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Original Article

Investigation of the effects of kinesiophobia level on physical activity and quality of life in university students

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Abstract

Background: Kinesiophobia, which is called activity avoidance, is a condition that may cause university students to stay away from physical activity more. This study aimed to understand how physical activity and quality of life levels of university students with different levels of kinesiophobia are affected.

Methods: Our study included 395 students who were studying at Ankara Medipol University in the 2022-2023 academic year and were accepted to participate in our study. The kinesiophobia, physical activity and quality of life levels of the students were evaluated with questionnaires. Demographic Characteristics of Students were analyzed using Chi-Square and Mann-Whitney U tests. Spearman correlation analysis was used for the correlation between the scores of the scales, and Mann-Whitney U was used for comparing physical activity levels and quality of life according to kinesiophobia levels. Statistical significance was set as $p<0.05$.

Results: Among the students who participated in our study, 226 (57.22%) students had high kinesiophobia levels and 169 (42.78%) had low kinesiophobia levels. While 74.3% of people with high kinesiophobia levels were women, 67.5% of participants with low kinesiophobia levels were women. Age and BMI levels of the participants in both groups were similar ($p>0.05$). In our study, while all parameters of WHOQOL and TKS were correlated with each other, only physical and psychosocial sub-parameters of WHOQOL and IPAQ were correlated ($p<0.05$). According to the results obtained from the study, the physical activity amount and quality of life scores of the students with lower kinesiophobia levels were found to be higher ($p<0.05$).

Conclusion: As a result, different levels of kinesiophobia in university students can affect the amount of physical activity and quality of life of students. It is essential to keep students away from the vicious circle of kinesiophobia and lack of physical activity and to direct them to physical activities.

Keywords: University Students, Kinesiophobia, Physical Activity, Quality of Life, Turkiye.

Background

University years, one of the critical periods of young adulthood, is when individuals make decisions that directly affect their lives and gain professional skills that they will continue to apply. These are not only the years in which individuals develop themselves in terms of education but also the period in which they mature in many ways and prepare themselves for the rest of life [1]. It is known that individuals who can spend this period with maximum contribution can more easily cope with both physical and social difficulties that they may encounter in the rest of their lives. There are harmful habits, valuable methods, and habits that individuals can add to their lives during this period. The most basic way to prevent these harmful habits is to turn to physical activity [2]. Studies on physical activity, defined as bodily movements that require muscle and joint movement with energy expenditure above the basal metabolism level, have reported that physically active university students have less harmful habits and are more successful in both academic and social dimensions. As a result, it is stated that the quality-of-life levels are higher. However, in most studies, it is stated that the physical activities of university students need to be increased and that students should be directed to physical activities [3,4]. Some situations may cause students to stay away from the activity. Especially the Covid-19

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pandemic and the distance education process we have been through have caused students to move away from physical activity even more. The withdrawal from this physical activity caused the students to be exposed to more depression and a decrease in their life satisfaction levels [4]. Physical inactivity may also cause some complications for students. One of these complications is kinesiophobia. Kinesiophobia, a term first used by Kori et al. in 1990, is a person's fear of performing physical movement resulting from susceptibility to pain or re-injury [5]. Kinesiophobia causes functional disability by causing a decrease in movement from individuals, which leads to a decrease in the quality of life of individuals. Kinesiophobia not only causes physical problems but also prevents the individual from socializing. This situation leads to a further decrease in the quality of life and causes an increase in depression in individuals [6]. Mood disorders and declines in quality of life, especially in university students, will bring many problems in students, especially their academic status [7]. Although the basis of kinesiophobia is the painful condition experienced, it may not always occur after a painful process. Kinesiophobia is associated with the amygdala and insula region of the brain, especially the limbic system structures. The amygdala and insula regions control impulses related to emotion, survival, and memory. In other words, it is thought that kinesiophobia, which means the fear of re-injury, may have increased with the fear of getting sick or harming other individuals, especially during the pandemic. Staying away from physical activity can turn into movement avoidance behavior and cause the continuation of the cycle of fear of movement [8]. At the same time, physical activity is one of the most effective methods to combat kinesiophobia. Studies have shown that after the Covid-19 process, kinesiophobia and physical activity decrease in people who had Covid-19 [9,10]. It has been shown in the literature that individuals who are physically active in their youth have lower levels of kinesiophobia at later ages [11]. Clarifying the relationship between kinesiophobia, lack of physical activity, and quality of life in university students will facilitate the development of individual and targeted treatment approaches and increase students' quality of life. Understanding the active promotion of health and well-being among college students and quality of life is integral to countering adverse health outcomes in education and postgraduate adulthood. Although it is reported in the literature that physical activity is an important parameter affecting the quality of life of university students, it has been stated that there is a need for studies with larger sample groups and the factors affecting different dimensions of quality of life [12]. In addition, no study has been found in the literature examining the effects of kinesiophobia on university students. For this reason, our study aims to examine how the physical activity levels and quality of life of university students, who experience changes in many areas in order to adapt to a new order in their lives, are affected by different levels of kinesiophobia and to make suggestions to increase the well-being of students.

Methods

Study design and setting

Our study, planned as cross-sectional research, included 395 students aged 18-30, who were studying at Ankara Medipol University in the 1st, 2nd, and 3rd grades between 2022 and 2023, and who agreed to participate in the study and did not use any medication. The questionnaires in the study were filled with the students by face-to-face interview method. First, the purpose and content of the questionnaire were explained to the students, and they were asked to fill in the questionnaire themselves.

Inclusion and exclusion criteria

This study included 1st, 2nd, and 3rd-year students at Ankara Medipol University, who agreed to participate and did not use medication. However, students with neurological or chronic systemic disease, diagnosed psychiatric disease, history of trauma in the last six months, and musculoskeletal surgery were excluded.

Sample size

In our study, in which the primary measurement parameter was determined as the quality of life, it was determined that a total of 342 individuals were needed in the study, with 80.0% power (three groups, alpha= 0.05, bidirectional), the effect size of Cohen's f: 0.16, according to the analysis performed in the G* Power program.

Study tool

The demographic information of the individuals included in the study was recorded. In addition, kinesiophobia levels, physical activity levels, and quality of life were evaluated by questionnaire forms. The kinesiophobia levels of the participants were measured with the Tampa Kinesiophobia Scale (TKS), which consists of 17 questions. It uses a 4-point Likert scale. While the score that can be obtained from the scale varies between 17-68, a high score indicates a high level of kinesiophobia [13]. Participants were grouped as "high-level kinesiophobia" with a score of 37 points and above and as "low-level kinesiophobia" with a score below 37 points. The Turkish version of the scale was used in our study [14], and the Cronbach Alpha value was 0.783. The International Physical Activity Questionnaire (IPAQ), which consists of seven questions and provides information about the time people spend in moderate to vigorous activities, was used to evaluate the level of physical activity in our study [15]. The amount of activity was recorded by asking the students the time spent in the last seven days in the questions covering the four areas of physical activity (work, transportation, housework/gardening, and leisure activities). The Turkish version of the questionnaire used in our study evaluates individuals as being physically inactive, having low physical activity levels, and having sufficient physical activity levels [16]. The quality of life of individuals was evaluated with the World Health Organization Quality of Life Scale-Short Form (WHOQOL-BREF) consisting of 27 items and five sub-dimensions [17]. In a scale where each question is scored on a Likert scale between 1 and 5, each sub-dimension independently expresses the quality of life in its field. As the score obtained from the scale increases, the quality-of-life increases. The Turkish version of the scale was used in our study [18], and the Cronbach Alpha value was found to be 0.812.

Statistical analysis

The initial data were entered into Excel database for storage and management. Then data were transferred into SPSS version

23.0 (SPSS Inc., Chicago, IL, USA) to perform the Statistical analysis. Mann Whitney U Test, and Chi-Square Tests were used to compare socio-demographic variables in relation to level of Kinesiophobia. The Spearman correlation analysis was performed between the Tampa Kinesiophobia Scale (TKS) items, The International Physical Activity Questionnaire (IPAQ), and the World Health Organization Quality of Life Scale-Short Form (WHOQOL-BREF). The Mann Whitney U Test was performed to compare the mean of the different scales used in the study.

Results

Socio-demographic characteristics of study participants

Three hundreds and ninety-five volunteer university students with mean age 20 (ranged 18-29) years have been included. Most of them (71.39%) were women, Age, BMI, gender, and smoking status of individuals according to their kinesiophobia levels are given in Table 1. About 42.78% of the students participating in our study had a low level of kinesiophobia, and 57.22% had a high level of kinesiophobia. There was no statistical difference was observed in the two groups' age (p=0.055) and BMI (p=0.401) compared with the Mann-Whitney U Test according to kinesiophobia levels. While no difference was observed between the gender differences of the two groups compared with the chi-Square Test (p=0.134), there was a significant difference in smoking in the group with high kinesiophobia (p=0.028).

The results of the evaluation methods used in the study were correlated with each other by Spearman correlation analysis. There was a significant positive correlation between IPAQ and WHOQOL-Physical Health (r=0.13, p=0.008) and WHOQOL-Psychological Health (r=0.13, p=0.008) (Table 2). A significant negative correlation was observed between TKS and WHOQOL sub-parameters of physical health (r= -0.33, p=0.001), psychosocial health (r= -0.26, p=0.001), social relationship (r= -0.17, p=0.001) and environmental health (r= -0.20, p=0.001) (Table 2). The student's physical activity levels were compared according to their kinesiophobia levels. A significant difference was found in favor of the group with low-level kinesiophobia (p=0.043) (Table 3). When the scores of the students in the sub-dimensions of WHOQOL were compared according to the level of kinesiophobia, a difference was found in favor of the group with the low level of fear of movement in the sub-parameters of physical health (p=0.001), psychosocial health (p=0.001), social relationship (p=0.014), and environmental health (p=0.011) (Table 3).

Table 1: Demographic characteristics of students by kinesiophobia levels

Variables	Categories	Low Level Kinesiophobia (n=169) Median (Min-Max)	High Level Kinesiophobia (n=226) Median (Min-Max)	P – value
Age (years)		20 (18-29)	20 (18-28)	0.055[a]
BMI (kg/m2)		22.10 (14.88-35.76)	21.49 (14.53-33.68)	0.401[a]
Gender n (%)	Female	114(67.5)	168(74.3)	0.134[b]
	Male	55(32.5)	58(25.7)	
Smoking n (%)	Yes	37(21.9)	72(31.9)	0.028[b]
	No	132(78.1)	154(68.1)	

n: sample size, Min-Max: minimum-maximum, cm: centimeter, kg: kilogram, BMI: body mass index, a: Mann Whitney U Test, b: Chi-Square Tests

Discussion

This study showed that the physical activity levels and quality of life of university students with different levels of kinesiophobia changed. While the demographic characteristics of the students in the groups with low kinesiophobia levels and high levels of kinesiophobia were similar, smoking was higher in those with high kinesiophobia levels. Although no study in the literature questioned smoking in university students according to kinesiophobia levels, studies have reported that low physical activity, known as a result of kinesiophobia, is associated with smoking [19]. In our study, we found that students with higher kinesiophobia levels were more likely to smoke.

The activity avoidance syndrome in the students may have led them to more negative habits. The lack of activity may have reduced the individual's gains from physical activity and increased the probability of the participants turning to harmful habits. Our study observed a positive correlation between IPAQ and WHOQOL's physical (r=0.13, p=0.008) and psychological health (r=0.13, p=0.008) sub-parameters. Similar to the results of our study, many studies have shown that physical activity is positively associated with quality of life [20-23]. Physical health begins with the individual's outward appearance and is completed with developing his inner world. Physical activity provides physical development and helps individuals complete their mental development, especially when done regularly. Physical activity's physical and mental benefits to individuals increase their life satisfaction levels. In addition, the belief and self-confidence provided by physical activity enable individuals to cope with adverse situations that may occur [21-23].

Quality of life is the increase in the satisfaction level of individuals in all areas of life. In addition to the benefits inherent in physical activity, it affects all areas of individuals and helps increase their life satisfaction [24]. One of the important reasons for decreased physical activity is kinesiophobia in individuals. In our study, a significant negative correlation was observed between TKS and WHOQOL sub-parameters of physical health (r= -0.33, p=0.001), psychosocial health (r= -0.26, p=0.001), social relationship (r= -0.17, p=0.001) and environmental health (r= -0.20, p=0.001). Similar to the results of our study, it has been shown in the literature [25,26] that staying away from activities as a result of the development of kinesiophobia affects both the mental and physical development of individuals, reduces their ability to adapt to developing situations, and as a result, affects the satisfaction levels of individuals with life.

Table 2. Results of Pearson correlation between the different scales' scores

	IPAQ		TKS		WHOQOL-Physical Health		WHOQOL-Psychological Health		WHOQOL-Social Relationships		WHOQOL-Environmental Health	
	r	p	r	p	r	p	r	p	r	p	r	P
IPAQ	-	-	-0.09	0.050	0.13	0.008*	0.13	0.008*	0.06	0.222	0.05	0.323
TKS	-0.09	0.050	-	-	-0.33	0.001*	-0.26	0.001*	-0.17	0.001*	-0.20	0.001*
WHOQOL-Physical Health	0.13	0.008*	-0.33	0.001*	-	-	0.56	0.001*	0.39	0.001*	0.52	0.001*
WHOQOL-Psychological Health	0.13	0.008*	-0.26	0.001*	0.56	0.001*	-	-	0.46	0.001*	0.49	0.001*
WHOQOL-Social Relationships	0.06	0.222	-0.17	0.001*	0.39	0.001*	0.46	0.001*	-	-	0.53	0.001*
WHOQOL-Environmental Health	0.05	0.323	-0.20	0.001*	0.52	0.001*	0.49	0.001*	0.53	0.001*	-	-

Spearman correlation analysis, IPAQ: International Physical Activity Questionnaire, TKS: Tampa Kinesiophobia Scale, WHOQOL: World Health Organization Quality of life Questionnaire, r: correlation coefficient

Our study observed that the physical activity levels of university students with low levels of kinesiophobia were higher (p=0.043). Although there is no study evaluating physical activity levels in university students according to kinesiophobia levels, studies show that an increase in kinesiophobia levels causes a decrease in physical activity [5,11]. A vicious circle exists between kinesiophobia, movement phobia, and lack of physical activity. The fewer physical activities of individuals, the higher their level of kinesiophobia [27]. It is known that the university period can turn into a period in which technology is used a lot and students are increasingly away from physical activity [28]. This situation will bring along the discomforts of all systems, especially the musculoskeletal system. These discomforts may increase the reluctance to move in students [29]. In our study, the higher level of physical activity in students with lower kinesiophobia levels may have helped reduce kinesiophobia levels thanks to the physical, mental, and social benefits of physical activity.

Table 3: Comparison of physical activity levels and quality of life according to students' kinesiophobia levels.

	Low Level Kinesiophobia (n=169) Median (Min-Max)	High Level Kinesiophobia (n=226) Median (Min-Max)	z	p
IPAQ	1668(0-19102)	1386(0-9252)	-2.028	0.043
WHOQOL-Physical Health	75(19-100)	69(6-100)	-5.060	0.001
WHOQOL-Psychological Health	63(19-100)	56(6-100)	-3.868	0.001
WHOQOL-Social Relationships	75(19-100)	69(19-100)	-2.464	0.014
WHOQOL-Environmental Health	69(19-100)	63(19-100)	-2.548	0.011

Mann Whitney U Test, IPAQ: International Physical Activity Questionnaire, WHOQOL: World Health Organization Quality of life Questionnaire, Min-Max: minimum-maximum

Thus, students can avoid the vicious circle of kinesiophobia and lack of physical activity. Studies between kinesiophobia and quality of life show that kinesiophobia minimizes the benefits of physical activity and reduces the quality of life due to decreased participation in physical activity [30,31]. Physical activity not only provides physiological benefits but also improves students' social participation. Social participation of students during university years, one of the most critical processes of maturation, will ensure that students' mental states, self-confidence, and environmental adaptations will be stronger. This will help them to maximize their level of satisfaction with life [32]. Our study observed that university students with low-level kinesiophobia had higher quality of life. This result is because students with low kinesiophobia are more active and can adapt to developing processes, an achievement of physical activity. In addition, physical activity improves students' physical and mental health and increases their self-confidence [33]. In this case, it reduces the students' avoidance of movements, the levels of kinesiophobia, and their participation in all areas of life, thus increasing the students' quality of life. University years are a period that sheds light on the future and may affect students' future lives. We, health professionals, and all segments of society must break the vicious circle of kinesiophobia-physical activity inadequacy to protect students from harmful habits and increase their social participation.

The most important limitation of our study is that the participating students were not classified according to the departments they studied. Another limitation of our study is that we did not question a musculoskeletal problem that could affect the kinesiophobia levels of the participants at the time of measurement.

Conclusion

In this study, the importance of doing physical activity in order to gain healthy habits and reduce the kinesiophobia at university age was emphasized once again. As a result, our study will guide the literature on the necessity of directing university students to various physical activities to increase their quality of life and protect them from the vicious circle of fear-physical inactivity. Also, future studies may explore the relationship between kinesiophobia and the quality of life of different types of physical activity, as well as the long-term effects of physical activity on college students' kinesiophobia. In conclusion, this study emphasizes the necessity of increasing physical activity levels in university students. It emphasizes the importance of physical activity in maintaining kinesiophobia and quality of life.

Abbreviation

IPAQ: International Physical Activity Questionnaire; TKS: Tampa Kinesiophobia Scale; WHOQOL-BREF: World Health Organization Quality of Life Scale-Short Form; BMI: Body Mass Index; Covid-19: Coronavirus Disease of 2019.

Declaration

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Availability of data and materials

Data will be available by emailing fztibrahim@hotmail.com

Authors' contributions

Halil Ibrahim Bulguroglu (H.I.B.) is the responsible author for creating the idea of the study and bringing it to the literature. Merve Bulguroglu (M.B.) participated in organizing the study method, creation of evaluation forms. Sezen Dincer (S.D.) participated in reaching the individuals who will participate in the study, organizing the study method. Cansu Gevrek Aslan (C.G.A.) participated in entering the data into the system analyzing the data. Serenay Zorlu (S.Z.) participated in making the necessary evaluations of the individuals for the study. Kübra Kendal (K.K.) participated in analyzing the data. All authors read and approved the final version of the manuscript.

Ethics approval and consent to participate

The study was conducted in accordance with the ethical principles of the Declaration of Helsinki (2013). The protocol of the study was approved by the Non-Interventional Clinical Research Ethics Committee of Ankara Medipol University (14/02/2023, numbered 22) in accordance with the Helsinki Declaration. All individuals were informed about the study, and an "Informed Consent Form" was signed.

Consent for publication

Not applicable

Competing interest

The authors declare that they have no competing interests.

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References

1. Moscardini AO, Strachan R, Vlasova T. The role of universities in modern society. Studies in Higher Education. 2022;47(4):812-830. doi: https://doi.org/10.1080/03075079.2020.1807493.
2. Campos-Uscanga Y, Gutiérrez-Ospina G, Morales-Romero J, Romo-González T. Self-regulation of eating and physical activity is lower in obese female college students as compared to their normal weight counterparts. Eat Weight Disord. 2017;22(2):311-319. doi: 10.1007/s40519-016-0338-9.
3. Ma PS, So WY, Choi H. Using the Health Belief Model to Assess the Physical Exercise Behaviors of International Students in South Korea during the Pandemic. Healthcare (Basel). 2023;11(4):469. doi: 10.3390/healthcare11040469.
4. Kosendiak AA, Adamczak B, Kontek S, Kuźnik Z, Roman M, Gostkowski M, Niedziółka A. Level of Physical Activity, Sleep Quality and Use of Personal Protective Equipment of Students at Wroclaw Medical University during the COVID-19 Pandemic. Int J Environ Res Public Health. 2023;20(3):2406. doi: 10.3390/ijerph20032406.
5. Naugle KM, Blythe C, Naugle KE, Keith N, Riley ZA. Kinesiophobia Predicts Physical Function and Physical Activity Levels in Chronic Pain-Free Older Adults. Front

Pain Res (Lausanne). 2022; 3:874205. doi: 10.3389/fpain.2022.874205.
6. Antunes RS, de Macedo BG, Amaral Tda S, Gomes Hde A, Pereira LS, Rocha FL. Pain, kinesiophobia and quality of life in chronic low back pain and depression. Acta Ortop Bras. 2013;21(1):27-9. doi: 10.1590/S1413-78522013000100005.
7. Wagner F, Wagner RG, Kolanisi U, Makuapane LP, Masango M, Gómez-Olivé FX. The relationship between depression symptoms and academic performance among first-year undergraduate students at a South African university: a cross-sectional study. BMC Public Health. 2022;22(1):2067. doi: 10.1186/s12889-022-14517-7.
8. Altunhan, A, Abanoz H. Investigation of Kinesiophobia and Depression Levels of Wrestlers Returning to Sports After Injury. Pakistan J. Medical Health Sci. 2022;16(02):380-383. doi: https://doi.org/10.53350/pjmhs22162380.
9. Bargı G. Kinesiophobia, Physical Activity, Depression, Anxiety and Stress Levels in Post COVID-19 Individuals: A Cross-Sectional Study. J. Health Sci. Kocaeli Univ. 2022;8(3):233-238. doi: https://doi.org/10.30934/kusbed.1136101.
10. Herrero-Montes M, Fernández-de-las-Peñas C, Ferrer-Pargada D, Izquierdo-Cuervo S, Abascal-Bolado B, Valera-Calero JA, Paras-Bravo P. Association of Kinesiophobia with Catastrophism and Sensitization-Associated Symptoms in COVID-19 Survivors with Post-COVID Pain. Diagnostics. 2023;13(5):847. doi: https://doi.org/ 10.3390/diagnostics13050847.
11. Saulicz M, Saulicz E, Knapik A, Linek P, Rottermund J, Myśliwiec A, Wolny T. Impact of physical activity and fitness on the level of kinesiophobia in women of perimenopausal age. Prz Menopauzalny. 2016;15(2):104-11. doi: 10.5114/pm.2016.61193.
12. Nowak PF, Bożek A, Blukacz M. Physical Activity, Sedentary Behavior, and Quality of Life among University Students. Biomed Res Int. 2019; 2019:9791281. doi: 10.1155/2019/9791281.
13. Vlaeyen JWS, Linton SJ. Fear-avoidance and its consequences in chronic musculoskeletal pain: a state of the art. Pain. 2000 Apr;85(3):317-332. doi: 10.1016/S0304-3959(99)00242-0.
14. Yilmaz O, Yakut Y, Uygur F, Ulug N. Turkish version of the Tampa Scale for Kinesiophobia and its test-retest reliability. Turk J Physiother Rehabil. 2011;22(1):44-49. doi: 10.1016/s1754-3207(11)70544-2.
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;35(8):1381-95. doi: 10.1249/01.MSS.0000078924.61453.FB.
16. Saglam M, Arikan H, Savci S, Inal-Ince D, Bosnak-Guclu M, Karabulut E, Tokgozoglu L. International physical activity questionnaire: reliability and validity of the Turkish version. Percept Mot Skills. 2010;111(1):278-84. doi: 10.2466/06.08.PMS.111.4.278-284.
17. Development of the World Health Organization WHOQOL-BREF quality of life assessment. The WHOQOL Group. Psychol Med. 1998;28(3):551-8. doi: 10.1017/s0033291798006667.
18. Eser E, Fidaner H, Fidaner C, Eser SY, Elbi H, Göker E. WHOQOL-100 ve WHOQOL-BREF'in psikometrik özellikleri. Psikiyatri Psikoloji Psikofarmakoloji (3P) Dergisi. 1999;7(Suppl 2):23-40 [in Turkish].
19. Heydari G, Hosseini M, Yousefifard M, Asady H, Baikpour M, Barat A. Smoking and Physical Activity in Healthy Adults: A Cross-Sectional Study in Tehran. Tanaffos. 2015;14(4):238-45.
20. Marquez DX, Aguiñaga S, Vásquez PM, Conroy DE, Erickson KI, Hillman C, Stillman CM, Ballard RM, Sheppard BB, Petruzzello SJ, King AC, Powell KE. A systematic review of physical activity and quality of life and well-being. Transl Behav Med. 2020;10(5):1098-1109. doi: 10.1093/tbm/ibz198.
21. Klepac Pogrmilovic B, Ramirez Varela A, Pratt M, Milton K, Bauman A, Biddle SJH, Pedisic Z. National physical activity and sedentary behaviour policies in 76 countries: availability, comprehensiveness, implementation, and effectiveness. Int J Behav Nutr Phys Act. 2020;17(1):116. doi: 10.1186/s12966-020-01022-6.
22. Lubans D, Richards J, Hillman C, Faulkner G, Beauchamp M, Nilsson M, Kelly P, Smith J, Raine L, Biddle S. Physical Activity for Cognitive and Mental Health in Youth: A Systematic Review of Mechanisms. Pediatrics. 2016;138(3):e20161642. doi:10.1542/peds.2016-1642
23. Jönsson T, Ekvall Hansson E, Thorstensson CA, Eek F, Bergman P, Dahlberg LE. The effect of education and supervised exercise on physical activity, pain, quality of life and self-efficacy - an intervention study with a reference group. BMC Musculoskelet Disord. 2018;19(1):198. doi:10.1186/s12891-018-2098-3
24. An HY, Chen W, Wang CW, Yang HF, Huang WT, Fan SY. The Relationships between Physical Activity and Life Satisfaction and Happiness among Young, Middle-Aged, and Older Adults. Int J Environ Res Public Health. 2020;17(13):4817. doi: 10.3390/ijerph17134817.
25. Saulicz M, Saulicz E, Knapik A, Linek P, Rottermund J, Myśliwiec A, Wolny T. Impact of physical activity and fitness on the level of kinesiophobia in women of perimenopausal age. Prz Menopauzalny. 2016;15(2):104-111. doi:10.5114/pm.2016.61193
26. Pazzinatto MF, Rio EK, Crossley KM, Coburn SL, Johnston R, Jones DM, Kemp JL. The relationship between kinesiophobia and self-reported outcomes and physical function differs between women and men with femoroacetabular impingement syndrome. Braz J Phys Ther. 2022;26(2):100396. doi: 10.1016/j.bjpt.2022.100396
27. Leon-Llamas JL, Murillo-Garcia A, Villafaina S, Domínguez-Muñoz FJ, Morenas J, Gusi N. Relationship between Kinesiophobia and Mobility, Impact of the Disease, and Fear of Falling in Women with and without Fibromyalgia: A Cross-Sectional Study. Int J Environ Res Public Health. 2022;19(14):8257. doi: 10.3390/ijerph19148257.
28. Gao Z, Lee JE. Emerging Technology in Promoting Physical Activity and Health: Challenges and Opportunities. J Clin Med. 2019;8(11):1830. doi: 10.3390/jcm8111830.

29. Kitis A, Buker N, Unal A, Savkın R. Effects of musculoskeletal system problems on quality of life and depression in students preparing for university entrance exam. Korean J Pain. 2017;30(3):192-196. doi: 10.3344/kjp.2017.30.3.192.
30. Altug F, Unal A, Kilavuz G, Kavlak E, Citisli V, Cavlak U. Investigation of the relationship between kinesiophobia, physical activity level and quality of life in patients with chronic low back pain1. J Back Musculoskelet Rehabil. 2016;29(3):527-31. doi: 10.3233/BMR-150653.
31. Ozer AY, Karaca S, Senocak E, Oguz S, Polat MG. Does kinesiophobia limit physical activity and quality of life in asthmatic patients? Int J Rehabil Res. 2022;45(3):230-236. doi: 10.1097/MRR.0000000000000534.
32. Eime RM, Young JA, Harvey JT, Charity MJ, Payne WR. A systematic review of the psychological and social benefits of participation in sport for children and adolescents: informing development of a conceptual model of health through sport. Int J Behav Nutr Phys Act. 2013; 10:98. doi: 10.1186/1479-5868-10-98.
33. Fernández-Bustos JG, Infantes-Paniagua Á, Cuevas R, Contreras OR. Effect of Physical Activity on Self-Concept: Theoretical Model on the Mediation of Body Image and Physical Self-Concept in Adolescents. Front Psychol. 2019; 10:1537. doi: 10.3389/fpsyg.2019.01537.