

Body Mass Index and Physical Activity of High-School Students: A Gender Study

Musa EROĞLU¹, Savaş AYDIN², Selçuk OKUYUCU³

¹Dr, Mersin University, Email ID: eroglumusa33@gmail.com

²Dr. Van Yüzüncü Yıl University, Faculty of sport sciences, Email ID: savasaydin@yyu.edu.tr

³Dr. Email ID: selcukokuyucu@hotmail.com

Cite this paper as: Musa EROĞLU, Savaş AYDIN, Selçuk OKUYUCU, (2025) Body Mass Index and Physical Activity of High-School Students: A Gender Study. *Journal of Neonatal Surgery*, 14 (13s), 533-539.

ABSTRACT

Background and Aim: This research aimed to: 1) assess the BMI and Physical Activity levels of a cohort of high school students, thereby evaluating the prevalence of underweight, overweight, and obesity; 2) analyze the physical activity levels of all participants in the study; and 3) compare BMI and physical activity between male and female students.

Methods: A descriptive-comparative approach was employed in this study. The sample comprised 423 high school students, of whom 201 were female. Participants' ages ranged from 12 to 18 years, with a mean age of 15.51 ± 0.96 years. Participants were selected through a convenience sampling method. Standard tests were used to collect data. Independent t test was used for data analysis.

Results: The findings indicated that the average Body Mass Index (BMI) for male students was 23.33 (2.66) kg/m², while for female students, it was 20.99 (2.17) kg/m². The BMI values for male students ranged from 16.5 to 34.0 kg/m², whereas female students exhibited BMI values between 16.0 and 27.8 kg/m². Furthermore, the data revealed that, on average, students engaged in physical activity for approximately 5.60 (5.03) hours per week. Specifically, female students participated in physical activities for an average of 4.05 (4.32) hours, compared to male students who averaged 8.11 (5.30) hours. The findings from the independent t-test indicate that the disparities between male and female participants in the measured variables are statistically significant ($p < 0.05$).

Conclusion: The results of our study align with those of previous research; however, we identified statistically significant differences related to gender and physical activity levels. It is essential to prioritize the education of young individuals, as they are more likely to adopt and sustain healthy habits throughout their lives. These findings underscore the importance of a comprehensive strategy for the prevention and management of risk factors, especially within the youth demographic.

Keywords: Physical activity, BMI, obesity, adolescents, gender

1. INTRODUCTION

Overweight and obesity, along with inadequate physical activity, are associated with various chronic, non-communicable diseases and a reduction in life expectancy. The World Health Organization (WHO) estimates that approximately 2.8 million individuals succumb to complications related to overweight and obesity each year, while an additional 3.2 million deaths are linked to a lack of physical activity (Akhmad et al. 2024; Baniyadi et al. 2022). Consequently, achieving and maintaining a healthy weight, as well as enhancing and diversifying physical activity, are critical objectives of public health policies in many developed nations. The global focus on overweight and obesity has intensified notably over the past decade. Furthermore, the rising prevalence of obesity is recognized as a significant health challenge, particularly in developed countries. For instance, the number of obese adults in the United States has tripled, and in the United Kingdom, it has doubled over the last twenty years. According to estimates from the International Obesity Task Force (IOTF), there are approximately 1.1 billion individuals classified as overweight and around 300 million as obese worldwide (Baniyadi, 2024; Chung et al. 2019). The situation is particularly concerning among children and adolescents, with obesity rates increasing by 0.5-1% annually over the past twenty years. Data from 2003 indicated that the prevalence of overweight among adults in Croatia was 38% for men and 34% for women, with obesity rates for both genders hovering around 20%. Similar trends are observed in other Central European and Mediterranean nations. Additionally, the proportion of overweight or obese children and adolescents in Croatia reached 26% and 20%, respectively, reflecting patterns seen in other Mediterranean countries but exceeding those in Central or Northern Europe (Benchelha et al. 2023; Hashemi, 2024; Ilkim et al. 2021; Duyan et al. 2024).

The Body Mass Index (BMI) serves as the predominant metric for assessing nutritional status. Also known as the Quetelet index, BMI is a practical tool for estimating body fat based on an individual's weight relative to their height. It is calculated by dividing a person's weight in kilograms by the square of their height in meters (kg/m^2). For adults, a BMI ranging from 18.5 to 25 (kg/m^2) is considered normal. Values below 18.5 (kg/m^2) suggest malnutrition, while those exceeding 25 (kg/m^2) up to 30 (kg/m^2) indicate overweight status; a BMI above 30 (kg/m^2) is classified as obesity (Khosravi et al. 2023; Saygın & Ceylan, 2017). Although originally designed for the global population, it has been observed that individuals in the Asian demographic tend to have a higher fat mass at equivalent BMI levels. Consequently, the World Health Organization (WHO) adjusted the BMI thresholds for this population, establishing 23 (kg/m^2) as the cutoff for overweight and 25 (kg/m^2) for obesity. It is important to note that the criteria for malnutrition, overweight, and obesity in children and adolescents differ from those applicable to adults, being specific to age and gender. While BMI is moderately correlated with body fat percentage, it does not provide a comprehensive assessment of body composition, as it primarily reflects nutritional status. Obesity, in contrast, is characterized by an excessive accumulation of fat that adversely affects health and can lead to a reduced life expectancy (Baniasadi et al. 2022; Ismaeel, 2024, Karaca end İlkım 2021).

Physical activity is characterized as any bodily movement that leads to a notable increase in energy expenditure, surpassing the energy consumption associated with a state of rest. It manifests in various forms and contexts, heavily influenced by cultural factors. The overall volume of physical activity is determined by its frequency, duration, and intensity (Gun & Agirbas, 2019; Levin et al. 2003). Leisure-time physical activity encompasses a broad spectrum of activities that individuals engage in during their free time, which can be either organized (such as various fitness programs) or informal (like walking, cycling, or dancing). In contrast, physical exercise is defined as a deliberate, structured, and repetitive activity aimed at enhancing the body's functional capabilities or maintaining health. For many first-year students and those in subsequent years, the course "Physical Education and Sport" often represents their sole opportunity for physical activity (Hohensee & Nies, 2014; Senbanjo & Oshikoya, 2010). The demanding nature of certain academic programs can lead to significant psycho-emotional stress and a scarcity of leisure time, resulting in limited opportunities for physical engagement. It is crucial to advocate for young individuals to participate in physical activities, ensuring that they have access to recreational spaces and organized sports within educational institutions (Najafzadeh et al. 2024; Shams, 2024). Given that students frequently spend extended periods seated at computers and desks, their engagement in physical activities has markedly declined. The World Health Organization estimates that around 60% of the global population is currently not sufficiently active. Notably, the level of physical activity tends to decline significantly during adolescence, making the transition from adolescence to adulthood a critical period for examining changes related to nutritional status and the functional capacity of the cardio-respiratory system (Lowry et al. 2007; Shafaei et al. 2024).

This research aimed to: 1) assess the BMI and Physical Activity levels of a cohort of high school students, thereby evaluating the prevalence of underweight, overweight, and obesity; 2) analyze the physical activity levels of all participants in the study; and 3) compare BMI and physical activity between male and female students.

2. METHODS

A descriptive-comparative approach was employed in this study. The sample comprised 423 high school students, of whom 201 were female. Participants' ages ranged from 12 to 18 years, with a mean age of 15.51 ± 0.96 years. Participants were selected through a convenience sampling method. The sample size was determined using G-Power analysis (Aliriad et al. 2023). Ethical approval was obtained from the Non-Interventional Research Ethics Board. Inclusion criteria required participants to be aged between 12 and 18 years, to provide consent for participation, and to be free from chronic conditions such as diabetes, hypertension, cancer, and diseases affecting the cardiovascular, liver, kidney, or thyroid systems. Additionally, participants should not be on a special diet or taking antidepressants or hormones, and they needed to demonstrate the ability to engage in physical activities. Exclusion criteria included failure to complete the questionnaire and lack of informed consent.

The evaluation of physical activity was conducted utilizing the Rapid Assessment of Physical Activity (RAPA) scale (Alricsson et al. 2008), which comprises seven items that necessitate binary responses of 'Yes' or 'No'. The cumulative score on this scale can vary from 0 to 7. In the context of this study, the internal consistency reliability of the RAPA scale, as determined by Cronbach's alpha, was calculated to be 0.92. Additionally, the validity of this instrument has been corroborated by a panel of ten experts, yielding a Content Validity Index (CVI) of 0.90 and a Content Validity Ratio (CVR) of 1.00.

In this study, the Body Composition X-Scan Plus II, produced in Gyeonggi-do, South Korea, was utilized to evaluate Body Mass Index (BMI). The height of child participants was first measured using a standard measuring instrument with a precision of 0.1 cm. Following this, each participant was placed on the device to record their weight. The apparatus utilizes eight electrodes to send electrical impulses through different tissues, enabling the calculation of BMI based on the speed of these electrical signals.

Data analysis was performed utilizing SPSS-27 software. Descriptive statistics, such as means, standard deviations and percentage were employed to characterize the variables. The Kolmogorov-Smirnov test was applied to assess the normality

of the data distribution. Additionally, an independent t-test was conducted to examine gender differences. A significance threshold of $P < 0.05$ was set.

3. RESULTS

The sample comprised 423 high school students, of whom 201 were female. Participants' ages ranged from 12 to 18 years, with a mean age of 15.51 ± 0.96 years. Notably, the average age for male participants was 15.49 ± 0.94 years, whereas female participants had a mean age of 15.53 ± 0.95 years ($P=0.986$). Additionally, the analysis revealed statistically significant differences between genders regarding height and weight (refer to Table 1).

Table 1. Demographic data of the participants

	Boys	Girls	Gender differences
Age (years)	15.49 ± 0.94	15.53 ± 0.95	$t=0.011$ $P=0.986$
Height (m)	1.70 ± 0.04	1.63 ± 0.04	$t=6.528$ $P<0.001$
Weight (kg)	65.44 ± 3.85	58.61 ± 2.82	$t=7.485$ $P<0.001$

The findings indicated that 44.9% of the surveyed students reported engaging in sports occasionally, but not consistently. Additionally, 21.7% of the respondents stated that they participate in sports at a recreational level on a regular basis, while 20.8% indicated that they do not engage in sports regularly. Lastly, 12.5% of the students claimed to train in one or more sports consistently and compete in events. Regarding the question about the average number of hours spent on sports per week over the past six months, the data revealed that the majority of students, 62.2%, reported spending between 0-5 hours. This was followed by 24.6% of students who spent 6-10 hours, 8.8% who spent 11-15 hours, 2.2% who spent 21-30 hours, and finally, 2.0% who reported spending 16-20 hours on sports activities.

The findings indicated that the average Body Mass Index (BMI) for male students was $23.33 (2.66) \text{ kg/m}^2$, while for female students, it was $20.99 (2.17) \text{ kg/m}^2$. The BMI values for male students ranged from 16.5 to 34.0 kg/m^2 , whereas female students exhibited BMI values between 16.0 and 27.8 kg/m^2 . Furthermore, the data revealed that, on average, students engaged in physical activity for approximately 5.60 (5.03) hours per week. Specifically, female students participated in physical activities for an average of 4.05 (4.32) hours, compared to male students who averaged 8.11 (5.30) hours.

Table 2 presents the findings related to normal distribution. The outcomes of the Kolmogorov-Smirnov tests indicated that all variables exhibited a normal distribution, with all P-values exceeding 0.05. The findings from the independent T-test indicate that the disparities between male and female participants in the measured variables are statistically significant ($p<0.05$). Specifically, the body mass index (BMI) of males exceeds that of females by an average of 2.35 kg/m^2 . Additionally, males engage in sports activities for an average of 4.06 hours more per week than their female counterparts (Table 3).

Table 2. Results of normal distribution

	Physical activity	BMI
Statistics	0.982	0.917
P-value	0.200	0.200

Table 3. Gender differences regarding physical activity and BMI

	Boys	Girls	Gender differences
Physical activity	8.11 ± 5.30	4.05 ± 4.32	$t=15.67$ $P<0.001$
BMI	23.33 ± 2.66	20.99 ± 2.17	$t=8.947$ $P<0.001$

4. DISCUSSION

This research aimed to: 1) assess the BMI and Physical Activity levels of a cohort of high school students, thereby evaluating the prevalence of underweight, overweight, and obesity; 2) analyze the physical activity levels of all participants in the study; and 3) compare BMI and physical activity between male and female students. The findings indicated that the average Body Mass Index (BMI) for male students was 23.33 (2.66) kg/m², while for female students, it was 20.99 (2.17) kg/m². The BMI values for male students ranged from 16.5 to 34.0 kg/m², whereas female students exhibited BMI values between 16.0 and 27.8 kg/m². Furthermore, the data revealed that, on average, students engaged in physical activity for approximately 5.60 (5.03) hours per week. Specifically, female students participated in physical activities for an average of 4.05 (4.32) hours, compared to male students who averaged 8.11 (5.30) hours. Specifically, the body mass index (BMI) of males exceeds that of females by an average of 2.35 kg/m². Additionally, males engage in sports activities for an average of 4.06 hours more per week than their female counterparts. The absence of inquiries regarding the causes of physical inactivity in the questionnaire suggests that such inactivity may primarily stem from obligations associated with academic and domestic responsibilities (Aires et al. 2010; Ghorbani et al. 2020; Seyedi Asl et al. 2020). It is reasonable to infer that the extensive array of study-related tasks, both in educational settings and at home, contributes significantly to this issue. Specifically, students often find themselves spending considerable amounts of time seated at computers or desks, engaged in various projects, which consequently reduces the time they can allocate to physical activities. It can be inferred that while students generally engage in physical activities and recreational pursuits, a considerable portion remains inactive, failing to allocate any time for sports or leisure activities (Danu et al. 2023; Omidvar et al. 2018). Contemporary lifestyles often involve prolonged periods of sitting, as many individuals are employed in office settings or work extensively on computers. The prevalence of automobiles has diminished the necessity for walking, and typical forms of relaxation now include watching television or playing video games. Social interactions frequently occur in sedentary environments such as coffee shops or restaurants (Chaharbaghi et al. 2022; Shafaei et al. 2024). These habits contribute adversely to body mass index (BMI). Obesity is clearly one of the most significant preventable risk factors, necessitating the integration of strategies aimed at reducing obesity and fostering healthy eating and behavioral patterns into the national policies of numerous countries. Emphasis should be placed on educating young individuals, as they are more likely to adopt and sustain healthy habits throughout their lives. Furthermore, investing in youth education is not only cost-effective but also advantageous from both a social medicine and economic perspective (Carayanni et al. 2021; Taghva et al. 2020). The findings of this study underscore the importance of a comprehensive approach to the prevention and management of risk factors, particularly among the youth population. Various elements, alongside physical activity, contribute to an individual's Body Mass Index (BMI), including genetic predispositions and dietary choices. The propensity for obesity can indeed be hereditary; however, the familial environment plays a significant role in shaping a person's BMI. This influence is particularly pronounced due to the greater exposure individuals have to familial behaviors and habits within the home setting, especially from family members who are present for extended periods (Abdoshahi & Ghorbani, 2022; Junger et al. 2019). Parents serve as critical role models, and their lifestyle choices are often emulated by their children, particularly regarding the promotion of healthy living practices at home. Additionally, dietary habits formed outside the home, such as those encountered in school settings, can significantly impact one's eating behaviors. For instance, the tendency to consume convenience foods without parental oversight can lead to detrimental eating patterns. The core principle underlying weight imbalance is the discrepancy between energy intake and expenditure; an imbalance in these energy dynamics can lead to the accumulation of adipose tissue within the body (Seyedi Asl et al. 2016; Shin et al. 2023). The incidence of obesity is expected to rise markedly among populations characterized by low levels of physical activity. Gender emerges as a significant determinant of engagement in physical exercise, with findings from this study indicating that male students tend to participate in vigorous physical activities more frequently than their female counterparts. Men generally expend more calories than women, even during periods of rest. This discrepancy can be attributed to the greater muscle mass typically found in males, which facilitates a higher caloric burn. Consequently, this physiological difference may contribute to a greater propensity for weight gain among women. Physical activity encompasses all movements of the body that result from the contraction of skeletal muscles and lead to energy expenditure (Alghadir et al. 2021; Liu et al. 2023). This includes a variety of activities such as household tasks, sports like badminton, basketball, table tennis, swimming, and volleyball, as well as running and various fitness routines. Certain physical activities are classified as sports, while exercise is specifically characterized as a purposeful endeavor aimed at enhancing fitness. In essence, exercise is typically organized, structured, and repetitive in nature. Engaging in physical activity is crucial for managing weight in adolescents, boosting energy expenditure, and aiding in fat reduction. The prevalence of obesity can adversely affect both the physical and mental well-being of young individuals, contributing to issues such as anxiety, depression, eating disorders, substance abuse, and even suicidal tendencies. Engaging in physical activity presents numerous benefits, particularly in relation to health (Jalali-Farahani et al. 2016). One significant advantage is the enhancement of metabolic processes, which occurs due to improved myocardial efficiency resulting from increased blood circulation and oxygen delivery. Additionally, regular physical activity is associated with a decreased likelihood of developing insulin resistance, a condition that can lead to elevated blood sugar levels and an increased risk of diabetes. Furthermore, physical activity plays a crucial role in the distribution of body fat; insufficient activity can lead to the accumulation of fat in specific regions of the body. The benefits of engaging in physical activity are closely linked to the equilibrium between energy intake and expenditure, which plays a crucial role in weight management. This balance can enhance the aesthetic appearance of the

body, leading to increased muscle flexibility and improved bone density. Such physical improvements can significantly boost an individual's self-esteem, fostering a sense of fitness, enthusiasm, and vitality. Furthermore, an individual's capacity to adjust their physical activity levels in response to internal or external stressors is essential for sustaining overall health. Therefore, it is important to avoid excessive physical exertion and to ensure that it is complemented by a well-rounded diet (Adebanjo, 2024; Baniasadi et al. 2022; Najafzadeh et al. 2024; Wright, 2011).

5. CONCLUSION

The results of our study align with those of previous research; however, we identified statistically significant differences related to gender and physical activity levels. It is essential to prioritize the education of young individuals, as they are more likely to adopt and sustain healthy habits throughout their lives. These findings underscore the importance of a comprehensive strategy for the prevention and management of risk factors, especially within the youth demographic.

REFERENCES

- [1] Abdoshahi, M., & Ghorbani, S. (2022). Effects of Playground Availability on Participation of Children in Physical Activity: The Role of Socioeconomic Status. *International Journal of School Health*, 9(3), 186-191.
- [2] Adebanjo, E. (2024). Effects of a Pilates Training Intervention on Mental Health, Adiposity and Self-Perceived Body-Image of Obese Children. *Physical Activity in Children*, 1(2), 5-11.
- [3] Aires, L., Silva, P., Silva, G., Santos, M. P., Ribeiro, J. C., & Mota, J. (2010). Intensity of physical activity, cardiorespiratory fitness, and body mass index in youth. *Journal of Physical Activity and Health*, 7(1), 54-59.
- [4] Akhmad, I., Heri, Z., Hariadi, H., Nurkadri, N., Novita, N., bin Syed Ali, S. K., ... & Setyawan, H. (2024). Physical activity levels among Malaysian University and State University of Medan Students: gender difference and the influence of BMI. *Retos: nuevas tendencias en educación física, deporte y recreación*, (60), 429-438.
- [5] Alghadir, A. H., Iqbal, Z. A., & A. Gabr, S. (2021). The relationships of watching television, computer use, physical activity, and food preferences to body mass index: gender and nativity differences among adolescents in Saudi Arabia. *International journal of environmental research and public health*, 18(18), 9915.
- [6] Aliriad, H., Fahrudi, A., Apriyanto, R., & Da'i, M. (2023). Exploring the relationship between body mass index and physical fitness: Implications from a comprehensive study in a secondary school setting. *Edu Sportivo: Indonesian Journal of Physical Education*, 4(2), 136-147.
- [7] Alricsson, M., Domalewski, D., Romild, U., & Asplund, R. (2008). Physical activity, health, body mass index, sleeping habits and body complaints in Australian senior high school students. *International journal of adolescent medicine and health*, 20(4), 501-512.
- [8] Baniasadi, T. (2024). The Relationship between Self-reported and Device-measured Physical Activity among Children with ADHD. *Physical Activity in Children*, 1(1), 1-5.
- [9] Baniasadi, T., Ranjbari, S., Abedini, A., Dana, A., & Ghorbani, S. (2022). Investigation the Association of Internet Addiction with Mental Health and Physical Activity in Teenage Girls: The Mediating Role of Parental Attitude. *Women's Health Bulletin*, 9(4), 243-250.
- [10] Baniasadi, T., Ranjbari, S., Khajehaflaton, S., Neshati, A., & Dana, A. (2022). Effects of physical activity on adiposity in children: mediating role of self-esteem and body-image. *International Journal of Pediatrics*, 10(12), 17172-17181.
- [11] Baniasadi, T., Ranjbari, S., Mofrad, S. K., & Dana, A. (2022). Associations between device-measured physical activity and balance performance in children: Mediating role of motor self-efficacy. *Biomedical Human Kinetics*, 14(1), 252-258.
- [12] Benchelha, H., Chakit, M., Mouilly, M., Nadir, K., Barkaoui, M., Moustaine, A., ... & Bikjdouene, L. (2023). Gender and Body Mass Index Difference in Aerobic Capacity: A Study in Moroccan High School Students. *The International Tinnitus Journal*, 27(2), 198-202.
- [13] Carayanni, V., Vlachopapadopoulou, E., Koutsouki, D., Bogdanis, G. C., Psaltopoulou, T., Manios, Y., ... & Michalacos, S. (2021). Effects of nutrition, and physical activity habits and perceptions on Body Mass Index (BMI) in children aged 12–15 years: A cross-sectional study comparing boys and girls. *Children*, 8(4), 277.
- [14] Chaharbaghi, Z., Baniasadi, T., & Ghorbani, S. (2022). Effects of Teacher's Teaching Style in Physical Education on Moderate-to-Vigorous Physical Activity of High-School Students: an Accelerometer-based Study. *International Journal of School Health*, 9(3), 143-150.
- [15] Chung, W. S., Shin, K. O., & Bae, J. Y. (2019). Gender differences in body image misperception according to body mass index, physical activity, and health concern among Korean university students. *Men's Health*, 15, e1-e9.

- [16] Danu, I. G. P. H., Sugiritama, I. W., Andayani, N. L. N., & Sundari, L. P. R. (2023). Relationship between level of physical activity and body mass index among senior high school students. *Physical Therapy Journal of Indonesia*, 4(2), 164-168.
- [17] Duyan, M., Çelik, T., Karataş, Ö., Ilkim, M., Karataş, E. Ö., Yavuz, C., ... & Rüzgar, K. (2024). Mental Training and Anxiety: Examining the Moderating Role of Gender in Athletes. *Revista de Psicología del Deporte (Journal of Sport Psychology)*, 33(1), 351-363.
- [18] Ghorbani, S., Rezaeeshirazi, R., Shakki, M., Noohpisheh, S., & Farzanegi, P. (2020). The role of BMI, physical activity and the use of electronic device in the status of trunk abnormalities in male adolescents. *Journal of Gorgan University of Medical Sciences*, 22(3), 129-136.
- [19] Gun, A., & Agirbas, O. (2019). The Relationship between Exercise Addiction, Physical Activity Level and Body Mass Index of the Students Who Are Studying at Physical Education and Sports College. *Asian Journal of Education and Training*, 5(1), 50-55.
- [20] Hashemi, S. (2024). The Effects of Twelve-Weeks of Aerobic Exercise on Body Composition, Physical Fitness and Happiness among Obese Adolescents. *Physical Activity in Children*, 1(1), 81-88.
- [21] Hohensee, C. W., & Nies, M. A. (2014). Physical activity in American schools and body mass index percentile. *Journal of Child Health Care*, 18(2), 192-201.
- [22] Ismaeel, S. A. (2024). Comparing the Anthropometric Characteristics and Physical Fitness of the School-Students with High and Low Levels of Physical Activity. *Physical Activity in Children*, 1(1), 52-57.
- [23] Ilkim, M., Özoğlu, F., & Kalayci, M. C. (2021). Evaluation of sports awareness of parents of individuals with autism attending to sports clubs. *About This Special Issue*, 76.
- [24] Jalali-Farahani, S., Amiri, P., & Chin, Y. S. (2016). Are physical activity, sedentary behaviors and sleep duration associated with body mass index-for-age and health-related quality of life among high school boys and girls?. *Health and quality of life outcomes*, 14, 1-9.
- [25] Junger, J., Salonna, F., Bergier, J., Junger, A., Frömel, K., Ács, P., & Bergier, B. (2019). Physical activity and Body-Mass-Index relation in secondary-school students of the Visegrad region. *Journal of Physical Education and Sport*, 19, 235-241.
- [26] Karaca, Y., & Ilkim, M. (2021). Investigation of the attitudes distance education of the faculty of sport science students in the Covid-19 period. *Turkish Online Journal of Distance Education*, 22(4), 114-129.
- [27] Khosravi, M., Asl, S. T. S., Anamag, A. N., Langaroudi, M. S., Moharami, J., Ahmadi, S., ... & Kasaeiyan, R. (2023). Parenting styles, maladaptive coping styles, and disturbed eating attitudes and behaviors: a multiple mediation analysis in patients with feeding and eating disorders. *PeerJ*, 11, e14880.
- [28] Levin, S., Lowry, R., Brown, D. R., & Dietz, W. H. (2003). Physical activity and body mass index among US adolescents: youth risk behavior survey, 1999. *Archives of pediatrics & adolescent medicine*, 157(8), 816-820.
- [29] Liu, G., Hao, R., Li, X., Gao, Y., Li, W., & Zhang, M. (2023). Body Mass Index and Physical Fitness among Chinese Adolescents Aged 15–18: A Cross-Sectional Study of Gender Differences. *Children*, 10(7), 1204.
- [30] Lowry, R., Lee, S. M., Galuska, D. A., Fulton, J. E., Barrios, L. C., & Kann, L. (2007). Physical activity-related injury and body mass index among US high school students. *Journal of physical activity and health*, 4(3), 325-342.
- [31] Najafzadeh, F., Ranjbari, S., Shafaei, H., & Ghorbani, S. (2024). Correlation between Participation in Physical Activity and Psychological Well-being among Elderly Women: The Mediating Role of Resilience. *Women's Health Bulletin*, 11(3), 188-194.
- [32] Najafzadeh, F., Shafaei, H., Alizadeh, S., & Dana, A. (2024). Correlations between Physical Activity Participation and Anthropometric Features with Gross and Fine Motor Skills in School Children with Attention Deficit Hyperactivity Disorder. *International Journal of School Health*, 11(3), 209-215.
- [33] Omidvar, A., Dana, A., Hamzeh Sabzi, A., & Pourpanahi Koltapeh, M. (2018). The effect of education based on developmental physical education on working memory of elementary school students. *Journal of School Psychology*, 7(1), 83-101.
- [34] Saygın, Ö., & Ceylan, H. İ. (2017). A Comparison of body mass index and daily step numbers of secondary school and high school students according to age and gender. *International Journal of Sport Exercise and Training Sciences-IJSETS*, 3(4), 142-152.
- [35] Senbanjo, I. O., & Oshikoya, K. A. (2010). Physical activity and body mass index of school children and adolescents in Abeokuta, Southwest Nigeria. *World Journal of Pediatrics*, 6, 217-222.
- [36] Seyedi Asl, S. T., Rahnejat, A. M., Elikaee, M. M., Khademi, M., Shahed-HaghGhadam, H., & Taghva, A.

- (2020). The role of resilience, positive/negative emotions, and character strengths in predicting burnout of military personnel. *EBNESINA*, 22(4), 4-13.
- [37] Seyedi Asl, S. T., Sadeghi, K., Bakhtiari, M., Ahmadi, S. M., Anamagh, A. N., & Khayatan, T. (2016). Effect of group positive psychotherapy on improvement of life satisfaction and the quality of life in infertile woman. *International journal of fertility & sterility*, 10(1), 105.
- [38] Shafaei, H., Najafzadeh, F., Shakki, M., & Ghorbani, S. (2024). Associations between Physical Activity and Quality of Life, Happiness, and Depression among Elderly Women. *Women's Health Bulletin*, 11(2), 104-111.
- [39] Shafaei, H., Rezaei, N., Mohammadi, S., & Ghorbani, S. (2024). Correlations between Physical Activity and Social Health, Moral Development and Physical Fitness among Middle School Students. *International Journal of School Health*, 11(2), 97-104.
- [40] Shams, A. (2024). The Effect of a Group-Based Play Therapy on Executive Function, Working Memory and Self-Efficacy in Children with ADHD. *Physical Activity in Children*, 1(1), 45-51.
- [41] Shin, J. Y., Lee, J., Lee, J. M., & Ho, N. Y. (2023). Factors affecting decreased physical activity during the COVID-19 pandemic: an age-, gender-, and body mass index-matched study. *Frontiers in Public Health*, 11, 1170049.
- [42] Taghva, A., Seyedi Asl, S. T., Rahnejat, A. M., & Elikae, M. M. (2020). Resilience, emotions, and character strengths as predictors of job stress in military personnel. *Iranian journal of psychiatry and behavioral sciences*, 14(2).
- [43] Wright, K. N. (2011). Influence of body mass index, gender, and Hispanic ethnicity on physical activity in urban children. *Journal for Specialists in Pediatric Nursing*, 16(2), 90-104.
-