Original Article

THE RELATIONSHIP BETWEEN PHYSICAL ACTIVITY, INTERNET ADDICTION, DEPRESSION, ANXIETY AND STRESS IN UNIVERSITY STUDENTS DURING THE COVID-19 PANDEMIC

Özlem MENEVŞE[1], Merve Nur KIRÇOVA[1], Zeynep ŞENYİĞİT[1], Ezgi TÜRKBEN[1], Derya KARA[1], Fatma AKMEŞE[1], Melike Şeyda FİDANCI[1], Büşra KEPENEK VAROL[1*] iD.

[1]Department of Physiotherapy and Rehabilitation, Faculty of Health Sciences, Nuh Naci Yazgan University, Kayseri, Turkey
*Corresponding author e-mail: busrakepenek@gmail.com

ABSTRACT

Purpose: The aim of this study was to investigate the relationship between physical activity, internet addiction, depression, anxiety and stress in university students studying in the physiotherapy and rehabilitation department in Turkey during the COVID-19 pandemic.
Methods: Eighty students were included in the study. The short form of the International Physical Activity Questionnaire was used to assess the level of physical activity in this study. Internet addiction of the students was assessed using 12-items Young's Internet Addiction Test - Short Form. Mental health (depression, anxiety and stress) of the students was assessed using the Depression Anxiety Stress Scale (DASS-21). All data were collected via online survey system.
Results: Fifty five percent of the students had low physical activity levels. Internet use was found to be normal in 44%, problematic in 20%, and pathological in 16%. When the students were examined in terms of mental health, 40% were normal for depression, 28% for anxiety and 54% for stress. There was low positive correlation (r= 0.276; p= 0.013) between internet addiction and depression, and a low positive correlation (r= 0.233; p= 0.037) between internet addiction and total score of DASS-21.
Discussion: In this study, a relationship was obtained between internet addiction and depression, while there is no relationship between other parameters. Considering today, internet addiction may be a serious problem in the future, especially in lockdowns and regional quarantine practices.
Keywords: COVID-19, physical activity, internet addiction, depression, anxiety

ÖZET

Amaç: Bu çalışmanın amacı, Türkiye'de fizyoterapi ve rehabilitasyon bölümünde öğrenim gören üniversite öğrencilerinde COVID-19 salgını sırasında fiziksel aktivite, internet bağımlılığı, depresyon, anksiyete ve stres arasındaki ilişkiyi araştırmaktı.

Yöntem: Araştırmaya 80 öğrenci dahil edildi. Bu çalışmada fiziksel aktivite düzeyini değerlendirmek için Uluslararası Fiziksel Aktivite Anketi'nin kısa formu kullanıldı. Öğrencilerin internet bağımlılığı 12 maddelik Young İnternet Bağımlılığı Testi - Kısa Formu kullanılarak değerlendirildi. Öğrencilerin ruh sağlığı (depresyon, kaygı ve stres) Depresyon Kaygı Stres Ölçeği (DASS-21) kullanılarak değerlendirildi. Tüm veriler çevrimiçi anket sistemi aracılığıyla toplandı.

Sonuçlar: Öğrencilerin %55'inin fiziksel aktivite düzeyi düşüktü. İnternet kullanımı % 44 normal, % 20 problemli, % 16 patolojik bulundu. Öğrenciler mental sağlık açısından incelendiğinde yüzde 40'ının depresyon, yüzde 28'inin kaygı ve yüzde 54'ünün stres durumunun normal olduğu görüldü. İnternet bağımlılığı ile depresyon arasında düşük pozitif korelasyon (r= 0,276; p= 0,013), internet bağımlılığı ile DASS-21 toplam puanı arasında ise düşük pozitif korelasyon (r= 0,233; p= 0,037) vardı.

Tartışma: Bu çalışmada internet bağımlılığı ile depresyon arasında ilişki elde edilirken diğer parametreler arasında ilişki bulunamadı. Bugün düşünüldüğünde internet bağımlılığı gelecekte özellikle tecrit ve bölgesel karantina uygulamalarında ciddi bir sorun olabilir.

Anahtar Kelimeler: COVID-19, fiziksel aktivite, internet bağımlılığı, depresyon, anksiyete.

INTRODUCTION

The novel coronavirus disease (COVID-19) first appeared in the Chinese city of Wuhan in December 2019 and was declared rapidly as a pandemic by the World Health Organization (1, 2). Many countries, including Turkey, took action against the spread of the virus through the implantation of stay-at-home orders and lockdowns (3). The nonvital businesses, as well as schools of all levels, including universities, sports, and recreational facilities (e.g., gyms, swimming pools), had to be closed (3, 4). COVID-19 has substantially decreased the population's time and spatial range of physical activity, moreover, sport events have been canceled or postponed (5). A study from Spain showed that sedentary time increased by 52.7% compared to the period before the COVID-19 pandemic, and physical activity during the lockdown period of COVID-19 decreased by 29.5% and 18.3% for moderate and vigorous physical activity in university students, respectively (6). In a study involving nursing, nutrition and dietetics, midwifery, and physiotherapy students and examining physical activity during the pandemic period the prevalence of physical activity was found 37.1%, with participants of the division of physiotherapy showing the lowest prevalence (7).

Lockdown may lead to a decrease in physical activity and an increase in a sedentary lifestyle due to excessive use of electronic devices by university students. Schools as well as universities were closed at the beginning of the pandemic and university students had to stay at home having online education. Therefore, reduced social interaction and the increase in time spent at home have increased the use of the Internet for both social interaction and obtaining health information (8). Regulations implemented during the pandemic have led to increased use of technology, including the internet, which may have put young people's health at risk, and there was high online activity compared to the pre-pandemic period (9). Previous studies have shown higher rates of internet addiction in and general population (10), and also university students (11).

The lockdown and the increase of these undesirable behaviors such as insufficient physical activities, increased sedentary lifestyle, excessive use of technology and internet addiction may further aggravate the symptoms of depression, anxiety, and stress in the COVID-19 pandemic (11-13). In a meta-analysis investigating the prevalence of mental health in higher education students during the COVID-19 pandemic, the pooled prevalence of depressive symptoms was 34%, pooled anxiety symptoms were 32%, and the prevalence of depressive and anxiety symptoms was higher compared to pre-pandemic prevalence (14). Another meta-analysis stated that the prevalence of depressive and anxiety symptoms during the COVID-19 pandemic is relatively high (15). This study aimed to investigate the relationship between physical activity, internet addiction, depression, anxiety, and stress in university students studying in the physiotherapy and rehabilitation department in Turkey during the COVID-19 pandemic.

METHODS

Study Design and Participants

Between February 2021 and July 2021, students studying at Nuh Naci Yazgan University, Department of Physiotherapy and Rehabilitation, and approved to participate in the study were included. Students who had an orthopedic, neurological, or cardiopulmonary disorder that would affect their physical activity level in the last six months, a diagnosed psychological problem, or a chronic disease were excluded from the study. All data were collected via an online survey system (Google Docs). The study was approved by the Ethics Committee of Nuh Naci Yazgan University (Protocol number: 2021/1742). Students were able to access the online survey system after providing informed consent, and informed consent was obtained from all participants included in the study via an online form.

Assessments

Socio-demographic characteristics of the students such as gender, age, height, weight, class level, sports habits, place of residence, and smoking status were recorded.

The International Physical Activity Questionnaire (IPAQ) is a widely used standardized tool with the long (27-item) and short form (7-item) versions available (16, 17). The short form of the IPAQ (IPAQ-SF) was used to assess the level of physical activity in this study. The Turkish validity and

reliability of the questionnaire were conducted by Saglam et al. (17) which assesses physical activity across a variety of domains including walking, moderate and vigorous activity in the past seven days, and estimated time spent sitting per week. The vigorous, moderate, and walking scores were calculated by reported minutes within each category by an average metabolic equivalent (MET) score (3.3 MET for walking, 4 MET for moderate activity, 8 MET for vigorous activity), and the results of the items were summarized to determine the overall physical activity score of all categories. The students were classified into high (>3000 MET-min/week), moderate (600-3000 MET-min/week), and low (<600 MET-min/week) activity groups based on their scores. The IPAQ also contained an item about time spent sitting, developed as a separate indicator and not as part of the summed physical activity score was not included in the physical activity score in this study (16, 17).

Internet addiction of the students was assessed using a 12-item Young's Internet Addiction Test-Short Form (YIAT-SF), which was revealed by Pawlikowski et al. (18) a short version of the 20-item Young's Internet Addiction Test. The scale was designed on a 5-point Likert-type scale ranging from 1 (rarely) to 5 (always). The overall score of the survey is recommended to examine the individual's tendency to or degree of internet addiction, and the higher scores indicate greater addiction to the internet. An overall score of less than 30 indicates a normal level, those who score >30 are described as 'problematic' and those who score >37 are classified as 'pathological' (18, 19). The Turkish version of IAT was adapted by Kutlu et al (20).

The mental health of the students was assessed using the Depression Anxiety Stress Scale (DASS-21), which is a modified version of the 42-item self-reported Depression Anxiety Stress Scale (21). The Turkish validity and reliability of DASS-21 were performed by Yılmaz et al. (22). The DASS-21 is a widely used screening tool, and has three subscales to measure three negative emotional states; depression (DASS-21-D), anxiety (DASS-21-A), and stress (DASS-21-S) symptoms. Each subscale comprises seven items scored from 0 (did not apply to me at all) to 3 (applied to me very much, or most of the time) for the week preceding the interview to reflect severity, and the total score for each subscale ranges from 0 to 21. Higher scores indicated greater levels of depression, anxiety, and stress (21, 22).

Statistical Analysis

In this study, we hypothesized to detect a significant relationship with a correlation coefficient of 0.400 between internet addiction and stress in students based on a previous study (23). The sample size was calculated as 61 subjects but was increased by 10% in case of possible missing values to a total of 67 subjects to detect this relationship with a 95% confidence level and 90% power (24).

Data analyses were performed using the SPSS V.20 (SPSS Inc., USA) program. The Kolmogorov–Smirnov and Shapiro-Wilk tests were used to evaluate whether the data had a normal distribution. Spearman correlation coefficient and statistical significance were calculated for the relationships between physical activity, internet addiction, and mental health, at least one of which was not normally distributed. The significance level was accepted as $p < 0.05$.

RESULTS

The socio-demographic characteristics of the students included in the study are shown in Table 1.

The physical activity levels according to IPAQ-SF, depression, anxiety, stress classification according to DASS-21, and internet addiction categorization according to YIAT-SF were presented in Table 2.

The results of the study showed a low positive correlation (r= 0.276; p= 0.013) between internet addiction and depression, and a low positive correlation (r= 0.233; p= 0.037) between internet addiction and total score of DASS-21 in students (Table 3).

DISCUSSION

This study was conducted with the participation of physiotherapy and rehabilitation students, and aimed to investigate the relationship between physical activity, internet addiction, depression, anxiety, and stress. A relationship was obtained between internet addiction and depression, while there is no relationship between other parameters.

Regulations implemented during the COVID-19 pandemic such as lockdown decreased the population's physical activity. A study from Spain showed that sedentary time increased by 52.7% compared to the period before the COVID-19 pandemic, and physical activity during the lockdown period of COVID-19 decreased by 29.5% and 18.3% for moderate and vigorous physical activity in university students, respectively (6). Another study conducted in the USA found that the number of university students engaging in low physical activity increased from 27.8% to 51.9% and the number of university students engaging in high physical activity decreased from 59.5% to 34.0% due to the COVID-19 pandemic (25). In our study, 68.8% of the students had low physical activity levels. However, since the pre-pandemic physical activity levels of the students were not questioned in our study, it is not known whether this result was due to the pandemic.

Table 1. Socio-demographic characteristics of the students

	X ± SD	Min - Max
Age (year)	21.98 ± 1.60	18 - 27
Height (cm)	166 ± 7.51	150 - 186
Weight (kg)	6.98 ± 13.42	43 - 113
Body mass index (kg/m^2)	22.31 ± 3.32	15.73 – 32.66
Internet use (h/day)	3.35 ± 0.81	1 - 4
	n	**%**
Gender		
Female	67	83.8
Male	13	16.3
Smoking		
No	62	77.5
Yes	18	22.5
Residence		
Homestay	73	91.3
Home owner	7	8.8
Level of class		
First	10	12.5
Second	10	12.5
Third	17	21.3
Fourth	43	53.8
Internet use (h/day)		
0 - 2	3	3.8
2 - 4	8	10
4 - 6	27	33.8
>6	42	52.5

X ± SD = mean ± standard deviation; Min – Max = minimum - maximum

Table 2. Physical activity, internet addiction, depression, anxiety and stress level of students

	n	%
IPAQ-SF		
Low	55	68.8
Moderate	16	20.0
High	9	11.3
YIAT-SF		
Normal	44	55
Problematic	20	25
Pathological	16	20
DASS-21-D		
Normal	40	50
Mild	7	8.8
Moderate	15	18.8
Severe	12	15
Extremely severe	6	7.5
DASS-21-A		
Normal	28	35
Mild	10	12.5
Moderate	14	17.5
Severe	8	10
Extremely severe	20	25
DASS-21-S		
Normal	54	67.5
Mild	9	11.3
Moderate	6	7.5
Severe	8	10
Extremely severe	3	3.8

IPAQ = International Physical Activity Questionnaire; YIAT-SF = Young Internet Addiction Test-Short Form; DASS-21-D = Depression Anxiety Stress Scale-Depression Subscale; DASS-21-A = Depression Anxiety Stress Scale-Anxiety Subscale; DASS-21-S = Depression Anxiety Stress Scale-Stress Subscale

The lockdown and the increase of these undesirable behaviors such as insufficient physical activities, increased sedentary lifestyle, excessive use of technology and internet addiction may further aggravate the symptoms of depression, anxiety, and stress in the COVID-19 pandemic (11-13). Wang and Li found an association between physical activities and depression, anxiety, and smartphone addiction, and a significant association between sedentary behavior and smartphone addiction among university students during the lockdown (12). In a meta-analysis, it was shown that physical activity has a significant impact on mental health improvement among university students with anxiety and depression during the control and prevention of COVID-19 (5). A study from Ethiopia indicated that a significant proportion of students participating in the study were affected by depression, anxiety, and stress, and the level of these mental illnesses among students is higher as compared to the pre-pandemic period in university students (28).

Table 3. Correlation between physical activity, internet addiction, and mental health

	IPAQ-SF Vigorous	IPAQ Moderate	IPAQ Walking	IPAQ Total	YIAT-SF	DASS-21-D	DASS-21-A	DASS-21-S
IPAQ-SF Vigorous								
IPAQ Moderate	r=.331** p=.003							
IPAQ Walking	r=.272* p=.015	r=.463** p<0.01						
IPAQ Total	r=.495** p<0.01	r=.622** p<0.01	r=.860** p<0.01					
YIAT-SF	r=.038 p=.739	r=-.021 p=.854	r=-.081 p=.473	r=-.119 p=.295				
DASS-21-D	r=.101 p=.372	r=.016 p=.890	r=.022 p=.844	r=.004 p=.972	r=.276* p=.013			
DASS-21-A	r=.038 p=.737	r=-.050 p=.661	r=.027 p=.811	r=-.029 p=.801	r=.205 p=.068	r=.878** p<0.01		
DASS-21-S	r=.050 p=.660	r=-.046 p=.686	r=-.077 p=.495	r=-.115 p=.310	r=.167 p=.139	r=.909** p<0.01	r=.871** p<0.01	
DASS-21 Total	r=.076 p=.505	r=-.038 p=.741	r=-.001 p=.991	r=-.039 p=.733	r=.233* p=.037	r=.965** p<0.01	r=.954** p<0.01	r=.957** p<0.01

IPAQ = International Physical Activity Questionnaire; YIAT-SF = Young Internet Addiction Test-Short Form; DASS-21-D = Depression Anxiety Stress Scale-Depression Subscale; DASS-21-A = Depression Anxiety Stress Scale-Anxiety Subscale; DASS-21-S = Depression Anxiety Stress Scale-Stress Subscale; DASS-21 = Depression Anxiety Stress Scale. *p value < 0.05, **p value < 0.01.

In the same study, the authors noted that numerous factors such as age, gender, self-efficacy, year, and field of study contribute to any of the problems of depression, anxiety, and stress (28). Another study showed that low social support and males were associated with having a higher level of depression, anxiety, and stress among undergraduate students (29). In this present study, contrary to the literature, there was no relationship between physical activity, screen addiction, anxiety, and stress. Demographic characteristics such as the higher number of women in the gender distribution may have affected this result. However, most students had DASS-21 scores that were considered normal. Since there is a relationship between the DASS-21 total score and screen addiction, it should be added that screen addiction may negatively affect the mental health of students.

Limitation

The lack of data on physical activity, screen addiction, and mental health from the pre-pandemic period in the study was a limitation. Physiotherapy and rehabilitation training involves a lot of face-to-face practical training in different levels of classes to varying degrees. Another limitation of the study is that the sample was not stratified according to the level of classes and gender.

CONCLUSION

Considering today, internet addiction may be a serious problem in the future, especially in lockdowns and regional quarantine practices. In case of any closure or regional quarantine, it is important to control changeable factors such as physical activity habits, internet addiction, depression, anxiety, and stress levels in university students. It is recommended to address these problems and provide more support to students by improving the psychological well-being of university students.

REFERENCES

1. World Health Organization. Coronavirus Disease 2019 (COVID-19) Situation Report-51. Available from: https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200311-sitrep-51-covid-19.pdf?sfvrsn=1ba62e57_10, accessed September 18, 2021.
2. Romano CM, Chebabo A, Levi JE. Past, present, and future of COVID-19: a review. Braz J Med Biol Res. 2020;53(9):e10475.
3. Toprak Celenay S, Karaaslan Y, Mete O, Ozer Kaya D. Coronaphobia, musculoskeletal pain, and sleep quality in stay-at home and continued-working persons during the 3-month Covid-19 pandemic lockdown in Turkey. Chronobiol Int. 2020;37(12):1778-85.
4. Bielec G, Omelan A. Physical activity behaviors and physical work capacity in university students during the COVID-19 pandemic. Int J Environ Res Public Health. 2022;19(2):891.
5. Luo Q, Zhang P, Liu Y, Ma X, Jennings G. Intervention of physical activity for university students with anxiety and depression during the COVID-19 pandemic prevention and control period: A systematic review and meta-analysis. Int J Environ Res Public Health. 2022;19(22): 15338.
6. Rodriguez-Larrad A, Manas A, Labayen I, Gonzalez-Gross M, Espin A, Aznar S, et al. Impact of COVID-19 confinement on physical activity and sedentary behaviour in Spanish university students: Role of gender. Int J Environ Res Public Health. 2021;18(2): 369.
7. Taeymans J, Luijckx E, Rogan S, Haas K, Baur H. Physical activity, nutritional habits, and sleeping behavior in students and employees of a Swiss University during the COVID-19 lockdown period: Questionnaire survey study. JMIR Public Health Surveill. 2021;7(4):e26330.
8. Tahir MJ, Malik NI, Ullah I, Khan HR, Perveen S, Ramalho R, et al. Internet addiction and sleep quality among medical students during the COVID-19 pandemic: A multinational cross-sectional survey. PLoS One. 2021;16(11):e0259594.
9. Gavurova B, Ivankova V, Rigelsky M, Mudarri T. Internet addiction in socio-demographic, academic, and psychological profile of college students during the COVID-19 pandemic in the Czech Republic and Slovakia. Front Public Health. 2022;10:944085.
10. Li YY, Sun Y, Meng SQ, Bao YP, Cheng JL, Chang XW, et al. Internet addiction increases in the general population during COVID-19: Evidence from China. Am J Addict. 2021;30(4):389-97.
11. Deb N, Roy P. Internet addiction, depression, anxiety and stress among first year medical students after COVID-19 lockdown: A cross sectional study in West Bengal, India. J Family Med Prim Care. 2022;11(10):6402-6.
12. Wang Y, Li Y. Physical activity and mental health in sports university students during the COVID-19 school confinement in Shanghai. Front Public Health. 2022;10:977072.
13. Woodruff SJ, Coyne P, St-Pierre E. Stress, physical activity, and screen-related sedentary behaviour within the first month of the COVID-19 pandemic. Appl Psychol Health Well Being. 2021;13(2):454-68.
14. Deng J, Zhou F, Hou W, Silver Z, Wong CY, Chang O, et al. The prevalence of depressive symptoms, anxiety symptoms and sleep disturbance in higher education students during the COVID-19 pandemic: A systematic review and meta-analysis. Psychiatry Res. 2021;301:113863.
15. Chang JJ, Ji Y, Li YH, Pan HF, Su PY. Prevalence of anxiety symptom and depressive symptom among college students during COVID-19 pandemic: A meta-analysis. J Affect Disord. 2021;292:242-54.
16. Craig CL, Marshall AL, Sjostrom M, Bauman AE, Booth ML, Ainsworth BE, et al. International physical activity questionnaire: 12-country reliability and validity. Med Sci Sports Exerc. 2003;35(8):1381-95.
17. Saglam M, Arikan H, Savci S, Inal-Ince D, Bosnak-Guclu M, Karabulut E, et al. International physical activity questionnaire: reliability and validity of the Turkish version. Percept Mot Skills. 2010;111(1):278-84.
18. Pawlikowski M, Altstötter-Gleich C, Brand M. Validation and psychometric properties of a short version of Young's Internet Addiction Test. Computers in Human Behavior. 2013;29(3):1212-23.
19. Cakar S, Eren G. Internet addiction in constipated adolescents. Turk J Gastroenterol. 2023;34(3):287-92.
20. Kutlu M, Savci M, Demir Y, Aysan F. Turkish adaptation of Young's Internet Addiction Test-Short Form: a reliability and validity study on university students and adolescents. Anatolian Journal of Psychiatry. 2016;17(1): 69-76.
21. Henry JD, Crawford JR. The short-form version of the Depression Anxiety Stress Scales (DASS-21): construct validity and normative data in a large non-clinical sample. Br J Clin Psychol. 2005;44(Pt 2):227-39.
22. Yılmaz Ö, Boz H, Arslan A. The validity and reliability of depression stress and anxiety scale (DASS-21) Turkish short form. J Financ Econom Soc Stud. 2017;2(2):78-91.
23. Akın A, İskender M. Internet addiction and depression, anxiety and stress. Int J Educ Sci. 2011;3(1):138-48.
24. Algina J, Olejnik S. Sample size tables for correlation analysis with applications in partial correlation and multiple regression analysis. Multivariate Behav Res. 2003;38(3):309-23.
25. Olfert MD, Wattick RA, Saurborn EG, Hagedorn RL. Impact of COVID-19 on college student diet quality and physical activity. Nutr Health. 2022;28(4):721-31.
26. Kumar G, Dash P, Jnaneswar A, Suresan V, Jha K, Ghosal S. Impact of internet addiction during COVID-19 on anxiety and sleep quality among college students of Bhubaneswar city. J Educ Health Promot. 2022;11:156.
27. Ismail N, Tajjudin AI, Jaafar H, Nik Jaafar NR, Baharudin A, Ibrahim N. The relationship between internet addiction, internet gaming and anxiety among medical students in a Malaysian Public University during COVID-19 pandemic. Int J Environ Res Public Health. 2021;18 (22): 11870.
28. Simegn W, Dagnew B, Yeshaw Y, Yitayih S, Woldegerima B, Dagne H. Depression, anxiety, stress and their associated factors among Ethiopian University students during an early stage of COVID-19 pandemic: An online-based cross-sectional survey. PLoS One. 2021;16(5):e0251670.
29. Guo K, Zhang X, Bai S, Minhat HS, Nazan A, Feng J, et al. Assessing social support impact on depression, anxiety, and stress among undergraduate students in Shaanxi province during the COVID-19 pandemic of China. PLoS One. 2021;16(7):e0253891.