations with mental disorders among college students: results of the World Health Organization World Mental Health Surveys International College Student Initiative. *Frontiers in Psychology*, 11, 1759. <https://doi.org/10.3389/fpsyg.2020.01759>
- Kaya, P., Yazgan, E.A. (2020). The effect of physical activity status on quality of life during social isolation in COVID-19 epidemic. *Istanbul Commerce University Journal of Social Science*, 19 (37), 262-279.
- Lee, Y., Lui, L. M., Chen-Li, D., Liao, Y., Mansur, R. B., Brietzke, E., Rosenblat, J.D., Ho, R., Rodrigues, N.B., Lipsitz, O., Nasri, F., Cao, B., Subramaniapillai, M., Gill, H., Lu, C., & McIntyre, R. S. (2021). Government response moderates the mental health impact of COVID-19: a systematic review and meta-analysis of depression outcomes across countries. *Journal of Affective Disorders*, 290, 364-377. <https://doi.org/10.1016/j.jad.2021.04.050>
- Li, Y., Qin, Q., Sun, Q., Sanford, L. D., Vgontzas, A. N., & Tang, X. (2020). Insomnia and psychological reactions during the COVID-19 outbreak in China. *Journal of Clinical Sleep Medicine*, 16(8), 1417-1418. <https://doi.org/10.5664/jcsm.8524>
- Lök, N., & Bademli, K. (2017). Determination of the relationship between physical activity and depression in adult individuals. *Hatay Mustafa Kemal University Journal of Social Sciences Institute*, 14(40), 101-110.
- Majumdar, P., Biswas, A., & Sahu, S. (2020). COVID-19 pandemic and lockdown: cause of sleep disruption, depression, somatic pain, and increased screen exposure of office workers and students of India. *Chronobiology International*, 37(8), 1191-1200. <https://doi.org/10.1080/07420528.2020.1786107>
- Marconcin, P., Werneck, A. O., Peralta, M., Ihle, A., Gouveia, É. R., Ferrari, G., ... & Marques, A. (2022). The association between physical activity and mental health during the first year of the COVID-19 pandemic: a systematic review. *BMC Public Health*, 22(1), 209. <https://doi.org/10.1186/s12889-022-12590-6>
- Marelli, S., Castelnuovo, A., Somma, A., Castronovo, V., Mombelli, S., Bottoni, D., Leitner, C., Fossati, A., & Ferini-Strambi, L. (2021). Impact of COVID-19 lockdown on sleep quality in university students and administration staff. *Journal of Neurology*, 268, 8-15. <https://doi.org/10.1007/s00415-020-10056-6>
- Ölçücü, B., Vatansever, Ş., Özcan, G., Çelik, A., Paktaş, Y. (2015). The relationship between depression, anxiety and physical activity level among university students. *International Journal of Turkish Education Sciences*, 3(4), 294-303.
- Osipov, A. Y., Ratmanskaya, T. I., Zemba, E. A., Potop, V., Kudryavtsev, M. D., & Nagovitsyn, R. S. (2021). The impact of the universities closure on physical activity and academic performance in physical education in university students during the COVID-19 pandemic. *Physical Education of Students*, 25(1), 20-27. <https://doi.org/10.15561/20755279.2021.0103>
- Özdiñ, S., Ata, H., Selcuk, H., Can, H. B., Sermenli, N., & Turan, F. N. (2020). Temporomandibular joint disorder determined by Fonseca Anamnestic Index and associated factors in 18-to 27-year-old university students. *CRANIO®*, 38(5), 327-332. <https://doi.org/10.1080/08869634.2018.1513442>
- Özdiñ, S., & Turan, F. N. (2019). Investigation of relationship among musculoskeletal system problems, physical activity and stress level in the students of faculty of health sciences. *Archives of Health Sciences and Research*, 6(2), 247-55. <https://doi.org/10.17681/hsp.434594>
- Özdoğan, A.Ç., & Berkant, H.G. (2020). The examination of stakeholders' opinions on distance education during the COVID-19 epidemic. *Milli Eğitim Journal*, 49(1), 13-43. <https://doi.org/10.37669/milliegitim.788118>
- Pirinççi, C. Ş., Cihan, E., & Yıldırım, N. Ü. (2020). The relationship between physical activity level and quality of life, presence of chronic disease, smoking and academic success in university students. *KTO Karatay University Journal of Health Sciences*, 1(1), 15-23.
- Rebar, A. L., Stanton, R., Geard, D., Short, C., Duncan, M. J., & Vandelanotte, C. (2015). A meta-meta-analysis of the effect of physical activity on depression and anxiety in non-clinical adult populations. *Health Psychology Review*, 9(3), 366-378. <https://doi.org/10.1080/17437199.2015.1022901>

- Rogowska, A. M., Kuśniercz, C., & Bokszczanin, A. (2020). Examining anxiety, life satisfaction, general health, stress and coping styles during COVID-19 pandemic in Polish sample of university students. *Psychology Research and Behavior Management*, 13, 797-811. <https://doi.org/10.2147/PRBM.S266511>
- Rösel, I., Bauer, L. L., Seiffer, B., Deinhart, C., Atrott, B., Sudeck, G., Hautzinger, M., & Wolf, S. (2022). The effect of exercise and affect regulation skills on mental health during the COVID-19 pandemic: A cross-sectional survey. *Psychiatry Research*, 312, 114559. <https://doi.org/10.1016/j.psychres.2022.114559>
- Rossi, R., Socci, V., Talevi, D., Mensi, S., Niolu, C., Pacitti, F., Di Marco, A., Rossi, A., Siracusano, A., & Di Lorenzo, G. (2020). COVID-19 pandemic and lockdown measures impact on mental health among the general population in Italy. *Frontiers in Psychiatry*, 11, 550552. <https://doi.org/10.3389/fpsy.2020.00790>
- Sahu, P. (2020). Closure of universities due to Coronavirus Disease 2019 (COVID-19): Impact on education and mental health of students and academic staff. *Cureus*, 12(4), e7541. <https://doi.org/10.7759/cureus.7541>
- Sañudo, B., Fennell, C., & Sánchez-Oliver, A. J. (2020). Objectively-assessed physical activity, sedentary behavior, smartphone use, and sleep patterns pre-and during-COVID-19 quarantine in young adults from Spain. *Sustainability*, 12(15), 5890. <https://doi.org/10.3390/su12155890>
- Silva, M. P. F. N. D., Silva Cardoso, G. M. D., Priolo Filho, S. R., Weber, S. A. T., & Corrêa, C. D. C. (2023). Technologies and mental health in university students: an unhealthy combination. *International Archives of Otorhinolaryngology*, 27(2), 324-328. <https://doi.org/10.1055/s-0042-1748807>
- Škrlec, I., Talapko, J., Pustijanac, E., & Meštrović, T. (2021, January). Depression, anxiety, stress and physical activity in health-related university students during COVID-19. *Medical Sciences Forum*, 4, 43. <https://doi.org/10.3390/ECERPH-3-09028>
- Su, T. P., Lien, T. C., Yang, C. Y., Su, Y. L., Wang, J. H., Tsai, S. L., & Yin, J. C. (2007). Prevalence of psychiatric morbidity and psychological adaptation of the nurses in a structured SARS caring unit during outbreak: a prospective and periodic assessment study in Taiwan. *Journal of Psychiatric Research*, 41(1-2), 119-130. <https://doi.org/10.1016/j.jpsychires.2005.12.006>
- Tüzün, H., Demirköse, H., Özkan, S., Dikmen, A. U., & İlhan, M. N. (2020). COVID- Risk communication in the COVID-19 pandemic. *Gazi Journal of Health Sciences*, (Special Issue), 1-8.
- Ulusoy, M., Sahin, N. H., & Erkmén, H. (1998). Turkish version of the Beck Anxiety Inventory: psychometric properties. *Journal of Cognitive Psychotherapy*, 12(2), 163-172.
- Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., Ho, C. S., & Ho, R. C. (2020). Immediate psychological responses and associated factors during the initial stage of the 2019 coronavirus disease (COVID-19) epidemic among the general population in China. *International Journal of Environmental Research and Public Health*, 17(5), 1729. <https://doi.org/10.3390/ijerph17051729>
- Wang, F., & Bíró, É. (2021). Determinants of sleep quality in college students: A literature review. *Explore*, 17(2), 170-177. <https://doi.org/10.1016/j.explore.2020.11.003>
- Xiang, M. Q., Tan, X. M., Sun, J., Yang, H. Y., Zhao, X. P., Liu, L., Hou, X.H., & Hu, M. (2020). Relationship of physical activity with anxiety and depression symptoms in Chinese college students during the COVID-19 outbreak. *Frontiers in Psychology*, 11, 582436. <https://doi.org/10.3389/fpsyg.2020.582436>
- Altuntaş-Yılmaz, N. (2020). Investigation of students' attitudes towards applied distance education in the COVID-19 pandemic process in higher education institutions: Example of physiotherapy and rehabilitation department. *Necmettin Erbakan University Faculty of Health Sciences Journal*, 3(1), 15-20.
- Yeni Elbay, R., Yılmaz, H., Cifteci, K., & Karadere, E. (2021). The psychological effects of COVID 19 on medical and non-medical university students. *Psychiatria Danubina*, 33(suppl 10), 126-131.
- Zhang, S. X., Wang, Y., Rauch, A., & Wei, F. (2020). Unprecedented disruption of lives and work: Health, distress and life satisfaction of working adults in China one month into the COVID-19 outbreak. *Psychiatry Research*, 288, 112958. <https://doi.org/10.1016/j.psychres.2020.112958>

Correspondence:

Sevil Yılmaz, İstanbul University-Cerrahpaşa,
Florence Nightingale Faculty of Nursing,
Department of Mental Health and Psychiatric Nursing.
Avcılar – İstanbul, Türkiye
sevil.yilmaz@iuc.edu.tr

Published under 

<https://creativecommons.org/licenses/by-nc-nd/4.0/>