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Examining the Attitudes of Students in Secondary Education Towards Physical Education and Sports Class in Terms of Some Variables

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Abstract

The purpose of this study was to compare some variables like gender, class level, engaging in sports outside of the school, sports participation status of parents, having an indoor sports facility of students studying in Edirne province secondary schools by determining their attitudes towards Physical Education and Sports class. The sample of the study consisted of 1649 students from 7th grades (448 male, 435 female) and 8th grades (401 male and 365 female). To determine the attitudes of students towards physical education class 'Physical Education Class Attitude Scale' (PECAS) developed by Sherrin and Toulmin and adapted to Turkish by Özer and Aktop (2003) was used. Statistical analysis showed that there was a significant difference between gender, class level, engaging in sportive activities outside of the schools variables in terms of physical education attitude scale total score and there was no statistically significant difference between the scale scores of sports participation status of parents, and having an indoor sports facility variable. Attitude scale scores of male students were found to be higher than female students ($p=0,05$). Attitude scale scores of 7th grade students were found to be higher than 8th grade-students ($p<0,05$). Attitude scale scores of students engaging in sportive activities outside of the school were found to be higher than those who did not participate in extracurricular activities ($p=0,00$). In addition, Pearson correlation analysis demonstrated that there was no relationship between BMI and attitude scale scores ($p>0,05$). As a result, the results obtained from the current study indicate that the attitudes of secondary school students towards physical education class were affected by gender, class level and age. It can be concluded that these factors were recommended to be taken into consideration in planning physical education lessons by relevant institutions to increase the attitudes of students towards physical education class.

Keywords: Physical education and sports, attitude, secondary school students.

Özet

Edirne İli Merkez Ortaokullarında Öğrenim Gören Öğrencilerin Beden Eğitimi ve Spor Dersine İlişkin Tutumlarının Bazı Değişkenler Açısından İncelenmesi

Bu çalışmanın amacı, Edirne ili merkez ilçe ortaokullarında öğrenim gören öğrencilerin beden eğitimi ve spor dersine ilişkin tutumlarının belirlenerek cinsiyet, sınıf düzeyi, öğrencilerin okul dışında spor yapip yapmaması, öğrenci anne veya babasının düzenli olarak spor yapip yapmaması, okullarında kapalı spor salonu olup olmamasına göre anlamlı bir fark olup olmadığı gibi bazı değişkenler açısından karşılaştırılmasıdır. Araştırmanın örneklemini 7. Sınıfta (448 erkek, 435 kadın) ve 8. Sınıfta (401 erkek, 365 kadın) öğrenim gören toplam 1649 öğrenci oluşturmaktadır. Öğrencilerin beden eğitimi dersine tutumlarının belirlenebilmesi için Sherrin ve Toulmin'in geliştirdiği; Özer ve Aktop (2003) tarafından Türkçeye uyarlanan 'Beden Eğitimi Dersi Tutum Ölçeği' (BESTÖ) kullanılmıştır. İstatistiksel analizler cinsiyet, sınıf düzeyi, okul dışında spor yapip yapmama değişkenleri arasında beden eğitimi tutum ölçeği toplam puanı açısından anlamlı farklılık bulunduğunu, anne ya da babanın spor yapip yapmaması, öğrencilerin okullarında kapalı spor salonu bulunup bulunmaması açısından ise ölçek taban puanları arasında istatistiksel düzeyde anlamlı farklılık bulunmadığını göstermektedir. Erkek öğrencilerin tutum ölçek puanı, kadın öğrencilerin tutum ölçek puanlarından daha yüksektir ($p=0,05$). 7. Sınıf öğrencilerinin tutum ölçek puanları, 8. Sınıf öğrencilerinin tutum ölçek puanlarından daha yüksektir ($p<0,05$). Okul dışında bir spor faaliyetine katılan öğrencilerin tutum ölçek puanları, okul dışında bir spor faaliyetine katılmayan öğrencilerin puanlarından daha yüksektir ($p=0,00$). Ayrıca, Pearson korelasyon analizi VKİ ile tutum ölçek puanı arasında bir ilişki olmadığını göstermiştir ($p>0,05$). Sonuç olarak mevcut çalışmadan elde edilen bulgular ortaokul öğrencilerinin beden eğitimi dersine karşı tutumlarının cinsiyet, sınıf düzeyi ve yaştan etkilendiğini göstermektedir. Öğrencilerin beden eğitimi dersine tutumlarının artırılabilmesi için ilgili kuruluşlar tarafından bu faktörlerin beden eğitimi derslerinin planlanması ve öğrencilerin tutumlarının artırılabilmesi için bu faktörlerin ele alınması gerektiği anlaşılmaktadır.

Anahtar Kelimeler: Beden Eğitimi ve Spor, Tutum, Ortaokul Öğrencileri.

INTRODUCTION

Attitude is a predisposition of behavioral, mental and emotional reaction of someone against an object or incident. For a more productive physical education class, It is important for students to exhibit positive attitude towards physical education class (1). The attitudes of students who are receiving education in secondary schools offer a perspective emphasizing the significance of physical activity and sports within an education system (8). The effect of physical education class on students, the contribution on physical health, the effects on personal development and general perception of the course establish a significant research discipline to investigate the factors shaping the attitudes of students in this field and how young individuals evaluate this course. For this reason, understanding the attitudes of students towards physical education and sports class, evaluating the importance that education system gives to physical activity and sports, and to encourage positive attitudes in this discipline have a critical importance. Attitudes arise from the beliefs we have in the people and objects. However, attitudes may often alter people's behavior and make us decide in terms of a participation in any activity or they may cause us to deviate from our goals (17).

People express their daily beliefs and attitudes through their languages and behaviors. Gaining insight towards the beliefs of students in physical education class forms a significant basis for understanding their attitudes, interest and participations in the class (26). From past to present, many scientific studies have been conducted examining students' attitudes towards sports activities. The mutual purpose of these research was to aid students to develop positive attitudes towards for those who had negative attitudes and alter their perceptions regarding this subject (12). Research on the perceptions of primary school students contributes to our understanding of their views on physical education class. For example, in a research conducted; it was revealed that students find physical education class entertaining and it made students feel special and happy (25). According to another study, it was determined that primary school students were able to assess physical

education lesson partially and these assessments might be helpful in terms of revising the instructional plan (19).

According to a research carried out in secondary education level; course content of physical education lesson was the most significant factor on developing a positive or negative attitude towards physical education class regardless of gender and selecting physical education class or not (18). In this study, the attitudes of students attending secondary schools in the central district of Edirne towards physical education and sports class were compared with respect to variables such as gender, grade level, extracurricular activities, availability of sports facilities in the schools, the education level of their parents, and whether their parents participate in sports regularly or not. The data obtained from this research is expected to foresee activities that can positively shift the negative attitudes of students towards physical education class.

METHOD

Research Model

In this study, descriptive survey model from general survey models was designed. When examining the general characteristics of the survey model, it was observed that these models were designed to collect data for the purpose of identifying specific attributes of a group, and they focus on determining participants' views, interests, skills, and attitudes related to particular subject or event (4).

Sample and Population of The Study

The population of the study consisted of a total of n=2756 students, including n=741 male students and n=650 female students in the seventh grade, as well as n=718 male students and n=647 female students in the eighth grade, who were enrolled in 20 primary schools in the central district of Edirne province. The sample of the study consisted of a total of n=1789 students, including n=483 male students and n=480 female students in the seventh grade, as well as n=424 male students and n=402 female students in the eighth grade. The proportional sample size formula (21) was used to determine the sample size, and according to this formula, reaching 364 students was sufficient to conduct the study with a 95% confidence interval (5% margin of error) (21).

Data Collection Tools

In the study, a data collection instrument consisting of two parts was used to measure students' attitudes toward physical education classes. The instrument was developed by the researcher and included a personal information form containing details such as the student's gender, class, age, height, weight, the presence of a sports hall in the school, engagement in extracurricular sports activities, and whether their parents engaged in regular sports. Additionally, the instrument included the "Physical Education Class Attitude Scale" (PECAS), adapted into Turkish by Özer and Aktop (2003), originally developed by Sherrin and Toulmin (23).

Data Collection

Attitude scales were distributed by the researcher to students in company with physical education teachers in a physical education class, informing students about the scale. Students were asked to fill the forms within an hour of lesson duration and attitude scales filled by the students were collected back by the researcher.

Statistical Analysis

Within the scope of the research, 1,789 people were contacted and asked to complete the scale. However, 140 scales were excluded from the study due to incompleteness or incorrect completion. Therefore, 1,649 scales were used for statistical analysis. The data of a total of 1649 students attending seventh grade, consisting of 435 girls and 448 boys, and eighth grade, consisting of 365 girls and 401 boys, in the central middle schools of Edirne province, were taken into consideration for evaluation. Statistical analysis of all the data were carried out by using SPSS 18 program. Minimum, maximum, mean and standard deviation parameters were used in determining descriptive statistics of the data. In addition, frequency and percentiles were controlled. The normality values of the data were determined by checking the Kurtosis and Skewness values. The values for

the assumption of normality were stated to be within the range of -1 to +1 (20). In this case, the data was determined to meet the normality assumption. Independent Sample T test was used in comparing this result with independent two groups. Cohen’s d formula was utilized in determining the effect size of statistical difference between groups. Pearson Product-Moment correlation coefficient analysis was used for the relationships between measuremental variances. $P < 0,05$ value was accepted as statistically significant.

FINDINGS

Age, height, weight, Body Mass Index of the participants and comparison of attitude scale scores in terms of gender were given in Table 1. In Table 2, Age, height, weight, Body Mass Index of the participants and comparison of attitude scale scores in terms of grade, and in Table 3, Age, height, weight, Body Mass Index of the participants and comparison of attitude scale scores in terms of sports participation were given. The data obtained from the comparison of scale scores between participants whose mothers engage in sports and who do not is given in Table 4. Table 5 presents the comparison of scale scores between participants whose fathers engage in sports and those who do not. The comparison of scale scores between participants with and without an indoor sports facility in their school (without gender distinction).

Table 1. Comparison of Participants’ Age, Height, Body Weight, BMI, and Attitude Scale Scores by Gender

Variables	Female Students		Male Students		t	p	d
	n = 800		n = 849				
	Mean	Sd	Mean	Sd			
Age (year)	13,12	0,66	13,15	0,67	-0,897	0,37	-
Height (cm)	160,48	6,58	163,94	9,77	-8,472	0,00*	-0,41
Body Weight (kg)	52,01	11,34	57,08	13,76	-8,197	0,00*	-0,40
BMI (kg/m ²)	20,10	3,71	21,03	4,01	-4,899	0,00*	-0,24
Scale Score	183,38	28,46	193,05	26,41	-7,156	0,00*	-0,35

p < 0,05*; d = Cohen’sd; t = Independent Sample t test Score

According to the results of independent samples t-test; the comparison of age groups in terms of gender did not reveal a significant difference among the participants ($p > 0.05$). However, in the comparison of height, weight, BMI, and scale scores based on gender, statistically significant differences were identified between male and female students (respectively, $t_{(1647)} = -8.472, -8.197, -4.899, -7.156$; $p < 0.05$). Male participants are found to be statistically heavier and taller than female students. Additionally, male students have higher BMI values and attitude scale scores compared to female students. The effect sizes of these differences are detailed in Table 1 as follows: -0.41, -0.40, -0.24, -0.35, respectively.

Table 2. Comparison of Participants’ Age, Height, Body Weight, BMI, and Attitude Scale Scores by Class Level

Variables	7th Grade		8th Grade		t	p	d
	n = 883		n = 766				
	Mean	Sd	Mean	Sd			
Age (year)	12,74	0,51	13,58	0,53	-32,142	0,00*	-1,61
Height (cm)	160,14	7,79	164,71	8,73	-11,208	0,00*	-0,55
Body weight (kg)	52,67	12,51	56,87	12,97	-6,671	0,00*	-0,32
BMI (kg/m ²)	20,39	3,94	20,80	3,84	-2,100	0,03*	-0,10
Scale Score	189,91	27,41	186,68	28,19	2,286	0,02*	0,11

p < 0,05*; d = Cohen’s; t = Independent Sample t test Score

According to the results of independent samples t-test; there is a statistically significant difference in favor of 8th grades in terms of age, height, weight (respectively, $t_{(1647)} = -32.142, -11.208, -6.671$; $p < 0.05$), and BMI values ($t_{(1647)} = -2.100$; $p < 0.05$), while the attitude scale scores of 7th grades are higher than those of 8th grades ($t_{(1647)} = 2.826$; $p < 0.05$) (Table 2).

Table 3. The Comparison of Participants in Terms of Sports Participation Regarding Age, Height, Weight, BMI, and Attitude Scale Scores

Variables	Sports Participants		Non Sports-Participants		t	p	d
	n = 473		n = 1176				
	Mean	Sd	Mean	Sd			
Age (year)	13,09	0,66	13,15	0,66	-1,595	0,11	-
Height (cm)	162,86	8,05	162,02	8,73	1,792	0,07	-
Weight (kg)	54,34	13,13	54,73	12,80	-0,556	0,57	-
BMI (kg/m ²)	20,33	3,88	20,68	3,90	-1,672	0,09	-
Scale score	193,86	26,35	186,14	28,13	5,130	0,00*	0,28

p < 0,05*; d = Cohen'sd; t = Independent Sample t test Score

According to the results of independent samples t-test; in Table 3, data obtained from the comparison of participants in terms of sports participation regarding age, height, weight, BMI, and attitude scale scores reveal that only the attitude scale scores of students who participate in sports are statistically significantly higher than those who do not participate in sports ($t_{(1647)} = 5.130$; $p < 0.05$). Among other variables, there is no statistically significant difference ($p > 0.05$).

Table 4. The Comparison of Scale Scores Between Participants Whose Mothers Engage in Sports and Those Whose Mothers do not Engage in Sports

Variable	Those Whose Mothers Engage in Sports		Those Whose Mothers Don't Engage in Sports		t	p	d
	n = 139		n = 1510				
	Mean	Sd	Mean	Sd			
Age (year)	13,14	0,63	13,13	0,67	0,137	0,89	-
Height (cm)	163,77	8,91	162,12	8,50	2,177	0,03*	0,18
Weight (kg)	55,69	13,23	54,52	12,86	1,025	0,30	-
BMI (kg/m ²)	20,56	3,73	20,58	3,91	-0,044	0,96	-
Scale Score	189,84	28,31	188,22	27,80	0,658	0,51	-

p < 0,05*; d = Cohen'sd; t = Independent Sample t test Score

According to the results of independent samples t-test; the data presented in Table 4 indicate that there is no statistically significant difference in attitude scale scores between students whose mothers engage in sports and those whose mothers do not engage in sports ($p > 0.05$). However, the height of students whose mothers engage in sports is statistically higher than those whose mothers do not engage in sports ($t_{(1647)} = 2.177$; $p < 0.05$).

Table 5. The Comparison of Scale Scores Between Participants Whose Fathers Engage in Sports and Those Whose Fathers do not Engage in Sports

Variable	Those Whose Fathers Engage in Sports		Those Whose Fathers Don't Engage in Sports		t	p	d
	n = 138		n = 1511				
	Mean	Ss	Mean	Sd			
Age (year)	13,13	0,61	13,13	0,67	0,023	0,98	-
Height (cm)	163,59	8,27	162,14	8,56	1,905	0,06	-
Weight (kg)	55,39	12,92	54,55	12,89	0,736	0,46	-
BMI (kg/m ²)	20,52	3,84	20,58	3,90	-0,171	0,86	-
Scale Score	188,97	29,17	188,30	27,73	0,271	0,78	-

p<0,05*; d = Cohen'sd; t = Independent Sample t test Score

According to the results of independent samples t-test; the data presented in Table 5 indicate that there is no statistically significant difference between students whose fathers engage in sports and those whose fathers do not engage in sports regarding the dependent variable (attitude scale score) and independent variables (age, height, weight, BMI) ($p>0.05$).

Table 6. The Comparison of Scale Scores Between Participants in Schools with and without Indoor Sports Facilities

Variables	Indoor Sports Facility		No Indoor Sports Facility		t	p	d
	n = 180		n = 1469				
	Mean	Sd	Mean	Sd			
Age (age)	13,11	0,54	13,13	0,68	-0,638	0,52	-
Height (cm)	162,02	7,84	162,29	8,63	-0,399	0,69	-
Weight(kg)	53,91	12,06	54,71	12,99	-0,781	0,43	-
BMI (kg/m ²)	20,41	3,68	20,60	3,92	-0,615	0,53	-
Scale Score	187,82	29,75	188,42	27,61	-0,275	0,78	-

p<0,05*; d = Cohen'sd; t = Independent Sample t test Score

According to the results of independent samples t-test; the data presented in Table 6 indicate that there is no statistically significant difference between students in schools with and without indoor sports facilities regarding the dependent variable (attitude scale score) and independent variables (age, height, weight, BMI) ($p>0.05$).

DISCUSSION AND CONCLUSION

The aim of this study was to investigate whether there was a significant difference in the attitudes towards physical education and sports classes among 7th and 8th-grade students attending secondary schools in the central district of Edirne. The study examined this difference in relation to various variables such as grade level, gender, engagement in sports outside of school, whether the students' parents engage in regular sports, and the presence of an indoor sports facility in the school they attend.

The discussion section of the study has been formulated based on the results obtained from the responses of a total of 1649 7th and 8th-grade students enrolled in 20 secondary schools located in the central district of Edirne regarding their attitudes towards physical education classes. According to the data in Table 1 when looked at the middle school 7th and 8th-grade students in the central district of Edirne based on their genders, it was observed that the attitude scores taken from the scale for male students were higher than the scale scores for female students. This indicates that male participants have more positive attitudes towards physical education class. In the context of the discussion, some of the studies reviewed in the literature share

similar results with the current study, indicating that students' attitudes towards physical education and sports classes vary based on gender.

In the study conducted by Canlı (2013), it was determined that the attitude scores of male students were higher than the attitude scores of female students (5). The study also noted a statistically significant difference in favor of males in terms of attitude scale scores between the two groups. In the study conducted by Korkmaz and Haloğlu (2011), they concluded that the attitude scores obtained by male students from the scale were statistically significantly higher than the scores obtained by female students (15). Within the scope of the research, some of the studies reviewed in the literature, in contrast to our study's results, have concluded that, in terms of gender, female students exhibit more positive attitudes towards physical education class compared to male students.

In the study conducted by Zekioğlu, Gürsoy, Gürsoy, and Çamlıyer (2020), they reached the conclusion that female students showed a more positive attitude towards physical education class compared to male students (31). The differences in results between their study and the current study may be attributed to variations in the scales used and the socio-economic conditions of the region under investigation. Within the scope of the discussion, some studies reviewed in the literature share different results from the current study, concluding that there was no difference in attitudes towards physical education class based on gender.

In the research conducted by Kural, Dilek, and Kural (2022), they concluded that there was no significant difference in attitudes towards physical education class between female and male students (16). The results obtained in the study conducted by Kural, Dilek, and Kural seemed to differ from the findings of the present study. These differences are thought to be attributed to factors such as the population of the region, social opportunities, and the specific scale used by the researchers. In the research conducted by Gürbüz and Özkan (2012), they concluded that a significant difference based on gender could not be detected when comparing the scores obtained from the attitude scale for participants (10).

Similarly, the difference in the results between the study conducted by Gürbüz and Özkan and the results of the current study is thought to be due to the use of a different scale in their study compared to the one used in this study and may also arise from the socio-cultural structure of the research sample (10). According to the findings obtained from Table 2, when looked at based on the class levels of 7th and 8th-grade students in the second stage of primary education in the central district of Edirne province, it is observed that the attitude scores obtained from the scale were higher for 7th-grade students compared to 8th-grade students. This result indicates that the attitudes of 7th-grade students towards physical education and sports class were more positive than those of 8th-grade students.

Within the scope of the discussion, some of the studies reviewed in the literature share similar results with the findings of the current study, indicating that the attitudes of 7th-grade students towards physical education and sports class were higher than those of 8th-grade students. In contrast to the results of the current study, Yıldız and Özbek (2018) reported that as the class level decreased, the attitude levels towards physical education class increased, and as the class level increased, the attitude levels towards physical education class decreased (29). Şarvan Cengiz, Öztaşyonar, and Kaplan (2016) reached a conclusion similar to the results of the current study (9). They found that as the educational levels of participants increased, the attitude scores towards physical education class decreased.

Within the scope of the discussion, some studies reviewed in the literature share different results from the findings of the current study, indicating that there was no difference in attitudes towards physical education class based on educational levels. Türksoy and Kurtuluş (2022) stated that there was no significant difference in attitude scores among students at different class levels (27). Hasdemir and Azar (2021) concluded that they could not reach a significant difference in students' attitude scores based on class levels (11). As the age of middle school students increases, the reasons for a decrease in their attitudes towards physical education may include their preparation for the High School Entrance Exam. They might have shown more interest in academic subjects to succeed in the exam and gain admission to a good high school.

According to the data obtained from the comparison of attitude scale scores of participants in 7th and 8th grades in secondary school in the central district of Edirne, as presented in Table 3, it has been determined that the attitude scale scores of students participating in sports outside of school are statistically significantly

higher than those of students who do not participate in sports outside of school. This result indicates that students participating in sports outside of school have higher attitudes towards physical education class compared to those who do not participate in sports outside of school. Within the scope of the discussion, some studies reviewed in the literature share similar results with the findings of the current study, indicating that students participating in sports outside of school tend to have relatively higher attitudes towards physical education class compared to students who do not participate in sports outside of school.

The results of Yücekaya's (2020) research indicated that the happiness levels of students engaged in licensed sports in any branch significantly differed from those who did not engage in licensed sports in any branch (30). According to the results of Keskin's (2015) research the attitude scores of students with a regular sports habit were found to be significantly higher when compared to students without a regular sports habit (13). Uslu and Özlü (2022) stated in their research on secondary school students that the attitude scores of participants engaging in regular physical activity were higher than the attitude scores of participants not engaging in regular sports, and a significant difference was obtained between the two groups (28). In Zengin's research (2013), it was found that students who engage in sports regularly had higher attitude scores compared to students who do not engage in regular sports (32).

When Table 4. and 5. are examined, according to the results obtained from the research, it has been concluded that the attitude scale scores of participants in 7th and 8th grades in the central district of Edirne, based on whether their mothers or fathers engage in regular sports or not, are close to each other, and no statistically significant relationship could be found. Within the scope of the discussion, some studies reviewed in the literature share different results from the findings of the current study, indicating that students who have a family member engaged in a sport have more positive attitudes towards physical education class compared to students whose family members are not engaged in a sport. According to the results of Çolak's (2019) research, it was understood that the attitude scores of students whose mothers or fathers participate in physical activity were higher compared to those whose mothers or fathers did not participate in physical activity (6). Sivrikaya and Kılıçık (2017) concluded that students with family members engaged in sports had higher attitude scores compared to those without family members engaged in sport (24).

The result of this study differs from the result of the current research. Erden and Özmütlu (2017) found a significant difference between individuals with family members engaged in sports and those without family members engaged in sports (7). This result differs from the findings of the current study. According to the research results of Öncü and Güven (2011), they concluded that the attitudes of children whose parents engage in sports towards participating in physical education class were more positive compared to those whose parents did not engage in sports (22).

Within the scope of the discussion, some studies reviewed in the literature share similar results with the findings of the current study, indicating that there was no significant difference in the attitudes of students towards physical education and sports class based on whether their mothers or fathers regularly participated in exercise. According to the results of Kılıç's (2015) study, it was stated that there was no significant difference in students' attitudes towards the class based on the variable of whether there was an individual in their family who had actively exercised or continued to exercise. The result of this study is similar to the result of the current study.

According to the results of Keskin's (2015) research, there was no significant difference in students' attitudes towards physical education class based on their mothers' participation in exercise (14). However, it was mentioned that the attitudes of students whose fathers engage in sports were significantly higher compared to students whose fathers did not engage in sports. When Table 6. is examined, according to the findings obtained from the research in the central district of Edirne, in secondary schools with or without an indoor sports hall, the results indicate that the attitude scale scores towards physical education class were similar, and no statistically significant relationship could be found. Within the scope of the discussion, some results obtained from studies in the literature share different results from the findings of the current study, indicating that students with indoor sports halls in their schools have more positive attitudes towards physical education and sports class compared to students without indoor sports halls in their schools. According to the results of Kılıç's (2015) study, participants with a sports hall in their schools have higher attitude scores compared to participants without a sports hall in their schools (14). Aras and Asma (2020) concluded that

participants with a sports hall in their schools exhibit a more positive attitude towards physical education and sports class compared to participants without a sports hall in their schools (2). Atik (2020) found that students who reported that their school does not have a sports hall have a higher level of attitude towards physical education and sports class compared to students who reported that their school has a sports hall (3).

In our literature review, we did not come across a study that specifically investigated the presence or absence of indoor sports facilities in secondary schools in Edirne city center. Therefore, we have compared our study results with research conducted on secondary school students in different cities and within Edirne city center. The reasons for the different outcomes reported in the literature compared to our study are multifaceted. Firstly, in Edirne city center, out of the 20 secondary schools included in our study, only one had an indoor sports facility, while the remaining schools did not. This scarcity of indoor sports facilities may have influenced the preferences of the students in this age group, as they tend to enjoy various recreational activities, not limited to indoor sports. Consequently, we believe that the results of our study differ from others due to the abundance of activities available in different areas, not just limited to sports facilities. Moreover, variations in the measurement tools used for attitude assessment, differences in the socio-economic structures of the study locations, and disparities in the income and education levels of the participating students' families may account for the divergent outcomes observed between our study and those in the literature.

The comparative analysis of the attitudes of students attending middle schools in Edirne city center towards physical education and sports classes, considering variables such as student gender, grade level, participation in sports activities outside of school, whether the student's parent engages in regular sports activities, and the presence of an indoor sports facility at their schools, is presented in the results obtained from our study."

According to the data obtained from our research, it has been determined that male students exhibit higher attitudes towards physical education and sports classes compared to female students. Additionally, a significant difference based on gender in attitudes towards physical education classes among the middle school students who participated in the study was identified.

Our research findings indicate that as students' educational levels increase, there is a decrease in their attitudes towards physical education classes. Furthermore, a notable difference in attitudes towards the class was observed when comparing middle school students across different grade levels. According to our research results, it has been determined that students engaged in any branch of sports outside of school exhibit more positive attitudes towards the class compared to students who do not participate in any sports outside of school.

The comparison based on whether their mothers or fathers engage in regular sports did not yield significantly different results, as the obtained outcomes were found to be similar, and no statistically significant relationship was identified. According to the comparison based on whether there is a closed sports hall in their schools, the obtained results were found to be similar, and no statistically significant relationship was identified.

Based on the results of this research, the following recommendations can be made:

-Taking into consideration the age and sensory characteristics of middle school students, fun activities can be organized in mixed groups by physical education and sports teachers to include both genders.

-As the age of entry into adolescence is determined, students' interests may change as they get older during this period. Therefore, physical education and sports teachers can plan sports activities and educational games to keep the interests of students whose interests change as class levels increase.

-Due to the susceptibility of this age group to guidance, it is important to direct them to sports centers during their free time outside of school to keep them away from harmful habits.

-Collaborative efforts between the Ministry of Youth and Sports (GSB) and the Ministry of National Education (MEB) can be planned to ensure that they engage in sports and maintain a healthy lifestyle.

-Educating parents on the indispensability of sports for a healthy lifestyle through workshops, seminars, and similar activities is crucial.

-Encouraging active participation in sports and serving as role models for their children in terms of engaging in physical activities should be emphasized. By observing their families adopting a habit of exercising, students can develop a positive attitude towards physical education and sports classes.

-Physical education lesson plans should be designed to include indoor sports, especially in schools with appropriate facilities. By organizing competitions, tournaments, and other activities related to indoor sports in schools with suitable facilities, a positive attitude towards physical education can be fostered.

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Effect of Aquatic Exercises on Strength and Quality of Life in Sarcopenia Older Individuals

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Abstract

There are various definitions for sarcopenia. The "European Working Group on Sarcopenia in the Elderly" (EWGSOP) has defined Sarcopenia as "a frail syndrome with a progressive and generalizing loss of the person's muscle strength, which carries the risk of undesirable consequences such as physical disability, poor quality of life and death." It is an analysis of the effect of water exercises on strength and quality of life in individuals. 40 volunteer sarcopenic elderly individuals living in the Muğla region, with inclusion and exclusion criteria, were included in our study. In the following weeks, the exercise program progress was started 2 days a week, 40 minutes (10 minutes nutrition, 23 minutes conditioning, 5 minutes stretching/cooling down). The data obtained as a result of the study was analyzed using the IBM SPSS 23 package program. . Shapiro-Wilks test to determine normal distribution of variables; Paired Samples T-Test was used for comparisons before and after exercise. Analysis result; There are permanently significant differences in the values of the ratios. ($p < 0.05$). As a result, it has been proven that exercise training for older individuals has a number of positive effects, and 8-week exercises have been observed to significantly increase muscle strength and decrease fat percentage. In parallel, it has been determined that Aquatic exercise has a positive effect on Energy / Vitality / Vitality, which is the subcategory of the life category.

Keywords: Ageing, Sarcopenia, Exercise, Aquatic exercise, Quality of life

Özet

Sarkopenik Yaşlı Bireylerde Aquatik Egzersizlerin Kuvvet ve Yaşam Kalitesi Üzerine Etkisi

Sarkopeni için yapılmış çeşitli tanımlamalar mevcuttur. Bunlardan "Avrupa Yaşlılarda Sarkopeni Çalışma Grubu"(EWGSOP) Sarkopeniyi "fiziksel engellilik, düşük hayat kalitesi ve ölüm gibi istenmeyen sonuçların riskini taşıyan, iskelet kas kütlelerinin ve gücünün ilerleyici ve jeneralize kaybı ile karakterize bir sendrom" olarak tanımlamıştır. Bu çalışmanın amacı, sarkopenik yaşlı bireylerde aquatik egzersizlerin kuvvet ve yaşam kalitesi üzerine etkisinin araştırmasıdır. Çalışmamıza Muğla bölgesinde yaşayan Tazelenme Üniversitesinin aktif öğrencilerinden, katılım ve dışlanma kriterleri taşıyan 40 gönüllü sarkopenik yaşlı bireyler dahil edilmiştir.

Yaşlılarda fiziksel Aktivite Anketi (PASE), yaşam kalitesinin objektif olarak değerlendirilebilmesi için Yaşam Kalitesi Ölçeği uygulanmıştır. Egzersiz programı suya adaptasyon ve nefes egzersizleri ile başlanmıştır. Sonraki haftalarda egzersiz programının ilerleyişi haftada 2 gün, 40 dk (10 dk ısınma, 25 dk kondisyonlama, 5 dk germe /soğuma) olacak şekilde uygulanmıştır. Çalışmanın sonucunda elde edilen veriler IBM SPSS 23 paket programı kullanılarak analiz edilmiştir. Değişkenlerin normal dağılıma uygunluk durumunu belirlemek için Shapiro-Wilks testi; egzersiz öncesi ve sonrası karşılaştırmalarında ise, Paired Samples T-Testi kullanılmıştır. Analiz sonucunda; katılımcıların değerlerinde istatistiksel olarak anlamlı fark bulunmuştur. ($p < .05$). Sonuç olarak Yaşlı bireyler için egzersiz eğitiminin bir dizi olumlu etkisi olduğunu gösteren kanıtlar tespit edilmiştir 8 haftalık uygulanan egzersizlerin önemli düzeyde kas kuvvetini arttırdığı ve yağ yüzdesinde de düşüş sağladığı gözlemlenmiştir. Buna paralel olarak Aquatic egzersizin yaşam kalitesi alt kategorisi olan Enerji/Canlılık/Vitaliteye pozitif etkisi olduğu tespit edilmiştir.

Anahtar Kelimeler: Yaşlılık, Sarkopeni, Egzersiz, Aquatik Egzersiz, Yaşam kalitesi

INTRODUCTION

Ageing and Sarcopenia

Ageing is an inevitable life stage that will be experienced in line with the social determinants of societies, unless there are premature deaths due to genetic diseases, accidents or any other reason (9). It is described as a period known as the last phase of human life, following development and maturation, where the interaction between the genetic structure and the environment is seen at the highest level, physiological and psychological changes occur, losses, chronic diseases and collapse (25,10). The world is aging rapidly. As people get older the emergence of physical limitations is caused by many factors. The elderly population, defined by the World Health Organization (WHO) as the group aged 65 and above, is increasing at an approximate rate of 5% annually in both developed and developing countries (13).

Global ageing has brought to the forefront chronic health problems and the concept of geriatric syndromes related to the elderly. Geriatric syndromes encompass a set of symptoms that are not fully explained by disease definition, manifesting with atypical symptoms because of the interaction between age and the impact of the disease on multiple systems in practice (7,24).

One of the commonly observed significant geriatric syndromes in the elderly population, sarcopenia, is named by combining the Greek words "sarcos" (flesh) and "penia" (loss). It was initially defined by Irwin Rosenberg as age-related muscle mass loss. The definition used for sarcopenia was redefined in 2010 by the European Working Group on Sarcopenia in Older People (EWGSOP) as a syndrome characterised by progressive and widespread loss of skeletal muscle mass and strength, increasing the risk of negative outcomes such as physical limitations, low quality of life, and death (7).

Sarcopenia is a geriatric syndrome characterised by progressive and widespread loss of muscle strength and is acknowledged as a disease. Sarcopenia, leading to physical dependence and falls in the elderly, causing a loss of quality of life and resulting in death, is more prevalent in individuals aged 80 and above, with a range of 5-13% in the 60-70 age group and 11-50% in those aged 80 and older (15).

Generally, the human body reaches its peak muscle mass around the age of 30. It is known that a gradual decline in muscle mass occurs with aging. The muscle mass, which constitutes approximately one-third of the total body mass in youth, starts to decrease after the age of 40 and halves by the age of 75 (20,1). Although muscle loss is more significant in men, the prevalence of sarcopenia is higher in women.

Sarcopenia is a syndrome characterized by the general and progressive loss of muscle mass and strength, leading to physical inadequacy, impaired quality of life, and death. In the aging process, there is a cycle between muscle mass and functionality: initially, there is a decrease in muscle mass, i.e., sarcopenia, followed by associated skeletal muscle insufficiency, subsequent reduction in muscle strength, and then the development of restricted functionality. Ultimately, this leads to decreased mobility and strength difficulties (11). This issue is faced by 4 out of every 10 individuals aged 80 and above, and this loss of muscle mass particularly manifests as a strength reduction in the back, arms, waist, and leg muscles (20).

Sarcopenia is practically divided into primary and secondary categories. Primary sarcopenia develops directly due to aging. Secondary sarcopenia, on the other hand, arises from one or more underlying causes (13). However, making this distinction is not always very possible when observing sarcopenia in the elderly.

The European Working Group on Sarcopenia in Older People (EWGSOP) has classified sarcopenia into three stages for staging: presarcopenia, sarcopenia, and severe sarcopenia. In the pre sarcopenia stage, muscle strength and physical performance are unaffected, but there is a decrease in muscle mass. In the sarcopenia stage, there is a decrease in muscle mass along with a reduction in muscle strength or performance. Severe sarcopenia, on the other hand, involves a decrease in all three criteria—muscle mass, muscle strength, and performance (6).

Sarcopenia Assessment Methods

Various methods are employed to determine sarcopenia. For measuring muscle mass in sarcopenic patients, the Dual Energy X-ray Absorptiometry (DEXA), also known as DXA (Dual Energy Xray Absorptiometry), Bioelectrical Impedance Analysis (BIA), and anthropometric methods are the most practical and cost-effective techniques. Magnetic Resonance Imaging (MRI) and Computed Tomography (CT) methods, known as MRG and CT, respectively, are specific techniques that can measure the area and mass of muscle mass (26).

Assessing muscle strength is a key parameter for diagnosing sarcopenia and indicates the capacity of a muscle mass to generate force in a very short period. Measurement of handgrip strength is considered an ideal test for determining the decrease in muscle strength and is measured using a Jamar dynamometer. Three measurements are taken for each hand, and the highest measurement is taken into account. Cutoff values for grip strength have been established for women and men based on body mass index (BMI) (19).

Exercise and Aquatic Exercise in Sarcopenia

Exercise is considered an effective strategy in the treatment of various pathologies such as cardiovascular diseases, lung diseases, diabetes, and various types of cancer (27). The International Sarcopenia Working Group (International Working Group 2015; Volume: 54 (Supplement) 47 on Sarcopenia (IWGS)) has defined sarcopenia as the "age-related loss of skeletal muscle mass and function" with a common view. Later, this group defined sarcopenia as a "combination of whole-body or appendicular lean mass deficiency and poor physical function" (18). Despite the well-known physical and psychological benefits derived from regular physical activity, studies indicate that approximately 30% of the world's population does not engage in the recommended dose of physical activity, reaching 45% in those over 65 and up to 75% in those over 75. Most elderly individuals are much less active than desired, often reporting that they do not exercise, will not exercise, or believe they should not exercise (23,24). Studies suggest that resistance exercise training can even alleviate skeletal muscle function impairments in elderly individuals. Therefore, elderly individuals should be encouraged to participate in resistance exercise training activities. Physical activity for individuals aged 65 and above includes daily activities performed individually or collectively with family, encompassing recreational activities, leisure activities, activities for transportation (walking and cycling), occupational activities, household chores, games, sports, or planned exercise activities (40).

Although there is no defined treatment method for sarcopenia, lifestyle changes, dietary modifications, and exercise constitute the fundamental principles of treatment. Studies have also observed that elderly individuals with low levels of physical activity have less muscle mass and strength compared to those with higher activity levels, and sarcopenia tends to develop more easily in this group (36). Aerobic activity (such as swimming, running, and walking) has long been associated with improvements in cardiovascular fitness and endurance capacity. While the contribution of aerobic exercise to muscle hypertrophy is less likely, it can increase the cross-sectional area of muscle fibers (34). Scanlon et al. [14] have demonstrated that resistance exercise, along with the changes it induces in the muscle, leads to significant positive developments in the disease level of sarcopenic individuals. In a study involving elderly individuals residing in a nursing home, 12 weeks of resistance training increased overall body balance and walking speed, while also showing a tendency to decrease the frequency of severe sarcopenia [5].

In sarcopenic individuals, resistance exercise training is an effective method to maintain and increase both bone mineral density and muscle strength (37, 5). Eliminating the risk of falls and working against the resistance of water with one's own body weight can reduce muscle stress while enhancing strength. Healthy lifestyle behaviours, proper nutrition, and appropriate exercise programs are effective in preventing sarcopenia and are beneficial at every stage of sarcopenia treatment.

Quality of Life

When reviewing the literature on quality of life, it is noteworthy that studies related to quality of life and the multitude of tools developed to measure it have been particularly prevalent since the 1970s. Quality of life denotes the alignment of healthy life years with the expected years of life at birth in terms of length and similarity. The measurement of health-related quality of life is not only individually utilised to identify patients' issues, observe the course of diseases, and measure the response to treatment but is also employed for societal purposes to evaluate and enhance the quality of public health services and guide health policies in the distribution decisions of health resources (14). While ageing is known to be associated with weakening in the cardiorespiratory and musculoskeletal systems, some of these changes can also be attributed to a sedentary lifestyle (37). Health is one of the determinants of quality of life. Activities such as rising from a seated position, walking, and climbing stairs performed by elderly individuals signify health and ageing healthily. Adverse changes occurring in the musculoskeletal system with age gradually affect physical activity levels. Implementing physical activity is crucial for elderly individuals in nursing homes to lead a healthier life (37). A sedentary lifestyle is prevalent in our country at all ages, continuing as an acquired habit, especially in advanced age (34).

METHOD

Research Design: Our research was conducted using a quasi-experimental model. In adherence to the study design, a control group was not established.

Participants: Our study included 40 volunteer sarcopenic elderly individuals who were active students of Tazelenme University living in the Muğla region and who met the inclusion and exclusion criteria. The impact of Aquatic Exercises on Muscle Strength and Quality of Life was investigated in elderly individuals diagnosed with sarcopenia, with the exercises being applied twice a week on alternate days for a duration of 8 weeks. A total of 39 participants voluntarily completed the study, with one participant expressing the desire to discontinue participation for personal reasons. Considering the possibility of an unusual and unforeseen situation, the necessary health precautions and precautions have been taken for emergency response. Due to risk groups, the exercises were carried out by experts who were trained on this subject and were in the research group.

According to the definition of sarcopenia renewed by the European Sarcopenia Working Group (EWGSOP) in 2018

Criteria for participation in the study.

- 1) Decrease in muscle strength,
- 2) Decrease in muscle quantity (mass) and quality,
- 3) Decrease in physical performance

Exclusion Criteria.

- 1) Not knowing how to swim and having a health problem that prevents exercise

Protocol: The impact of Aquatic Exercises applied twice a week on alternate days for a duration of 8 weeks, on Muscle Strength and Quality of Life was investigated in elderly individuals diagnosed with sarcopenia. Written informed consent forms were obtained from all participants. Initially, Bioelectrical Impedance Analysis (BIA) was conducted to determine body fat and muscle percentages of the volunteers. Subsequently, the Physical Activity Scale for the Elderly (PASE) was administered to gather information about the activities performed by the participants in their daily lives. The Quality-of-Life Scale was employed for the

objective assessment of life quality, and a 24-hour Dietary Recall and Food Frequency Measurement were conducted to detect dietary changes related to nutritional status.

Exercise Program: The exercise program commenced with water adaptation and breathing exercises. The progression of the exercise program in the subsequent weeks involved sessions conducted twice a week, each lasting 40 minutes (including a 10-minute warm-up, 25-minute conditioning, and 5-minute stretching/cooling down). The difficulty levels of the exercises were adjusted according to the physical activity levels of the participants. The severity and intensity of exercise were adjusted according to changing water depth levels and walking distances.

Warm-up Section: Basic warm-up exercises were performed during the warm-up sessions. In some studies, brief warm-up exercises without entering the water have been implemented.

Main Exercise Section: This section constitutes the foundation of water exercise routines. Depending on the structure of the aquatic exercise program, some walking exercises were complemented with arm movements. In certain studies, the main exercise type consisted of various walking applications. Participants engaged in dual and multiple-task exercises while implementing the water walking program. Walking exercises were conducted at different water depth levels and with designated walking distances.

Table 1. Types of Walking Exercises

forward (without support)	arm walk back. (without support)	sideways arm (without arm support)	Tandem	march step walking obstacle step
forward (arm supported)	walk back. (arm supported)	obstacle step	dance steps	march step walking (arm supported)
diagonal	tiptoe walking	forward fast (arm supported)	rotational walk	heel walking

Table 2. Exercise Program

1.Group Movement Type	2.Group Movement Types	3.Group Movement Types
Dorsal And Plantar Flexion of The Ankle	Abdominal Exercise	Pedaling
Elbow Flexion and Extension	Jump	Cross Country Ski Trekking
Knee Flexion and Extension	Leg Transitions	Cross Leg Movement
Arm Abduction and Adduction (At Chest Level)	Go Up and Down the Steps	Forward Kick
Trunk Rotation	Neck Exercises	Rocking Horse Movement
Hip Abduction and Adduction	Posture Exercises	Pendulum Exercise
Shoulder Horizontal Flexion and Extension	Sculling Exercises	Kicking Movements: Forward, Diagonal, Side and Back

Categorization of the Types of Movements Implemented in the Aquatic Exercise Program into Three Groups

Ethical approval and institutional permission

The research received approval from Muğla Sıtkı Koçman University Medicine and Health Sciences Ethics Committee on 25.12.2022. Protocol no:220170/151 Written informed consent forms were obtained from all participants.

FINDINGS

Table 3. Skewness – Kurtosis Values

Variables	Test	n	Skewness	Kurtosis
Body fat percentage	Pre-test	39	-0,738	0,128
	Post-test	39	-0,702	0,299
Right hand grip strength	Pre-test	39	0,536	-0,711
	Post-test	39	0,497	-0,740
Left hand grip strength	Pre-test	38	0,609	-0,671
	Post-test	38	0,580	-0,770

P<0.05

The analysis of six independent variables indicates that the skewness-kurtosis outlier values fall within the range of +1.5 to -1.5.

Table 4. Comparison of Participants' Body Fat Percentage and Hand Grip Strength Pre-Test and Post-Test

Variables	Test	n	\bar{x}	ss	t	p
body fat percentage	Pre-test	39	36,989	8,751		
	Post-test	39	35,150	8,829	7,072	< 0,001*
Right hand grip strength	Pre-test	39	23,256	5,612		
	Post-test	39	24,535	5,687	-7,744	< 0,001*
Left hand grip strength	Pre-test	38	20,974	5,082	,	
	Post-test	38	22,210	4,924	-8,250	< 0,001*

P<0.05

Since the p-value for all three parameters is less than 0.05, aquatic exercises are positively effective in increasing muscle mass (with a negative impact on body fat percentage) and muscle strength. Muscle strength has been determined to increase positively after aquatic exercises, and a decrease in body fat percentage has also been measured.

Table 5: Comparison of Participants' Quality of Life Form - SF36 Scale Pre-Test and Post-Test

Variables	Test	n	\bar{x}	ss	t	p
Energy/Vitality	Pre-test	39	56,048	4,245		
	Post-test	39	58,787	5,094	-7,089	< 0,001*

P<0.05

In the participant group, an examination was conducted on the Energy/Vitality/Vitality values in the Quality-of-Life Scale before and after the exercise, and a statistically significant difference was found in the Energy/Vitality/Vitality values, a subcategory of the quality of life related to aquatic exercise ($p < 0.05$). This effect appears to be positive.

Table 6. Correlation Test between Participant Body Fat Percentage and Hand Grip Strength

Correlations	1	2
Body fat percentage post-test	1	
Hand grip strength (right) post-test	-0,414**	1
Hand grip strength (left) post-test	-0,288	0,828**

**p<0,01 and *p<0,05

In the correlation test between body fat percentage and muscle strength data, a negative correlation is observed between body fat percentage and muscle strength. Participants showed a decrease in body fat percentage and an increase in muscle strength after aquatic exercise. As right-hand dominance is more

common among participants, the correlation coefficient (-0.414) between right-hand grip strength and body fat percentage is significantly more negative than the other correlation coefficients.

DISCUSSION AND CONCLUSION

There were findings showing that a range of exercise training had a positive effect on older individuals. It has been observed that 8-week exercises significantly increase muscle strength and decrease fat percentages. In parallel, it has been determined that Aquatic exercise has a positive effect on Energy / Vitality / Vitality, which is the subcategory of the life category. With today's technological developments, people's daily physical activity levels are gradually decreasing (39). Villareal et al. In his study, he applied combined exercise to 139 women diagnosed with SO for 60 minutes twice a week for 12 weeks. It was observed that knee extension strength increased in women with CA after 12 weeks of combined exercise. It was also determined that after combined exercise, there was a significant increase in arm and leg muscle mass and a decrease in total body fat mass (23). Exercise training should be personalized to suit each older person's unique abilities and goals. The ideal exercise program should offer a combination of aerobic, resistance, flexibility, and balance exercises. Most studies have been conducted among older, nonsarcopenic obese adults. Resistance exercise (RE) is recommended as first-line treatment to counteract the undesirable consequences of sarcopenia in older adults. For example, as a result of a meta-analysis of 49 studies with a total of 1328 participants aged 50 and over, it was observed that skeletal muscle mass increased by approximately 1.1 kg after an average of 20.5 weeks of resistance exercise training two to three times a week (35). In another study, Hurst C. et al. (20) recommend a resistance exercise program that consists of two exercise sessions per week and includes a combination of upper and lower body exercises performed with a relatively high degree of effort for 1-3 sets of 6-12 repetitions.

Exercise training for seniors can improve physical function, reduce cardiovascular risk factors, reduce the risk of all-cause mortality, and improve overall quality of life.

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The Relationships among Stages of Exercise Behavior, Body Composition and Perceived Health Levels in University Students

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Abstract

This study aims to investigate the relationship between regular physical activity level, body composition and perceived health levels of university students. Participants of this study were consisted of 331 university students including 158 females and 173 males. The mean ages were 21.85 ± 3.04 years for females and 22.94 ± 5.09 years for males, respectively. Various questions were asked to determine the perceived health levels of university students and body composition was determined by calculating Body Mass Index (BMI). The Stages of Exercise Behavior Change Questionnaire was used to determine the physical activity level. Mann Whitney U test was used to compare two genders while Spearman rank order correlation was performed to test the relationship among variables. Results of our study showed that there are significant differences between males and females in all variables except age and stages of exercise behavior. While the stages of exercise behavior and perceived health level of those who exercise in females are significantly different from those of sedentary, height and exercise behavior level in males are more statistically significant in favor of those who exercise. While the health level in females is positively related to the age variable and negatively related to the BMI, there was no significant difference between the health and exercise level and other variables in males. As a result, it can be concluded that male and female university students do not engage in regular physical activity at a level that will affect their perceived health levels.

Keywords: Physical activity, Transtheoretic Model, Stages of Exercise behavior Change Questionnaire.

Özet

Üniversite Öğrencilerinin Egzersiz Davranışı, Vücut Kompozisyonu ve Algıladıkları Sağlık Düzeyleri Arasındaki İlişki

Bu çalışma, üniversite öğrencilerinin düzenli fiziksel aktivite düzeyi, vücut kompozisyonu ve algılanan sağlık düzeyleri arasındaki ilişkiyi araştırmayı amaçlamaktadır. Çalışmaya 158'i kadın, 173'ü erkek olmak üzere 331 üniversite öğrencisi katılmıştır. Yaş ortalamaları sırasıyla kadınlarda 21,85±3,04, erkeklerde 22,94±5,09 idi. Üniversite öğrencilerinin algıladıkları sağlık düzeylerini belirlemek için çeşitli sorular sorulmuş ayrıca Vücut Kitle İndeksi (VKİ) hesaplanarak vücut kompozisyonu belirlenmiştir. Fiziksel aktivite düzeyini belirlemek için Egzersiz Davranışı Değişim Basamakları Anketi kullanılmıştır. Değişkenler arasındaki ilişkiyi test etmek için Spearman sıralı korelasyonu uygulanırken, iki cinsiyeti karşılaştırmak için Mann Whitney U testi kullanıldı. Çalışmamızın sonuçları, erkek ve kadınların egzersiz davranış aşamaları ile algıladıkları sağlık düzeyleri arasında istatistiksel anlamlı farklılığın olmadığını göstermiştir. Yaş ve egzersiz davranış aşamaları hariç tüm değişkenlerde kadın ve erkekler arasında anlamlı farklılıklar vardır. Kadınlarda egzersiz yapanların egzersiz davranış aşamaları ve algıladıkları sağlık düzeyi sedanterlerden anlamlı düzeyde farklı iken erkeklerde boy uzunluğu ve egzersiz davranış düzeyi egzersiz yapanların lehine daha istatistiksel anlamlı düzeyde farklıdır. Kadınlarda sağlık düzeyi yaş değişkeni ile pozitif ve BKİ ile negatif ilişkili iken erkeklerde sağlık ve egzersiz düzeyi ile diğer değişkenler arasında anlamlı farklılık yoktur. Sonuç olarak, erkek ve kadın üniversitelilerin algıladıkları sağlık düzeylerini etkileyecek seviyede düzenli fiziksel aktivite yapmadığı sonucuna varılabilir.

Anahtar Kelimeler: Fiziksel aktivite, Transteoretik Model, Egzersiz Davranışı Değişim Basamakları Anketi.

INTRODUCTION

As globalization has become widespread, individuals have started to develop an increased awareness of their own bodies through activities aimed at enhancing their physical well-being (2). Currently, a weekly regime of 75 to 150 minutes of moderate to high-intensity exercise is deemed essential for maintaining and enhancing overall health, subject to age and individual characteristics (27). By engaging in regular exercise, one can potentially reduce the risks of numerous health problems, including depression and premature death, while maintaining a long, independent, and robust existence (1). Many countries are supporting several projects aimed at making exercise culture a part of life in all sectors of society, as it has positive physiological, sociological, and psychological effects. Several factors hinder one's decision to start exercising and maintaining it (8). As a result, numerous exercise behaviour theories have emerged to make exercising a necessity in living spaces. Among them, the Transtheoretical Model (TTM), originally created by Prochaska and Velicer, is broadly used today (21). This model classifies the stages of change in exercise-oriented behaviour from most negative to highest in the five existing levels of change.

During the first stage, the 'Precontemplation' stage, the individual neither exercises nor intends to start exercising for the next six months. In the second stage, 'Contemplation', the individual still does not exercise, however, intends to start exercising within six months. In the following 'Preparation' stage, the individual does not regularly exercise at the desired level of at least 30 minutes per day and three days per week. In the fourth stage, 'Movement', the individual exercises at the desired level; however, this behaviour has not persisted for more than six months. At the highest level, 'Maintenance', the person has been regularly exercising for more than six months.

The approaches and strategies to be followed for individuals to have positive perspectives on exercise and to maintain continuous exercise behaviors should be planned and implemented by considering these stages. In these stages of change, cognitive (awareness, emotional arousal, re-evaluation of the environment, social liberation-environmental opportunities, self-reevaluation) and behavioral processes (control of stimuli, supportive relationships, counter-conditioning, empowerment, agreement with oneself) play an important role (26).

Delshad et al. obtained the opinions of office workers on exercise using TTM and found that the majority did not intend to exercise or were in the contemplation stage (6). In another study, the exercise behavior stage after open heart surgery was determined using TTM and it was stated that interventions could be made to maintain and improve a healthy lifestyle by increasing the level of physical activity (12). Han et al. reported the lack of relationship between sedentary behaviors of university students and psychological determinants by using newly developed TTM questionnaires (11). In our study, we aimed to establish the basic data necessary to ensure the participation of university students in exercise and the sustainability of this participation and to determine the relationship between exercise behavior level, body composition and health levels.

METHOD

The purpose of this study was to determine the relationship between exercise behaviour, health levels, and body composition of university students.

Our sample of volunteer participants consisted of 331 public, private and foundation university students from Turkey. Demographic information was questioned to determine the age, height, body weight, department of study, chronic disease of the students.

In order to determine the exercise behaviour levels of students, the Exercise Behaviour Change Steps Questionnaire (EBQ) used by Ronda et al. in 2001 will be applied (22). Cengiz et al. (4) evaluated the validity and reliability of the Turkish version of the Exercise Behaviour Change Steps Questionnaire. The EBQ questionnaire consists of 4 questions and is answered as Yes/No. The questions are based on moderate-intensity activities in which a slight increase in breathing and heart rate is observed in physical activities. The questionnaire, administered online using the Google Survey method, aimed to identify exercise intentions and participation habits among university students. The following are the questions: 1. Currently, I engage in moderate physical activity. 2. In the next six months, I plan to increase my engagement in moderate physical activity. 3. Currently, I regularly participate in moderate physical activity. 4. I have been participating in moderate physical activity regularly for the last six months. Body composition was also determined by calculating Body Mass Index (BMI).

The scoring process is as per the following guidelines; Pre-contemplation= 1st question=No; 2nd question=No, Contemplation= 1st question=No; 2nd question=Yes, Preparation= 1st question=No; 2nd question=Yes, Action= 1st question=Yes; 3rd question=Yes; 4th question=No, Maintenance 1st question=Yes; 3rd question=Yes; 4th question=Yes. Moreover, a question was added, with the following wording, 'In the past, I regularly participated in moderate level activities for at least three years' in observance of the Continuation stage. Additionally, to evaluate the health status of the university students, they were instructed to select the most fitting option, from among a) disabled, b) bad, c) moderate, d) good and e) very good alternatives, when answering the question "How would you gauge your prevailing health condition?"

The data were analysed using version SPSS-21. In view of the lack of normal distribution, the Mann-Whitney U test was employed to compare the male and female student groups. Moreover, the Spearman's rank correlation coefficient was calculated to determine the relationship between exercise behaviour, health levels and BMI.

Ethical approval and institutional permission

Our descriptive study was approved by Çukurova University Faculty of Medicine Non-Interventional Clinical Research Ethics Committee (Decision No: 55).

FINDINGS

The results of the analysis of our study conducted to determine the relationship between the level of exercise behaviour, health levels and body composition of university students are given in the tables.

Of the participants whose percentages are given in Table 1, 158 were female and 173 were male students. The distribution between genders is not statistically significant ($p < 0.05$).

Table 1. Distribution of Female and Male Students

Gender	f	%	sd	X ²	Asymp. Sig.
Female	158	47,7	1	,680	,410
Male	173	52,3			
Total	331	100,0			

P<0.05

The distribution of exercise behaviour levels of female and male students is shown in Table 2. 26 of the females and 33 of the males are in the 'Pre-contemplation' stage. There is a decrease in the number of females and males as they move from the 'Contemplation' stage to other stages. There is no significant difference between the exercise behaviour levels of men and women according to crosstabs analysis.

Table 2. The distributions of the exercise behavior levels of male and female students

Gender	The Level of Exercise Behaviour					Total
	PreContemplation	Contemplation	Preparation	Action	Maintenance	
Female	26 (%14,45)	65 (%41,13)	20 (%12,65)	16 (%10,12)	31 (%19,62)	158 (%100)
Male	33 (%19,07)	61 (%35,26)	16 (%9,24)	18 (%10,40)	45 (%26,01)	173 (%100)
Total	59 (%17,82)	126 (%38,06)	36 (%10,87)	34 (%10,27)	76 (%22,96)	331 (%100)

Crosstabs: X²=3,426, sd=4, Asymp. Sig.= ,489. * P<0.05 ** P<0.01

There is no significant difference between the distribution of health levels of male and female students. 181 students stated their health level as 'Good and Very Good', while 150 students stated their health level as 'Disabled, Poor and Moderate' (Table 3). When the health levels of male and female students were analyzed, it was seen that there was no significant difference.

Table 3. Distribution of health levels of female and male students

Gender	Health Level					Total
	Disabled	Poor	Fair	Good	Very Good	
Female	1 (%0,63)	6 (%3,79)	74 (%46,83)	61 (%38,60)	16 (%10,12)	158 (%100)
Male	3 (%1,73)	4 (%2,31)	62 (%35,83)	78 (%45,08)	26 (%15,02)	173 (%100)
Total	4 (%1,20)	10 (%3,02)	136 (%41,08)	139 (%41,99)	42 (%12,68)	331 (%100)

Crosstabs: X²=6,252, sd=4, Asymp. Sig.= ,1181 * P<0.05 ** P<0.01

The study analysed the connection between body composition (age, height, body weight, BMI, exercise behaviour) with the health levels of male and female students using the Mann-Whitney U test. Table 4 shows significant differences in the height, body weight, BMI, and health levels of the students.

Table 4. Comparison of body composition, exercise behaviour and health levels of female and male students

	Group	N	X	S.S.	MWU	Z	Asymp. Sig.
Age (years)	Female	158	21,85	3,04	12519,5	-1,336	,181
	Male	173	22,94	5,09			
	Total	331	22,42	4,26			
Body Height (cm)	Female	158	163,86	6,49	3348,5	-11,881	,000**
	Male	173	175,38	7,49			
	Total	331	169,88	9,08			
Body Weight (kg)	Female	158	58,99	9,94	6300,5	-8,475	,000**
	Male	173	71,76	14,43			
	Total	331	65,66	14,01			
BMI	Female	158	21,97	3,56	10474,0	-3,672	,000**
	Male	173	23,19	3,57			
	Total	331	22,61	3,61			
Stages of Exercise Behaviour (1-5 points)	Female	158	2,75	1,38	13166,0	-,599	,549
	Male	173	2,89	1,50			
	Total	331	2,82	1,45			
Health Level (1-5 points)	Female	158	21,85	3,04	11991,5	-2,084	,037*
	Male	173	22,94	5,09			
	Total	331	22,42	4,26			

* P<0.05 ** P <0.01

Table 5 and Table 6 respectively show a comparison of the body composition, exercise behaviour and health levels of sedentary and exercising female and male students.

Table 5. Comparison of body composition, exercise behaviour and health levels of sedentary and exercisers in female university students

	Group	N	X	S.S.	MWU	Z	Asymp. Sig.
Age (years)	Sedentary	111	21,77	2,88	2541,5	-,259	,796
	Exercised	47	22,06	3,42			
	Total	158	21,85	3,04			
Body Height (cm)	Sedentary	111	163,68	6,09	2397,5	-,805	,421
	Exercised	47	164,28	7,41			
	Total	158	163,86	6,49			
Body Weight (kg)	Sedentary	111	58,45	9,02	2409,0	-,760	,447
	Exercised	47	60,26	11,84			
	Total	158	58,99	9,94			
BMI	Sedentary	111	21,83	3,32	2490,5	-,449	,654
	Exercised	47	22,30	4,09			
	Total	158	21,97	3,56			
Stages of Exercise Behaviour 1 (1-5 points)	Sedentary	111	1,95	0,64	,000	-10,370	,000**
	Exercised	47	4,66	0,48			
	Total	158	2,75	1,38			
Health Level (1-5 points)	Sedentary	111	21,77	2,88	2082,5	-2,185	,029*
	Exercised	47	22,06	3,42			
	Total	158	21,85	3,04			

* P<0.05 ** P<0.01

Significant differences were obtained in Stages of Exercise Behaviour Change (p<0.01) and Health Level (P<0.05) of female students.

Table 6. Comparison of body composition, exercise behaviour and health levels of sedentary and exercising male students

	Group	N	X	S.S.	MWU	Z	Asymp. Sig.
Age (years)	Sedentary	110	22,71	5,00	3242,0	-,711	,477
	Exercised	63	23,33	5,25			
	Total	173	22,94	5,09			
Body Height (cm)	Sedentary	110	174,50	7,17	2793,5	-2,122	,034*
	Exercised	63	176,92	7,85			
	Total	173	175,38	7,49			
Body Weight (kg)	Sedentary	110	71,11	13,93	3229,0	-,745	,456
	Exercised	63	72,89	15,31			
	Total	173	71,76	14,43			
BMI	Sedentary	110	23,22	3,56	3449,5	-,049	,961
	Exercised	63	23,14	3,62			
	Total	173	23,19	3,57			
Stages of Exercise Behaviour (1-5 points)	Sedentary	110	1,85	0,65	,000	-11,336	,000**
	Exercised	63	4,71	0,46			
	Total	173	2,89	1,50			
Health Level (1-5 points)	Sedentary	110	22,71	5,00	3239,0	-,769	,442
	Exercised	63	23,33	5,25			
	Total	173	22,94	5,09			

* P<0.05 ** P<0.01

Significant differences were obtained in exercise behaviour level (P<0.01) and height (P<0.05) of male students.

The relationship between body composition and exercise behaviour and health levels of female students is shown in Table 7.

Table 7. The relationship between Spearman correlation coefficients of body composition and exercise behaviour and health level variables in female students

Variables	1.Health Level	2.Exercise Behaviour Level	3.Age	4. Height	5.Weight
1.Health Level	1				
2. Stages of Exercise Behaviour	,146	1			
3.Age	,092	-,011	1		
4. Height	,162*	,021	,086	1	
5.Weight	-,123	,036	,156	,409**	1
6.BMI	-,216**	,017	,112	-,024	,872**

* There is a significant difference between the two groups at 0.05 level.

** There is a significant difference between the two groups at 0.01 level.

Significant relationships were found between height and BMI with health level and body weight with height and BMI in female students.

Table 8. The relationship between Spearman correlation coefficients of body composition and exercise behaviour and health level variables in male students

Variables	1.Health Level	2.Stages of Exercise Behaviour	3.Age	4. Body Height	5.Body Weight
1.Health Level	1				
2. Stages of Exercise Behaviour	,078	1			
3.Age	,027	,028	1		
4. Body Height	,105	,128	,114	1	
5.Body Weight	,022	,066	,211**	,673**	1
6.BMI	-,059	,022	,181*	,311**	,902**

* There is a significant difference between the two groups at 0.05 level.
 ** There is a significant difference between the two groups at 0.01 level.

In male students, significant relationships were obtained between age and body weight and BMI, height and body weight and BMI, and body weight and BMI.

DISCUSSION AND CONCLUSION

Exercise has an important place among the strategies to be implemented to protect and improve health in all ages and genders. Lifelong sustainability as well as the age of starting exercise is important in improving health. Consequently, the purpose of our study was to assess the exercise-related behaviour levels of university students and explore the correlation between their health status and body composition. In simpler terms, the study aimed to investigate the attitudes of university students towards physical exercise, and identify the approaches that can be implemented to encourage regular exercise.

According to the results of this study, it was determined that most of the university students constituting our population were not even at the stage of starting exercise. The reasons why university students do not start exercising include academic pressure, time limitation, lack of facilities and exercise guides (20). The decrease in the level of physical activity observed in these age groups is likely to affect health negatively in the future. Çeker et al. (5) found similar results in their study on different age groups and found a decrease in the rate of participation in physical activity with increasing age. Therefore, considering exercise as a lifestyle and doing it for a lifetime should be one of the main goals. It is thought that exercise habits gained during the university period will be a pioneer in continuing exercise in the future. In this context, Ziyagil et al. (28) emphasised that the reasons for university students' participation in exercise and why they quit exercise should be well known and strategies should be developed for this situation.

According to Delshad et al.'s study that used the TTM model, 32.9% of office workers showed 'Contemplation' stage in their exercise behaviour attitude. Likewise, Emdadi (10) and Delshad (6) reported that 30.5% of female college students' exercise behaviour levels were in the 'Contemplation' stage in their respective studies. In our study, the 'Contemplation' stage of exercise behaviour was observed in 41.13% (65 persons) of female students and in 35.26% (61 persons) of male students, with similar results. Students may not initiate exercise due to lack of information regarding effective exercise management (20). Therefore, the provision of professional exercise guidance at universities is believed to alter the students' view towards exercise and kindle their interest. Effective use of social media to highlight the benefits of exercise through remarkable advertising can specifically reduce the count of sedentary students.

Our study questioned the health levels of male and female students and found no significant differences between the two genders. However, nearly half of the 331 students reported their health as 'Disabled, Poor, and Moderate'. According to Ebem (9), the reasons for health problems include poor exercise behaviour and poor education of the family and school on this subject. In this case, education on this subject should be emphasised by prioritising 'health protection and improvement' in the strategies for participation in exercise activities. Male students had an average BMI of 23.19, whereas female students had an average BMI of 21.97.

These differences between the two genders are due to sexual dimorphism, which explains that the body structure between men and women is not the same (15). In addition, the fact that the population consisted of university students suggests that the rate of chronic diseases is relatively lower in higher age groups (16). Physical activity level in these age groups constitutes the basis of adult health. According to a study, it has been reported that the level of physical activity decreases when passing from high school to university (3). With aging, there is an increase in weight gain with a decrease in physical activity due to physiological, psychological and sociological reasons (25). Laredo-Aguilera et al. (17) reported that the rate of obesity increased with increasing age and that men between the ages of 18-30 years participated in physical activity more than women. In our study, it was observed that the exercise behaviour level of men was 6.39% higher than that of women at the 'Continuation' stage. Research has shown that women tend to participate in exercise less than men, primarily due to their responsibilities towards family care, sociocultural differences, and household chores (19). Among the reasons why university students do not start and maintain regular exercise; inability to allocate time for exercise due to academic performance anxiety, lack of security, lack of suitable places for exercise, lack of social support, overload of study programmes and subsequent lack of sleep, insufficient scientific information about the importance of exercise and socio-cultural differences can be counted (14, 19). According to Sirard et al. (23), men's competitive nature increased their motivation to participate in physical activity compared to women. Furthermore, Mori et al. (18) reported that women's participation in physical activity declines as they age. Therefore, exercise programmes should emphasise various motivational projects for university students, especially women. Moreover, Ignatjeva et al. (13) reported that women are more health-conscious than men. To promote the participation of university students in physical activity and ensure its sustainability, various parameters such as health, social group membership, competition, entertainment, body image, and success can be used to increase motivation and interest as part of our strategy (7, 24).

As a result, the findings of this study show that there are significant differences in all variables except age and exercise behaviour level due to gender factor. In females, exercise level and perceived health level of exercisers were significantly different from those who were physically inactive, while in males, height and exercise behaviour level were significantly different in favour of exercisers. While the health level in females was positively correlated with age and negatively correlated with BMI, there was no significant difference between health and exercise levels and other variables in males. As a result, it can be concluded that male and female university students do not perform regular physical activity at a level that will affect their perceived health levels and do not have obesity problems and 4% of both genders report health problems.

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Investigation of Eating Behaviors and Life Satisfaction in Terms of Different Variables in Individuals Who Exercise Regularly

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Abstract

In this study, it was aimed to examine the eating behaviors and life satisfaction of individuals who regularly exercise in sports centers in terms of different variables. For this purpose, a total of 161 people, 70 female and 91 male, with an average age of 30.30 ± 10.02 , were surveyed. According to the results of the independent sample t-test, it was determined that the difference between the eating behavior levels of the participants according to the gender variable was not statistically significant ($p > 0.05$). Considering the marital status variable, it was determined that there was a significant difference between married and single individuals in terms of external eating behavior levels ($p < 0.05$). According to One Way Anova test results, there was a significant difference in emotional eating behavior levels between slightly overweight, normal and obese participants according to body mass indexes ($p < 0.05$). There was no significant difference in terms of external eating and restrained eating behavior ($p > 0.05$). It is seen that there is a significant difference in terms of restrained eating behavior levels between graduate and undergraduate level participants according to education levels, and there is a significant difference in external eating behaviors between undergraduate and graduate school participants ($p < 0.05$). According to the perceived weight, there is a significant difference between those who want to gain weight, those who do not have weight problems and those who want to lose weight ($p < 0.05$). According to the duration of exercise, the difference between the appears to be statistically significant. those who have been exercising for a month and those who have been exercising for six months or more in terms of restrictive eating behavior levels ($p < 0.05$). With the participants for a month; it is seen that there is a significant difference in terms of restrained eating behavior levels between the participants for more than six months and more than one year ($p < 0.05$). Accordingly, as the duration of doing sports increases, the restrained eating behavior also increases. According to the results obtained from Pearson correlation analysis, according to eating behavior, BMI, education level and time to attend the sports center, there is a moderate positive correlation between the time to attend the sports center and the restrained eating behavior ($p < 0.01$). It has also been determined that there are moderate negative relationship between education level and BMI ($p < 0.05$).

Keywords: Exercise, Eating behavior, Life satisfaction.

Özet

Düzenli Egzersiz Yapan Bireylerde Yeme Davranışlarının ve Yaşam Doyumlarının Farklı Değişkenler Açısından İncelenmesi

Bu çalışmada spor merkezlerinde düzenli egzersiz yapan bireylerde yeme davranışları ve yaşam doyumlarının farklı değişkenler açısından incelenmesi amaçlanmıştır. Bu amaçla yaşları ortalama 30.30±10.02 olan ve 70'i kadın, 91'i erkek olmak üzere toplam 161 kişiye anket uygulanmıştır. Bağımsız örneklem T testi sonuçlarına göre, katılımcıların cinsiyet değişkenine göre yeme davranış düzeyleri arasında istatistiksel olarak farkın anlamlı olmadığı tespit edilmiştir ($p>0.05$). Medeni durum değişkenine göre evli ve bekârlar arasındadışsal yeme davranış düzeyleri açısından anlamlı farklılık olduğu görülmektedir ($p<0.05$). One Way Anova testinden elde edilen sonuçlarına göre, Vücut kitle indekslerine göre, hafif şişman, normal ve obez katılımcılar arasında duygusal yeme davranış düzeyleri açısından anlamlı farklılık olduğu ($p<0.05$). Dışsal yeme ve kısıtlayıcı yeme davranışı açısından ise anlamlı farklılık olmadığı bulunmuştur ($p>0.05$). Eğitim düzeylerine göre, lisansüstü ve lisans düzeyindeki katılımcılar arasında kısıtlayıcı yeme davranış düzeyleri açısından anlamlı farklılık olduğu, lisans ve ortaokul düzeyindeki katılımcılar arasında ise, dışsal yeme davranışlarında farklılık anlamlı düzeyde olduğu görülmektedir ($p<0.05$). Algılanan kiloya göre ise, kilo almak isteyenlerle, kilo sorunu olmayanlar ve kilo vermek isteyenler arasında anlamlı farklılık vardır ($p<0.05$). Buna göre kilo almak isteyenler, diğerlerine göre daha az kısıtlayıcı yeme davranışı göstermektedirler. Egzersiz yapma sürelerine göre, Bir aydır egzersiz yapanlar ile Altı ay ve bir yıldan daha fazla süredir egzersiz yapanlar arasında kısıtlayıcı yeme davranış düzeyleri bakımından farklılığın anlamlı düzeyde olduğu görülmektedir ($p<0.05$). Bir aydır katılanlarla; altı ay ve bir yıldan daha fazla süredir katılanlar arasında kısıtlayıcı yeme davranış düzeyleri bakımından farkın anlamlı seviyede görülmektedir ($p<0.05$). Buna göre egzersiz yapma süresi arttıkça kısıtlayıcı yeme davranışı da artmaktadır. Yeme davranışı, VKİ, eğitim düzeyi ve spor merkezine katılma sürelerine göre, Pearson korelasyon analizi sonuçlarına göre, spor merkezine katılma süreleri ile kısıtlayıcı yeme davranışı arasında pozitif yönde orta seviyede korelasyon vardır ($p<0.01$). Yine eğitim düzeyi ile VKİ arasında ise orta seviyede negatif yönde bir ilişki olduğu belirlenmiştir ($p<0.05$).

Anahtar Kelimeler: Egzersiz, Yeme davranışı, Yaşam doyumunu.

INTRODUCTION

Eating disorders; it refers to certain complex problems with excessive emotions, attitudes and behaviors that develop with irregular eating consumption. Eating disorders are seen in both genders, although women are predominant (3).

The changes in the standards of aesthetic appearance in the society were followed by the differences in normal eating behaviors. Normal eating habits; Recently, it has begun to be perceived as a long-term diet. The desire to reach the "ideal body dimensions" in the society can be considered as the reason for the increase in the number of people who diet and the prevalence of eating disorders (6-11). Shillak and Crago (1995) identified 8 risk factors for developing an eating disorder. These; weight anxiety, overweight, dissatisfaction with physical appearance and dietary restriction were determined as important factors for eating disorder, while early maturation, low self-esteem, depression and negative emotionality were determined as additional factors (10).

Generally, it is a matter of curiosity how the eating behaviors of those who are thought to go to sports centers to get rid of weight problems are affected by different variables. Therefore, in this study, it will be tried to determine the eating behaviors of individuals who exercise.

In our present study, we aimed to reveal eating behaviors of individuals. individuals who regularly attend sports centers.

For this purpose, answers to the following sub-problems were sought.

1. Are there any difference between the eating behaviors of individuals who exercise in terms of gender?
2. Are there any relationship between the eating behaviors of individuals who exercise in terms of body mass indexes?
3. Are there any difference in the eating behaviors of the individuals who exercise in terms of their marital status?
4. Are there any relationship between the eating behaviors of the individuals who exercise, according to their education level, perceived weight and duration of doing sports?

METHOD

In this study, the general screening model, which is one of the many research models, was used. This model is a scan made on the whole universe or on a sample to be taken from the universe in order to reach a general conclusion about the universe in a universe with a large numerical coverage. The study was carried out with the approval of the ethics committee with the decision of Kahramanmaraş Sütçü İmam University Medical Research Ethics Committee (TAREK) dated 14.06.2022 and numbered 04.

Universe and Sample

The population of the research consists of 3750 participants who regularly attend 21 private sports centers in the city center of Kahramanmaraş. The pattern is as follows a total of 161 participants, 70 women and 91 men, with an average age of (X age; 30.30 ± 2), who agreed to participate in our study voluntarily.

Data Collection Tools

In the study, a personal information form and the Dutch Eating Behavior Questionnaire (DEBQ) originally developed by Van Stree et al. (14) were applied.

Personal Information Form

In the personal information form, questions were asked including different demographic characteristics such as gender, age, marital status, educational status, satisfaction with his weight, how much he exercised regularly, and height and weight.

Dutch Eating Behavior Questionnaire (DEBQ): The Dutch Eating Behavior Questionnaire (DEBQ) was used in the second part. The Dutch Eating Behavior Questionnaire (DEBQ) consists of 33 items and consists of 3 sub-dimensions that evaluate emotional eating behaviors, external eating behaviors and restricted eating behaviors. The Turkish validity and reliability of the scale was performed by Bozan (4) The Cronbach alpha internal consistency coefficient of DEBQ was 0.94 for the whole scale.

Analysis of Data

The collected data were processed in the SPSS 21 Package program. Z values of skewness and kurtosis were examined to determine whether the obtained data showed a normal distribution. The Z value was found to be between -1.96 and +1.96 ($p < 0.05$) and the distribution was considered normal Tabachnick & Fidell (12). According to this; Differences between paired groups were used with Independent Samples T-Test, for comparisons of more than two groups, one-way analysis of variance (ANOVA) and Pearson correlation analysis were used to determine the relationship between the sub-dimensions of the scale. In statistical comparisons, their significance was interpreted according to $p < 0.05$ values.

Ethical approval and institutional permission

The study was carried out with the approval of the ethics committee with the decision of Kahramanmaraş Sütçü İmam University Medical Research Ethics Committee (TAREK) dated 14.06.2022 and numbered 04.

FINDINGS

Table 1. Classification of Participants According to Some Socio-Demographic Characteristics:

	Value Label	N	%
Gender	Female	70	43,5
	Male	91	56,5
	Total	161	100
Income	Low	14	8,7
	Middle	128	79,5
	High	19	11,8
	Total	161	100
Marital status	Married	81	50,3
	Single	80	49,7
	Total	161	100
How long has she been exercising	One month	51	31,7
	Three months	25	15,5
	Six month	40	24,8
	Over One Year	45	28,0
	Total	161	100
BMI	<24.99 (Normal)	86	53,4
	25.00-29.99(Overweight)	53	32,9
	> 30.00 (Obese)	22	13,7
	Total	161	100
Educational Status	Middle school	18	11,2
	High school	60	37,3
	Licence	55	34,2
	Graduate	28	17,4
	Total	161	100

Table 1 shows that 43.5% of the individuals participating in the research are female and 56.5% are male. Those expressing low income constitute 8.7%, medium 79.5% and 11.8% expressing their high income. 50.3% of the participants are married and 59.7% are single. The duration of the exercise of the participants; 15.5% for three months, 24.8% for six months and for one year or more make up 28.0%.

Looking at the averages of BMI; 53.4% of them are <24.99 (Normal), 32.9% of them are 25.00-29.99 (Overweight), 13.7% of them are > 30.00 (Obese) individuals. Educational status of the participants; 11.2% are secondary school, 37.3% high school, 34.2% undergraduate, 17.4% graduate individuals.

Table 2. Eating Behaviors Independent Samples T-Test Results by Gender

	Gender	N	M	SD	t	df	p
Extrinsic Eating	Female	70	2,8375	,81576	,632	159	,528
	Male	91	2,7527	,86442			
Emotional Eating	Female	70	2,6327	1,00091	1,289	159	,199
	Male	91	2,4403	,88725			
Restrictive Eating	Female	70	3,4661	,73102	1,113	159	,267
	Male	91	3,3159	,92802			

In Table 2., there is no significant difference in terms of eating behavior between male and female participants by gender ($p>0.05$).

Table 3. Eating Behaviors by Marital Status Independent Samples T-Test Results

	Marital Status	N	M	SD	t	df	p
Extrinsic Eating	Married	81	2,9336	,83878	2,210	159	,029*
	Single	80	2,6438	,82512			
Emotional Eating	Married	81	2,6649	,93655	1,930	159	,055
	Single	80	2,3812	,92798			
Restrictive Eating	Married	81	3,4105	,71650	,439	159	,661
	Single	80	3,3516	,96826			

In Table 3, it is seen that there is a significant difference between the married and single participants in terms of external eating behavior levels ($p>0.05$).Accordingly, those who are married show more external eating behavior. The difference does not appear to be statistically significant in terms of restrictive and emotional eating behaviors ($p>0.05$).

Table 4. Eating Behaviors According to Body Mass Indexes One Way Anova Test Results

		Sum of Squares	Mean Squares	df	f	p
Extrinsic Eating	between groups	,859	,430	2	,603	,548
	within groups	112,591	,713	158		
	Total	113,451		160		
Emotional Eating	between groups	5,442	2,721	2	3,161	,045*
	within groups	135,997	,861	158		
	Total	141,438		160		
Restrictive Eating	between groups	1,466	,733	2	1,017	,364
	within groups	113,809	,720	158		
	Total	115,275	,430	160		

*($p<0.05$)

Table 4 shows that there is a significant difference in emotional eating behavior levels between normal, slightly overweight and obese participants according to body mass indexes ($p<0.05$). Accordingly, those who are slightly obese show more emotional eating behavior than others. It is seen that there is no significant difference in terms of external eating and restrictive eating behavior ($p>0.05$).

		Sum of Squares	Mean Squares	df	f	p
Extrinsic Eating	between groups	7,120	2,373	3	3,504	,017*
	within groups	106,331	,677	157		
	Total	113,451		160		
Emotional Eating	between groups	,381	,127	3	,141	,935
	within groups	141,057	,898	157		
	Total	141,438		160		
Restrictive Eating	between groups	9,536	3,179	3	4,720	,004*
	within groups	105,739	,673	157		
	Total	115,275	2,373	160		

*(p<0.05).

In Table 5, it was found that there was a similar to difference in terms of restrictive eating behavior levels between graduate and undergraduate participants according to education levels (p<0.05). there was a significant difference external eating behaviors between undergraduate and secondary school participants (p<0.05).

Table 6. Eating Behavior Levels According to Perceived Weight One Way Anova Test

		Sum of Squares	Mean Squares	df	F	P
Extrinsic Eating	between groups	1,291	,646	2	,909	,405
	within groups	112,159	,710	158		
	Total	113,451		160		
Emotional Eating	between groups	1,205	,603	2	,679	,509
	within groups	140,233	,888	158		
	Total	141,438		160		
Restrictive Eating	between groups	11,903	5,951	2	9,096	,000*
	within groups	103,372	,654	158		
	Total	115,275	,646	160	,909	

*(p<0.05).

According to the perceived weight in Table 6, there is a significant difference between those who want to gain weight, those who do not have weight problems and those who want to lose weight (p<0.05). Accordingly, those who want to gain weight show less restrictive eating behavior than others.

Table 7. One Way Anova Test Results for Eating Behavior Levels According to the duration of participation

		Sum of Squares	Mean Squares	df	F	P
Extrinsic Eating	between groups	3,071	1,024	3	1,456	,229
	within groups	110,380	,703	157		
	Total	113,451		160		
Emotional Eating	between groups	2,890	,963	3	1,092	,354
	within groups	138,548	,882	157		
	Total	141,438		160		
Restrictive Eating	between groups	14,337	4,779	3	7,434	,000*
	within groups	100,938	,643	157		
	Total	115,275	1,024	160	1,456	

*(p<0.05).

According to the duration of doing sports in Table 7, it is seen that there is a significant difference between those who have been doing sports for one month and those who have been doing sports for six months or more in terms of their restrictive eating behavior levels (p<0.05).

With those who have been participating for a month; the difference appears to be significant in terms of restrictive eating behavior levels between the participants for more than six months and more than one year (p<0.05). Accordingly, as the duration of exercise increases, restrictive eating behavior also increases.

Table 8. Pearson Correlation Analysis Results by Eating Behavior, BMI, Education Level and the duration of participation in the sports center

	(1)	(2)	(3)	(4)	(5)
Extrinsic Eating (1)	-				
Emotional Eating (2)	,426**	-			
Restrictive Eating (3)	-,023	,211**	-		
BMI (4)	-,085	,027	-,013	-	
Education level (5)	,118	-,036	,018	-,269**	-
The duration of participation in the sports center (6)	,049	,055	,344**	-,127	,054

Considering the results of Pearson correlation analysis according to eating behavior, BMI, education level and participation in sports center, There is a moderate positive correlation between the duration of participation in the sports center and the restrictive eating behavior (p<0.05). It was also determined that there was a moderate negative relationship between education level and BMI (p<0.05).

DISCUSSION AND CONCLUSION

In this study, which was carried out with a total of 161 people, 91 female and 70 male, with an average age of 30.30± 10.02, who were reached from the sports centers within the borders of Kahramanmaraş and accepted to participate in the study, it was aimed to determine the eating behaviors of the individuals who go to regular sports centers.

In the current study, in terms of the gender variable of the participants, it was determined that the difference in eating attitudes was not statistically significant.

According to the marital status variable, it has been revealed that the difference between married and single individuals in terms of eating behavior was statistically significant. Accordingly, those who are married show more external eating behavior. Married people generally consume more regular meals than when they

live alone, however, their motivation to stay fit after marriage decreases. It can be thought that these factors caused the finding in our study.

According to body mass indexes, It is revealed that there is a significant difference between normal, slightly overweight and obese participants in terms of emotional eating behavior levels. Accordingly, those who are slightly obese show more emotional eating behavior than others. Similar to our study, Akdevelioğlu and Yörüsün (1) conducted a study on university students, and it was shown that there was a positive significant difference between the weak group and the normal and obese group in terms of emotional and restricted eating scores.

In the study conducted by Hekimoğlu (7) the study conducted by Kadioğlu and Ergün (8) on university students, and the study conducted by Değirmenci (5) on obese adults, similar to our current study, it is revealed that there is a positive relationship between body mass indexes and eating attitudes.

Even if individuals exercise regularly, negative tendencies in their eating attitudes cause them to consume food above the calories they spend daily, and it can be thought that this situation leads to the findings in our study, which gives similar results with the literature.

In our study, it is seen that as the education level of the participants increases, their eating attitudes are scored positively. Similar to our research, in the study conducted by Yavuz (15) and in the study conducted by Tepe (13) it has been revealed that the level of eating disorders decreases with the increase in education level. As the education level of individuals increases, their awareness of healthy and regular nutrition also increases. It can be thought that this situation caused the result in our current study.

According to perceived weight, there is a significant difference between those who want to gain weight, those who do not have weight problems and those who want to lose weight. Accordingly, those who want to gain weight show less restrictive eating behavior than others. Compared to other groups, it can be thought that those who want to gain weight will show an attitude towards increasing their food consumption due to the motivation to increase their current weight, and this situation enables us to reach the obtained result.

According to the duration of doing sports, it is seen that there is a similar to difference between those who do sports for one month and those who do sports for six months or more in terms of restrictive eating behavior levels; accordingly, as the time to do it increases, the restrictive eating behavior also increases.

The findings obtained in the study of Ayaz (2) on the investigation of eating attitudes and awareness of individuals between the ages of 18-65, are similar to our study.

In the study conducted by Keyf (9) physical activity levels of individuals were compared according to their attention to nutrition, and similar to our study, physical activity levels were found to be statistically significantly higher in those paying attention to food consumption.

Differently; In the study conducted by Tepe (13) it was shown that there is no statistical difference between the tendency of those who do or do not do regular physical activity to show eating attitude behavior disorder. It can be thought that it causes them to exhibit restrictive eating behaviors in their eating attitudes.

In our current study, it was revealed that there was a moderate positive relationship between the participants' time to go to the sports center and their restrictive eating behaviors. It has been It was determined that there was a statistically moderate negative correlation between education level and BMI. As a result, as the rate of participation in sports centers increases, they may tend to restrictive eating behavior in order to achieve a healthy physical appearance. it can be thought that this situation causes their body mass index to decrease.

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Investigation of Acute Effects of Concurrent Training Programs on Physiological Parameters, Explosive Strength and Balance Performance in Soccer Players

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Abstract

In the study, the acute effects of two different concurrent training models including high intensity interval training (HIIT) and high intensity interval functional training (HIIFT) plus strength training (S) on physiological indicators (blood lactate and heart rate) and performance (balance and explosive power) parameters were examined in soccer players. A total of 13 moderately active young soccer players (19.92; ±1.44 years) participated in the study. In the study, body composition measurements, heart rate, blood lactate, explosive strength measurement and balance testing were measured. Training models (S+HIIT-S+HIIFT) were applied sequentially with a crossover design. The training sessions were conducted with a three-day interval. Mixed model ANOVA was used for repeated measures and Bonferroni Correction was used for pairwise comparisons. Significance level was accepted as $p < 0.05$. The observation that both heart rate (HR) and blood lactate concentration (LA) values exhibited similar increases in the concurrent training groups (S+HIIT and S+HIIFT) in relation to the training intensity suggests that the intensity was appropriately calibrated in both training programs within the scope of this study. It was observed that the S+HIIT group exhibited a statistically significant and more rapid decrease in the blood lactate value compared to the S+HIIFT group. When the explosive force performance (CMJ) was analyzed; S+HIIFT explosive force value was found to be lower than the baseline value, while this value was higher in the S+HIIT group compared to the baseline value. In summary, there was a statistically significant difference CMJ in the S+HIIT group, while this difference was not significant in the S+HIIFT group. In our study, it was determined that the changes in balance performance before and after training were similar in both groups ($p > 0.05$).

Keywords: Concurrent training, explosive strength, balance, heart rate, blood lactate

Özet

Futbolcularda Eş Zamanlı Antrenman Programlarının Fizyolojik Parametreler, Patlayıcı Kuvvet ve Denge Performansı Üzerine Akut Etkisinin İncelenmesi

Araştırmada futbolcularda yüksek şiddetli aralıklı antrenman (HIIT) ve yüksek şiddetli aralıklı fonksiyonel antrenman (HIFT)'a ilave kuvvet antrenmanı (K) içeren iki farklı eş zamanlı antrenman modelinin fizyolojik parametreler (kan laktat ve kalp atım hızı) ile performans (denge ve patlayıcı kuvvet) parametreleri üzerine akut etkisi incelendi. Araştırmaya, toplamda 13 orta düzeyde aktif genç futbolcu katılmıştır (19,92; ±1,44 yıl). Çalışmada vücut kompozisyonu ölçümleri, kalp atım hızı, kan laktat, patlayıcı kuvvet ölçümü ve denge testi uygulandı. Antrenman modelleri (K+HIIT-K+HIFT) crossover tasarım ile sırayla uygulandı. Antrenmanlar üç gün ara ile yapıldı. Uygulamalar sırasında ve sonrasında kalp atım hızı ve kan laktat konsantrasyonundaki değişimlerin farklılığı karışık desen ANOVA ile incelendi. İkili karşılaştırmalarda ise Bonferroni Düzeltmesi kullanıldı. Anlamlılık düzeyi $p<0.05$ olarak kabul edildi. Eş zamanlı antrenman gruplarında (K+HIIT ile K+HIFT) kalp atım hızı (KAH) ve kan laktat konsantrasyonu (LA) değerlerinin antrenman şiddetine bağlı olarak benzer şekilde yükselmesi bu çalışmadaki her iki antrenman programında şiddetin doğru bir şekilde ayarlandığının bir göstergesi olarak karşımıza çıktı. Her iki antrenman modelinin toparlanma süreçleri değerlendirildiğinde K+HIIT grubunun LA değeri, K+HIFT grubuna göre daha hızlı ve istatistiksel olarak anlamlı bir şekilde düşüş gösterdiği tespit edildi. Patlayıcı kuvvet performansı (CMJ) incelendiğinde ise; K+HIFT patlayıcı kuvvet değeri başlangıç değerine göre daha düşük bulunurken bu değer K+HIIT grubunda başlangıç değerine göre daha yüksek bulundu. Özetle bu değerde, K+HIIT grubunda istatistiksel olarak anlamlı farklılık tespit edilirken K+HIFT grubunda ise bu fark anlamlı değildi. Araştırmamızda antrenman öncesi ve sonrası denge performansında meydana gelen değişimlerin K+HIIT ve K+HIFT gruplarında benzer olduğu tespit edildi ($p>0.05$).

Anahtar Kelimeler: Eş zamanlı antrenman, patlayıcı kuvvet, denge, kalp atım hızı, kan laktat

INTRODUCTION

Sportive performance can be affected by many physical, physiological, psychological variables and external factors. The combination of strength and endurance training, called concurrent training, is used to develop specific motor abilities according to the needs of the sport. Concurrent training plays a significant role in the advancement of several sports disciplines, leading to modifications in body composition, heightened physiological load outputs, preservation of health, and impacts related to age, gender, and bodily functions (48, 34). In soccer, which requires the development of concurrent training, it is considered a basic prerequisite to have an improved physical fitness and to achieve high performance during the match. While the majority of existing studies claim that endurance capacity is an important characteristic to achieve a high level of performance in soccer players (23), some studies emphasize the importance of sprinting, jumping and agility abilities that require short-term explosive power (20, 53).

The concurrent training model may be met with many designs. In this study, HIIT (high-intensity interval training) (50, 9, 55, 19, 45, 21) and HIFT (high-intensity functional training) programs (5), which have been frequently used in concurrent training models in recent years, were included. It is recommended to apply different protocols of concurrent training according to sports branches. In the selection of these protocols, the purpose of the training should be taken into consideration, as well as the condition of the athletes (55).

Several studies have documented the positive effects of concurrent training on performance development (4, 50, 8, 27, 51, 40, 6, 44). However, it is important to note that other studies have reported negative effects, indicating the need for further investigation (14, 36, 41, 54, 2).

Concurrent training is known as a complex training model that is influenced by several factors such as exercise mode and intensity, muscle groups trained (upper and lower body), participant characteristics (elite athletes, sedentary, moderately trained athletes, young, old). It is also claimed that the interaction of these factors among themselves can influence the results and level of training adaptations (19).

Studies examining the acute effects of concurrent training on performance (explosive strength and balance) and physiological load outcomes (blood lactate and heart rate) were found to be insufficient in the

literature. Moreover, the Strength training (S) S+HIIT model was tested for the first time in this study as a different concurrent training model. Existing studies also emphasize the need for more comprehensive research on this issue. Therefore, the present study was designed to examine the acute effects of two different concurrent training programs on both performance and physiological parameters. It is thought that the findings and results to be obtained from the study will shed light on the literature in terms of eliminating the uncertainties about concurrent training and the debates about its effects. Furthermore, it is widely believed that the outcomes of this study will yield significant insights applicable to coaching, athletes, and the field of sports sciences.

METHOD

Participants

The sample size for this study was determined using a power analysis conducted in the G*power software, with a significance level of 0.05, a power of 0.80, and an effect size of 0.80. Following the assessment, the overall sample size was established to consist of 12 people. The study was conducted using a sample of 13 male athletes aged 18-25 who voluntarily participated. These individuals were in good health, had a minimum of 2 years of training experience, and were actively involved in the university football league. Table 1 provides an overview of the physical attributes of the participants. The research procedure was carried out in adherence to the principles outlined in the Declaration of Helsinki and after the approval of the Fenerbahce University Non-Interventional Clinical Research Ethics Committee (Decision Number: 50.2023fbu). Prior to commencing the study, the participants were provided with comprehensive information regarding the study. The subjects provided consent for voluntary participation in the study.

Table 1. Physical characteristics of the participants

Parameters (n=13)	Mean	Std. Deviation	Minimum	Maximum
Age (years)	19.92	1.44	18	22
Training experience (years)	9.69	3.37	4	17
Body height (cm)	180.15	7.24	165	191
Body weight (kg)	72.93	10.14	58.9	89.9
Skeletal Muscle Weight (kg)	36.80	5.38	29.6	46.3
Body Fat Weight (kg)	9.09	3.61	1.90	14.6
Body Fat Percentage (%)	10.73	4.58	3	18.7
BMI (kg/m ²)	22.30	2.42	19	26.3
Maximal Bench press (kg)	63.46	11.61	50	85
Maximal Squat press (kg)	92.69	19.53	70	145

95% CI= 95% confidence interval lower and upper limits of the mean; BMI= Body mass index

Experimental design

In the present study, two different concurrent training models, namely S+HIIT and S+HIIT, were implemented. The training models were executed with a randomized crossover method.

The primary objective of this design is to mitigate the influence of individual and physical attributes of the participants on the outcomes of measurements, while also reducing the variability that may arise among participants (28). Each participant completed both the initial and subsequent training patterns in a randomized sequence at various time intervals.

This design enabled the achievement of a comparable degree of accuracy to that of a crossover design, but with a reduced number of participants. This study aimed to assess the performance metrics, specifically balance and explosive strength, as well as physiological outcomes, such as Heart Rate (HR) and Blood Lactate (LA), before and after implementing the training program.

The laboratory and sports facility were visited by participants on four occasions throughout the duration of the study. During the initial visit, the assessment of body composition and the implementation of adaption activities were conducted. Measurements were conducted on balance and jumping apparatuses as

part of the trial. Then, the participants underwent maximal strength measures to ascertain the level of intensity required for the training program. Consecutively, the last two sessions incorporated a sequence of training sessions that employed the crossover concept. The training sessions were conducted with a three-day interval. The measurement sessions were conducted within the same time frame (10:00-14:00) and in comparable ambient circumstances (20-25 °C, 35-40% relative humidity). The participants were provided with instructions to refrain from participating in intense physical activities, to guarantee sufficient sleep, and to abstain from consuming substances such as narcotics, alcohol, cigarettes, and caffeine during the 24-hour period prior to the commencement of the tests.

Data Collection

Body composition: The height of the participants was assessed using an anthropometric equipment (Holtain, UK) while they were minimally clothed and barefoot. The height was assessed using a stadiometer (Holtain Ltd., UK) that was securely attached to the wall. The measurements were recorded in centimeters with a precision of ± 0.1 millimeters, as stated by Tamer (2000). The researchers utilized bioelectrical impedance measurements (BIA) using the In Body 370S device to assess the body weight and body fat percentage of the participants (1). Body mass index (BMI) was calculated by dividing the participants' body weight (kg) by the square of their height (m²) (Weight (kg)/Height (m²) (56).

Heart Rate (HR) Measurement: The participants' HR measurements were recorded at 5 and 10 minutes (39, 25) of the active recovery period before and after training. Measurements were taken on the left arm with a Basic Comfort Plus brand electronic blood pressure monitor (24).

Blood Lactate (LA) Analysis: Blood lactate measurements of the participants before training and at 5 and 10 minutes of the active recovery period after training (39, 25) were taken with the Edge brand (Brussel / Belgium) lactate kits and device. With blood lactate measurement; blood was taken from the fingertip and the blood lactate value in the blood was measured. Participants were asked to wash their hands before starting the test. Before starting the measurement, the finger to be applied was disinfected with alcohol and wiped dry with cotton wool. Care was taken to ensure that all participants were drawn from the same hand before starting blood collection. First of all, the finger was grasped well, the puncture was made with the puncture tool and the first blood was wiped with cotton wool. The second drop of blood was applied to the application site of the test apparatus. The result in millimoles (mmol) of blood lactate concentration was recorded on a data information sheet prepared for each individual.

Explosive Strength Measurement: A jump test was conducted to assess explosive strength and anaerobic power. During the jump test, participants' baseline information was collected and a trial measurement was then recorded. Every individual engaged in the experiment conducted the test on three separate occasions, and the measurement with the greatest numerical outcome was documented. The CMJ jump method was conducted using the Smart Jump machine to accomplish the jump test. In the CMJ method, participants were instructed to do a jump while maintaining a non-upright stance, with their feet positioned shoulder-width apart and their hands resting on their waist (42, 18). A total of four measurements were conducted to assess explosive force, both before and after two acute training sessions using different combinations of strength training (S) and HIIT or HIFT.

Balance Testing: The measurement of balance was conducted using the SensBalance instrument, specifically the SensBalance Miniboard manufactured by Sensamove® in Utrecht, The Netherlands. The device involved the use of a moving platform. The present investigation involved the collection of static balancing measures from the subjects.

A measurement of balance was conducted over a duration of 60 seconds, as reported by Liviu et al. (29) and Canli et al. (10). The subject was instructed to maintain balance on the balancing beam for a duration of 60 seconds without experiencing any instances of falling. Following a duration of 60 seconds, the performance of each participant in terms of balance was documented on the data sheet. A total of four balance assessments were conducted both prior to and following two training sessions, namely S+HIIT and S+HIFT.

Rated Perceived Exertion (RPE): The study employed the Borg (6-20) scale to assess the RPE during acute training. The participants were provided with information regarding the Borg Scale at their initial visit.

In the study conducted by Yasli et al. (57), individuals were instructed to determine their RPE within a time frame of one minute after acute training. This was done with the aim of assessing the RPE reactions in conjunction with other physiological responses such as heart rate and blood lactate levels. The objective was to enhance the comprehension of training intensity by a comprehensive analysis of these variables.

Maximal Strength Measurement (One-repetition maximum): The athletes underwent maximal strength assessments in order to ascertain the level of training intensity. The participants were instructed to abstain from engaging in any strenuous physical activity within a 48-hour timeframe preceding the maximal strength training session. The second laboratory visit involved the collection of maximal strength measurements from the participants. Based on the maximal strength measures conducted three days before to the test, training intensities were computed for each participant. Maximal strength refers to the maximum weight an individual can lift during a single repetition. Prior to doing the maximal strength assessment, the participants were provided with detailed information regarding the test protocol. A two-minute warm-up was conducted prior to the administration of the test. One to two sets of warm-up exercises were conducted using a light load, consisting of 6-10 repetitions. Following the warm-up phase, a singular repetition trial was conducted, where in each participant's performance was evaluated at a level of 90%. If the trial was successful, the weight was increased depending on the completion rate. Participants who failed the trial had their weight reduced. A five-minute interval was provided between each trial. The maximum load that can be lifted with good technique is sometimes referred to as the one-repetition maximum. Typically, the determination of one-repetition maximum is achieved within a range of 3 to 5 repetitions. The assessment of maximal strength was conducted for the full squat and bench press. Consequently, a singular measurement of maximum force was acquired for both the upper and lower extremities (32).

Training Protocol

Strength training for both groups includes the full squat (1RM:SxT), bench press (1RM:SxT), CMJ (SxT), and sprint (SxD). Rest time between strength training sessions was 2-3 minutes. After 15 minutes recovery time was given after strength training, endurance training was started. The endurance training of the S+HIIT group included a 20-second run and 10-second rest (personalized distance). S+HIIT group included opposite skips, air squat jumps, lateral squats, lunges, jumping jacks, burpees, mountain climbers, and glute bridge movements. Each movement was performed as 20s load-10s rest. Eight movements were planned as 4 sets. 1 minute rest was given between sets. Thus, the duration of HIIT and HIIT training was kept equal (20 min). The average training duration was 90 minutes.

Data Analysis: The data were subjected to analysis using the statistical software SPSS 24 (SPSS Inc., Chicago, IL, USA). Descriptive statistics were employed to provide an overview of the participants' overall characteristics. The means and standard deviations of the test values were computed. The Shapiro-Wilk test was employed to assess the normality of the data, while Levene's test was utilized to examine the homogeneity of variance. The results indicated that the data exhibited normal distribution. The paired sample t-test was employed to assess the pre- and post-intervention differences within two different interventions. Mixed model ANOVA was used for repeated measures and Bonferroni Correction was used for pairwise comparisons. Significance level was accepted as $p < 0.05$.

Ethical approval and institutional permission

The research procedure was carried out in adherence to the principles outlined in the Declaration of Helsinki and after the approval of the Fenerbahçe University Non-Interventional Clinical Research Ethics Committee (Decision Number: 50.2023fbu).

FINDINGS

The present investigation observed a significant time interaction effect between the two training models, namely S+HIIT and S+HIIT, in relation to blood lactate values (Table 2). However, it is important to note that there was no statistically significant differences seen between the two training models in terms of blood lactate values during the initial measurements, as depicted in Figure 3. In a similar vein, it was observed that the concentration of blood lactate increased at the 5-minute mark following both types of training models, but subsequently dropped at the 10-minute mark post-training. Following the S+HIIT, there was a notable increase

in blood lactate at the 5-minute mark compared to the first baseline measurement ($p < 0.001$). Conversely, by the 10-minute mark, there was a substantial decrease in blood lactate levels ($p < 0.05$). Following the S+HIIT intervention, it was seen that the blood lactate concentration at the 5-minute mark exhibited a statistically significant increase when compared to the baseline measurement. However, no significant difference in the decrease of blood lactate was observed at the 10-minute mark ($p > 0.05$).

Table 2. Dependent variables across all time points and training models

Dependent variable	Training Models	Time (min)			F	p
		Pre-0	Post-5	Post-10		
Blood Lactate (mmol/L) mean(±SD)	S+HIIT	1.62±1.14	5.82±3.17 χ	2.90±2.29	17.387*	.001§
	S+HIIT	1.69±1.21	4.93±3.70 ϕ	3.41±3.63		
Heart Rate (bpm) mean (±SD)	S+HIIT	68.85±11.31	97.85±19.87 χ	83.62±14.94	40.596*	.001§
	S+HIIT	70.85±13.64	91.62±13.53 χ ¥	74.62±12.97		

§ Significant interaction effect $p < 0.001$

ϕ A Significant difference from baseline measures from the same condition $p < 0.05$

χ A Significant difference from baseline measures from the same condition $p < 0.001$

χ A Significant difference from 10 minutes measures from the same condition $p < 0.05$

¥ A Significant difference from 10 minutes measures from the same condition $p < 0.01$

*Time and training model interactions

An interaction effect was seen between the two training models in HR values, as indicated in Table 2. There was no statistically significant difference between the two training models in the pre-tests conducted to measure HR values (Figure 3). In all training modalities, there was a consistent pattern of HR elevation at the 5-minute mark, followed by a subsequent decline at the 10-minute mark. Following the S+HIIT intervention, HR values at the 5-minute mark exhibited a statistically significant increase when compared to the baseline measurement ($p < 0.001$). Subsequently, at the 10-minute mark, there was a substantial drop in HR values ($p < 0.05$). Following the administration of S+HIIT, there was a substantial increase in HR values at the 5-minute mark compared to the baseline measurement ($p < 0.001$). Subsequently, there was a significant drop in HR values at the 10-minute mark ($p < 0.01$).

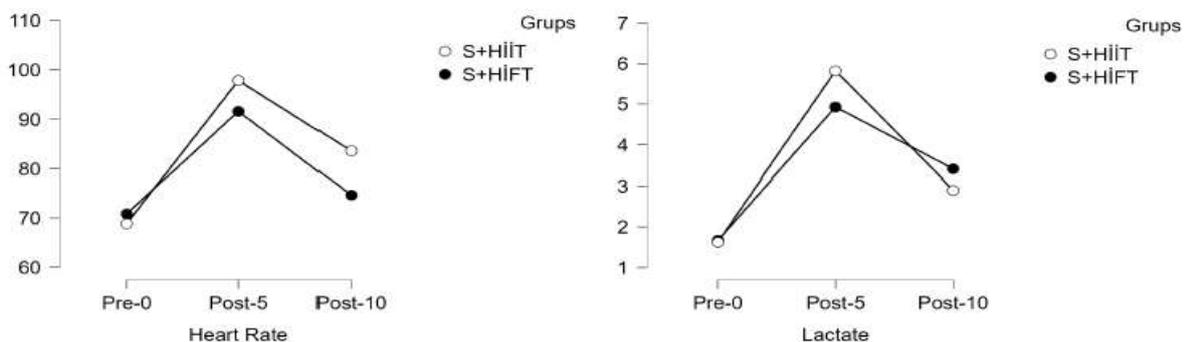


Figure 1. Changes in heart rate and blood lactate after the training models

Upon analysis of the CMJ data (Table 3), it was seen that there existed a statistically significant distinction between the before and post test results in the S+HIIT group ($p < 0.05$). Conversely, no statistically significant distinction was found between the pre and post test results in the S+HIIT training group ($p > 0.05$). Furthermore, it is worth noting that there was no statistically significant disparity between the pre-test and post-test outcomes in terms of balancing measurements and the RPE ($p > 0.05$).

Table 3. Within-group comparisons of dependent variables

Dependent variable (n=13)	Condition	Mean	Std. Deviation	p
S+HIIT CMJ	Pre	36.29	3.53	0.020*
	Post	37.67	4.01	
S+HIFT CMJ	Pre	37.63	4.17	0.098
	Post	36.35	4.23	
S+HIIT Balance	Pre	65.62	14.10	0.875
	Post	65.23	14.57	
S+HIFT Balance	Pre	56.39	16.93	0.095
	Post	62.31	13.86	
RPE	S+HIIT	13.15	2.15	0.913
	S+HIFT	13.08	1.32	

*p<0.05; CMJ = Counter movement jump; RPE = Ratings of perceived exertion

DISCUSSION AND CONCLUSION

The observed similarity in the increase of HR and blood lactate values in the concurrent training groups (S+HIIT and S+HIFT) in relation to the training intensity suggests that the intensity was appropriately adjusted in both training programs within the scope of this study. Upon evaluating the recovery processes of both training models, it was observed that the blood lactate value of the S+HIIT group exhibited a statistically significant decline at a faster rate compared to the S+HIFT group. The analysis of blood lactate outcomes according to different training models revealed significant differences between blood lactate pre0 and blood lactate post5, as well as between blood lactate post5 and blood lactate post10 in the S+HIIT group. Based on the observed outcomes, it was evident that the S+HIIT group exhibited a comparatively accelerated recovery rate in relation to the specific training modality. Significant differences were observed in the comparison of HR outcomes among various time points within the S+HIIT and S+HIFT groups. Specifically, significant differences were identified between HR pre0 and HR post5, HR pre0 and HR post10, and HR post5 and HR post10 in the S+HIIT group. Similarly, significant differences were observed between HR pre0 and HR post5, HR post5 and HR post5, and HR post5 and HR post10 in the S+HIFT group.

Although the outcomes exhibit comparable graphical representations, it is hypothesized that the discrepancies in significance levels can be attributed to the divergent compositions of the employed training models. The observed disparity in the rate of blood lactate increase and recovery decline between the S+HIIT and S+HIFT groups following loading can perhaps be attributed to the S+HIIT group's greater reliance on the cardiorespiratory system in comparison to the S+HIFT group. The enhanced functionality of the cardiorespiratory system demonstrated that the physiological reactions to high-intensity and continuous training were notably more efficient in the S+HIIT cohort. Nevertheless, no significant difference observed between the two groups (p>0.05). The present study found no significant difference between the post5 and post10 blood lactate levels in the S+HIFT group, suggesting that metabolic responses in this group were relatively lower. Conversely, the difference in blood lactate levels between post5 and post10 was larger in the S+HIIT group, indicating a more pronounced metabolic response in this group (p<0.05). Keytsman et al. (27), Medica et al. (33) and Cerexhe et al. (11) have documented comparable alterations in blood lactate dimensions in their respective investigations including HIIT. The study done by Kang et al. (25) aimed to investigate the potential correlation between maximal oxygen consumption (VO_{2max}) following resistance training and post-exercise HR and blood lactate levels. According to the paper, there was a positive correlation observed between persons with higher aerobic capacity and a more pronounced reduction in HR and blood lactate during the recovery phase following strength training. This correlation was particularly evident at the 5 and 10-minute intervals post-training. The utilization of the crossover design in our study effectively mitigated the presence of this interaction. Similar changes in max LA have been reported in studies using HIIT training (22). Furthermore, it has been observed that HIIT leads to more significant enhancements in mitochondrial content, enzyme activity, and potentially skeletal muscle recruitment when compared to moderate intensity training,

as highlighted by Cerexhe et al (11). A meta-analysis study was conducted to investigate the association between the HIIT model and cardiovascular health (7,13). In a similar vein, a separate investigation documented that the restoration of HR and blood lactate to their initial levels occurred within a span of 15-20 minutes, contingent upon the intensity and duration of the training session (3). The study also indicated that when implementing Strength + Endurance or Endurance + Strength training regimens, comparable levels of blood lactate were observed in both concurrent training models. However, a higher concentration of blood lactate was reported in concurrent training compared to strength or endurance training performed individually. According to Arsoniadis et al. (3), engaging in swimming training prior to strength training resulted in greater metabolic responses compared to engaging in endurance training following strength training on the same training day. In contrast, a study conducted by Drummond et al. (15) examined the effects of strength-endurance training compared to an endurance-strength training sequence. The findings revealed that both blood lactate and oxygen consumption exhibited an increase during the 5-minute recovery interval. Regardless of the circumstances, the response of blood lactate in the body reflects the impact of the previous exercise session, whether it focused on strength or endurance. This response can serve as an indicator of the intensity of the activity, but its usefulness in evaluating the effectiveness of strength and endurance training or recuperation may be restricted.

This study found that the changes in balance performance were comparable across the S+HIIT and S+HIFT groups before and after training. There was a lack of statistical significance observed in the comparison of balance performance between the S+HIIT and S+HIFT. In line with our investigation, Ozer (38) arrived at the finding that the balance capabilities of wrestlers were unaltered under conditions of high-intensity activity. According to Mahmood et al. (31), engaging in moderate intensity anaerobic exercise has been found to have a favorable impact on dynamic balancing performance, likely attributed to the warm-up effect. However, it is worth noting that engaging in high intensity exercise may have a detrimental effect on dynamic balance ability, maybe related to the onset of tiredness. Furthermore, Sarikaya et al. (46) conducted a study examining the impact of static warm-up exercises on various performance measures in basketball players. The findings revealed that engaging in static warm-up exercises resulted in immediate improvements in jump and balance performances. However, it was observed that these exercises had a detrimental influence on leg strength.

The analysis of explosive strength performance revealed a disparity in the pre- and post-training change in CMJ between the S+HIIT and S+HIFT groups. The S+HIIT group exhibited a rise in CMJ, while the S+HIFT group had a decrease in CMJ.

The temporal relationship between the two types of training (pre-training, 5 minutes and 10 minutes after training) had a statistically significant impact on CMJ explosive strength performance ($F_{1/12}=17.7$, $p<0.01$). The observed variations in loading requirements and metabolic resistance of functional workouts conducted with body weight in the S+HIFT group can be attributed to the relatively slower reduction in blood lactate values during the recovery period, as compared to the S+HIIT group.

Furthermore, it is plausible that the decline in CMJ performance seen in the S+HIFT group, characterized by the execution of body weight functional movements, can be attributed to muscle structure and peripheral fatigue. To clarify, the use of jumping activities within this workout paradigm serves as an indication of inducing weariness. According to Sparkes et al. (52), it has been posited that the decline in CMJ explosive strength performance during concurrent training can be attributed to factors such as muscle exhaustion and peripheral fatigue. In a separate investigation conducted by Coutinho et al. (12), it was shown that the implementation of half squat exercises among soccer players resulted in a discernible decline in jump performance. The inclusion of running-based workouts in the S+HIIT group may suggest the presence of Post-Activation Potentiation (PAP) effect, as noted by Ribeiro et al. (43), Nicol et al. (37), and Low et al. (30). The study conducted by Ribeiro et al. (30) found that although the RPE showed equal fatigue levels, the running-based S+HIIT group demonstrated PAP effect as revealed by the CMJ.

In summary, both cardiorespiratory-based S+HIIT and functional-based S+HIFT demonstrated comparable outcomes, underscoring the need of considering branch-specific requirements when choosing between these training modalities. The observation that both heart rate (HR) and blood lactate concentration (LA) values exhibited similar increases in the concurrent training groups (S+HIIT and S+HIFT) in relation to the training intensity suggests that the intensity was appropriately calibrated in both training programs within

the scope of this study. It was observed that the S+HIIT group exhibited a statistically significant and more rapid decrease in the blood lactate value compared to the S+HIFT group. When the explosive force performance (CMJ) was analyzed; S+HIFT explosive force value was found to be lower than the baseline value, while this value was higher in the S+HIIT group compared to the baseline value. In our study, it was determined that the changes in balance performance before and after training were similar in both groups ($p>0.05$). The selection of models for concurrent training applications should prioritize their ability to fulfill the physical and physiological requirements of the specific sports discipline. The training models presented in our study can serve as exemplar training models that address these demands. The anticipated outcomes and conclusions of this study are expected to contribute valuable insights to the existing body of literature by addressing the ambiguities surrounding concurrent training and the ongoing disputes regarding its consequences.

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Evaluating Physical Education Courses in Civil Defense and Firefighting Associate Degree Programs in Türkiye

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Ethical Statement: It is declared that scientific and ethical principles have been followed while carrying out and writing this study and that all the sources used have been properly cited.

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Abstract

This study aims to evaluate the physical education/sports education courses, content, and practices in the curricula of Civil Defense and Firefighting associate degree programs in Türkiye. Within the scope of the study, the Bologna course packages of 42 associate degree programs between 2022-2023 were examined in detail using document analysis method. According to the findings, it was determined that 14.3% (6 programs) did not include physical education courses, and 40.5% (17 programs) did not have course content for occupational physical fitness. In addition, 52.3% of the lecturers teaching the course did not have a degree in physical education and sports. The findings reveal important problems considering the requirement of high physical fitness in firefighting profession. The research emphasizes that the deficiencies in the physical education course content should be updated to meet the requirements of the firefighting profession and should be made compulsory. The results of the study clearly indicate that Civil Defense and Firefighting programs should focus on physical fitness-based education to train qualified personnel. In this context, it is recommended to adopt a special curriculum under the name of "Occupational Physical Fitness" course and it is emphasized that this course should include the objectives of achieving high physical capacity and fitness by focusing on the basic skills of the firefighting profession. Consideration of these recommendations may contribute to the creation of a strong and appropriate educational infrastructure in the firefighting profession.

Keywords: Firefighting training, Physical education curriculum, Occupational physical fitness, Civil defense and firefighting.

Özet

Türkiye'deki Sivil Savunma ve İtfaiye Önlisans Programlarında Beden Eğitimi Derslerinin Değerlendirilmesi

Bu araştırma, Türkiye'deki Sivil Savunma ve İtfaiyecilik önlisans programı müfredatlarında yer alan beden eğitimi/spor eğitimi derslerini, içeriğini ve uygulamalarını değerlendirmeyi amaçlamaktadır. Çalışma kapsamında 42 önlisans programının 2022-2023 yılları arasındaki Bologna ders paketleri doküman analizi yöntemi kullanılarak

detaylı bir şekilde incelenmiştir. Elde edilen bulgulara göre %14,3'ünde (6 program) beden eğitimi dersinin yer almadığı, %40,5'inde (17 program) ise mesleki fiziksel uygunluğa yönelik ders içeriği bulunmadığı belirlenmiştir. Ayrıca, dersi veren öğretim elemanlarının %52,3'ü beden eğitimi ve spor alanı mezuniyetine sahip değildir. Bulgular, itfaiyecilik mesleğinde yüksek fiziksel uygunluk gerekliliği göz önüne alındığında önemli sorunları ortaya koymaktadır. Araştırma, beden eğitimi dersi içeriğindeki eksikliklerin, itfaiyecilik mesleğinin gereksinimlerini karşılayacak şekilde güncellenerek zorunlu hale getirilmesi gerektiğini vurgulamaktadır. Araştırmanın sonuçları, sivil savunma ve itfaiyecilik programlarının, nitelikli personel yetiştirmek adına fiziksel uygunluk temelli bir eğitime odaklanması gerektiğini açıkça ortaya koymaktadır. Bu bağlamda, "Mesleki Fiziksel Uygunluk" dersi adı altında özel bir müfredatın benimsenmesi önerilmekte ve bu dersin, itfaiyecilik mesleğinin temel becerilerine odaklanarak yüksek fiziksel kapasite ve uygunluğa ulaşma hedeflerini içermesi gerektiği vurgulanmaktadır. Bu önerilerin dikkate alınması, itfaiyecilik mesleğinde güçlü ve uygun bir eğitim altyapısının oluşturulmasına katkı sağlayabilir.

Anahtar Kelimeler: Beden eğitimi müfredatı, İtfaiyecilik eğitimi, Mesleki fiziksel uygunluk, Sivil savunma ve itfaiyecilik

INTRODUCTION

Fires are unexpected events that can result in serious consequences, including damage to property, loss of life, and harm to the environment. To handle these situations effectively, it's important to have a trained firefighting team equipped with the necessary skills and gear. However, being prepared isn't just about having the right personnel—it's also about their ability to respond quickly and efficiently (65). Civil Defense and Firefighting programs are essential for training individuals in fire safety and emergency management, ensuring a coordinated and effective response to fire incidents.

These programs, which aim to enhance emergency management by providing training in fire prevention, response, and rescue, play a crucial role in preparing individuals for firefighting duties. However, physical fitness is an essential requirement for the success of firefighters, who must endure high temperatures, toxic gases, and various hazards (35, 54, 55, 65). Therefore, the physical education course within Civil Defense and Firefighting associate degree programs in Türkiye assumes significant importance, as it contributes to enhancing firefighters' physical abilities and readiness to tackle challenging situations effectively.

The aim of our research is to evaluate the physical education course in Civil Defense and Firefighting associate degree programs in Türkiye with regards to physical fitness. This evaluation will aid in comprehending the nature and requirements of the firefighting profession, enabling us to develop recommendations to enhance the effectiveness and applicability of these programs. The ability of firefighting teams to move rapidly and with resilience is crucial for successful emergency responses. Therefore, by focusing on the role, content, and effectiveness of the physical education course, we can gain a better understanding of the firefighting profession and improve education in this field.

Firefighting Profession and Physical Challenges

Firefighting is a highly challenging profession due to the significant danger and risks to life involved (56, 65, 68). The firefighting profession entails considerable peril, including exposure to extreme temperatures surpassing human endurance thresholds, inhalation of toxic gases posing respiratory hazards, and the constant risk of physical and chemical explosions during fire suppression efforts (22, 49). Firefighters must maintain exceptional physical fitness levels to effectively navigate the demanding tasks inherent in the profession, including maneuvering heavy protective gear, carrying air cylinders to safeguard against toxic inhalants, and managing bulky equipment such as hoses filled with pressurized water (16).

Tasks at the fire scene require intense physical exertion, imposing significant stress on the cardiovascular system and muscular endurance (24, 28). The weight of protective equipment and high temperatures exacerbate cardiovascular and thermoregulatory demands, further challenging professional firefighters. For instance, the 22 kg weight of individual protective equipment can induce thermal issues during firefighting, such as hyperthermia and dehydration, ultimately limiting firefighters' working time and

causing fatigue (65). Moreover, prolonged exposure to high heat can lead to fatal heat stroke, cognitive impairment, and an increased risk of injury (65).

Firefighting tasks may require high levels of aerobic fitness, anaerobic capacity, muscular strength, and endurance. The main activities that test the physical strength and endurance of firefighters include hose dragging, load carrying, and arm lifting. Studies have shown a high correlation between muscle strength, muscle endurance, and anaerobic performance in predicting performance time in simulated fire tasks (67). There was a strong correlation between the time taken to complete simulated fire courses and measures of muscle strength, endurance, and anaerobic performance.

Obesity rates among firefighters are high and may cause significant health problems (20). Research has shown that an increase in body mass index is directly linked to an increased risk of injury (66). Physical fitness may be a viable solution to combat the issues caused by obesity. To effectively tackle demanding fire tasks, firefighters require consistent levels of strength, aerobic fitness, and anaerobic capacity. Therefore, it is important to use training methods that target aerobic fitness, anaerobic capacity, and strength endurance (10, 13, 21).

Firefighting Training in Turkiye

In recent years, the diversity and number of institutions providing firefighting training has increased in Turkiye. The personnel need of fire brigade organizations are met by vocational high schools, two-year vocational colleges and universities providing four-year undergraduate education. "Firefighting and Fire Safety" departments in vocational high schools, "Civil Defense and Firefighting Programs" in two-year associate degree programs, and "Emergency Aid and Disaster Management" departments in four-year undergraduate programs train the personnel needed by the fire brigade (73).

In Turkiye, according to the Yükseköğretim Kurulu (YÖK) Atlas database (76), a total of 42 universities offering Civil Defense and Firefighting associate degree programs were identified (Table 1) All 42 universities offering these programs are state universities, and there are no such programs in foundation universities.

	University / Vocational School		University / Vocational School
1	Ağrı İ.Ç.Ü. (Patnos VS)(1)	23	Iğdır Ü. (Iğdır VS)(37)
2	Akdeniz Ü. (Elmalı VS)(2)	24	İstanbul. Ü.-C. Paşa (Tek. B. VS)(38)
3	Akdeniz Ü. (Teknik Bilimler VS)(2)	25	Kahramanmaraş İÜ (Türkoğlu VS)(39)
4	Alanya AKÜ (Akseki VS)(3)	26	Karabük Ü. (TOBB Tek. Bil. VS)(40)
5	Amasya Ü. (Suluova VS)(4)	27	Kastamonu Ü. (Bozkurt VS)(42)
6	Ankara Ü. (Beypazarı VS)(5)	28	Kayseri Ü. (Bünyan VS)(43)
7	Ankara. YBÜ (Sos. Bil VS)(6)	29	Kocaeli Ü. (İzmit VS)(45)
8	Ardahan. Ü. (Nihat D. Göle VS)(7)	30	Kütahya DÜ (Küt. Tek. B. VS)(46)
9	Artvin Çor. Ü. (Artvin VS)(8)	31	Malatya TÖÜ. (Doğanşehir VK VS)(48)
10	Atatürk Ü. (Horasan VS)(9)	32	Muğla SKÜ (Kavaklıdere Şma VS)(52)
11	Bingöl. Ü. (Genç VS)(11)	33	Necmettin EÜ (Meram VS)(53)
12	Bitlis E. Ü. (Tek. Bil. VS)(12)	34	Sakarya UBÜ (Denizcilik VS)(57)
13	Bolu A. İ. B. Ü. (Gerede VS)(14)	35	Selçuk Ü (Kadınhanı Faik İçil VS)(60)
14	Burdur MAE Ü. (A. M. T. VS)(17)	36	Sinop Ü (Boyabat VS)(63)
15	Çankırı K. Ü. (Yapraklı VS)(19)	37	Sivas C. Ü (İmranlı VS)(64)
16	Çukurova Ü. (Ceyhan VS)(23)	38	Tekirdağ NKÜ (Çerkezköy VS)(69)
17	Erzincan BYÜ. (Üzümlü VS)(29)	39	Tokat Gop Ü. (Niksar VS)(70)
18	Gaziantep Ü. (Oğuzeli VS)(30)	40	Trabzon Ü (Şalpaazarı VS)(71)
19	Giresun Ü. (Espiye VS)(31)	41	Yalova Ü (Yalova VS)(72)
20	Gümüşhane Ü. (Kürtün VS)(32)	42	Yozgat BÜ. (Yozgat VS)(75)
21	Harran Ü. (Şanlıurfa T. Bil. VS)(33)		
22	Hitit Ü. (Alaca Avni Çelik VS)(34)		

Objective and Significance of the Research

In Türkiye, there is no research that analyses the purpose and content of the courses called Physical Education/Sports Education in "Civil Defense and Firefighting" associate degree programs with the dimension of physical fitness. Therefore, the main purpose of this study is to analyze and evaluate the Physical Education/Sports Education course given in Civil Defense and Firefighting associate degree programs in Türkiye by considering the physical fitness dimension of physical fitness and firefighting tasks.

This study investigates the status of physical education courses within Türkiye's Civil Defense and Firefighting programs, aiming to identify curriculum issues and advocate for its inclusion as a compulsory component with an academic and practical curriculum, ultimately enhancing physical fitness. Moreover, it calls for specialized instructors and proposes recommendations to standardize nomenclature and improve curriculum development, addressing key questions such as the course's presence, mandatory status, instructor qualifications, curriculum listing, and inclusion of fitness and firefighting objectives.

METHOD

Research Design

This study utilizes a descriptive qualitative research model to evaluate the curriculum and content of the "Physical Education" course in Türkiye's Civil Defense and Firefighting Associate Degree Programs, employing document analysis to examine existing materials from universities offering these programs (74). Document analysis is a systematic approach aimed at extracting information and data from written materials, entailing the thorough examination of documents relevant to the research topic (15).

Population-Sample

The population of this research comprises 42 universities offering civil defense and firefighting associate degree programs in Türkiye. These universities are exclusively state universities, and foundation universities are not encompassed within this population.

In this study, the entire population was considered, and no sampling was conducted. Full access to the population was ensured, aligning with the aim of conducting a comprehensive and universal evaluation of the "Physical Education" course within the Civil Defense and Firefighting Associate Degree Programs in Türkiye.

By including the entire population, this research aimed to obtain detailed and accurate information about program content, curricula, and practices from each university. This approach increases the possibility of capturing the full spectrum of variations and nuances across institutions, thereby enhancing the richness and depth of the study findings.

The advantage of not employing a sampling method lies in the fact that each unit in the population is included, with a probability of 100%. Consequently, the research results provide a reliable representation of the population as a whole, enhancing the credibility and generalizability of the study outcomes.

Data Collection Instruments

In this study, data pertaining to physical education curricula was gathered utilizing the document analysis method. Within the study, fundamental details such as the content, objectives, elective or compulsory nature of physical education courses, and the educational qualifications of the instructors responsible for teaching these courses were scrutinized utilizing Bologna course packages. This analysis furnishes a comprehensive insight into the structure and implementation of physical education programs.

The data collection process consisted of downloading the Bologna course packages from the websites of the relevant schools, and then analyzing and recording the information obtained using a specific data collection form. Through these sources, basic information such as the name, content, objectives, elective or compulsory status of the Physical Education courses and the educational status of the teachers teaching the course were collected. The data collection process took into account recurring themes and ensured that this information was recorded in an organized way.

Research and Publication Ethics

In this process of document analysis, we considered the principles of objectivity and reliability to ensure accurate and reliable interpretation of the data. We established an ethical framework for the research to guarantee impartial and objective analysis. During the analysis process, we carefully considered the conformity of the determined themes and findings with the principle of impartiality. We ensured that the inferences were in accordance with the principle of objectivity (50). The reliability of the data used in the document analysis process is based on the Bologna course packages obtained from official sources and the data obtained from the websites of the universities. These sources usually provide current and reliable information.

The analysis process was conducted with transparency and assessed for adherence to predetermined criteria. This transparency facilitates comprehension and evaluation of the research methodology by others. Nevertheless, it is essential to acknowledge the limitations of this analysis, which solely relies on the Bologna course packages accessible through official websites. The research plan did not incorporate direct feedback from participants, thereby potentially omitting the perspectives of lecturers or students. It is crucial to recognize these limitations and interpret the findings accordingly.

Data Analysis

Throughout the document analysis process, the gathered data underwent detailed examination employing the content analysis methodology. This approach was employed to elucidate the contents of the Bologna course packages. Content analysis constitutes a research methodology geared towards identifying distinct words, concepts, or themes within textual or verbal discourse, followed by their systematic categorization (74).

This study employed content analysis to examine the course contents within Bologna course packages, with a specific focus on fundamental information including course names, objectives, and content.

The stages of content analysis are outlined as follows:

Data collection: Data were collected from university websites and Bologna course information packs.

Data Classification: The data were categorized into course name, course objective, course content, educational status of the lecturer, elective or compulsory status of the course.

Data coding: Data were coded according to the identified categories.

Analysis of data: The coded data were analyzed to identify themes and findings.

In the process of evaluating the physical education course content of 42 universities in civil defense and firefighting programs, the content was divided into two main categories to better understand the content. This categorization was used to better understand the focus and general structure of the physical education course. This approach makes comparisons clearer and more understandable.

Categorization Criteria:

If the course content prioritizes physical fitness, skills, and knowledge relevant to firefighting, it falls under the 'firefighting-oriented' classification. Conversely, if the course incorporates physical education-based activities such as games, it is categorized as 'physical education-oriented'. This categorization aids in the interpretation of study outcomes. The classification of courses into 'physical education-oriented' and 'firefighting-oriented' categories is based on whether the curriculum primarily focuses on physical education-based activities or includes content relevant to fitness for firefighting tasks, as outlined in the curricula.

To classify instructors teaching physical education courses, two primary categories were established: 'in-field' and 'out-of-field', determined by their educational backgrounds. This categorization aims to address the issue of delineating the expertise areas of instructors and understanding how physical education course contents are influenced by instructors from various disciplines. The analysis process entailed a thorough examination of instructors' educational histories and fields of study. Information regarding instructors' alma maters and graduation details was sourced from the YÖK Academic portal and incorporated into the analysis. Data analysis was conducted using MS Excel and SPSS 23 for percentage and frequency analyses.

FINDINGS

The YÖK Atlas database indicates that 42 state universities in Türkiye provide associate degree programs in Civil Defense and Firefighting (76). Table 2 illustrates the course title, mandatory/elective statuses, course contents, and details regarding the academic disciplines of instructors teaching the courses, sourced from data retrieved from university websites and course content packages.

Table 2. Physical education course title, course content, mandatory/elective status, and field of lecturer in civil defense and firefighting programs

	University / Vocational School	Course Title	M/E	Course Content	Lecturer
1	Ağrı İ.Ç.Ü. (Patnos VS)	Physical Education	M	PES Focused	out-of-field
2	Akdeniz Ü. (Elmalı VS)	Rescue Techniques and Sports Training	M	FF Focused	out-of-field
3	Akdeniz Ü. (Tek. Bil. VS)	Rescue Techniques and Sports Training	M	FF Focused	out-of-field
		FF Sports Training	E	FF Focused	out-of-field
4	Alanya AKÜ (Akseki VS)	FF Sports Training	M	PES Focused	in-field
5	Amasya Ü. (Suluova VS)	Occupational Physical Fitness	M	FF Focused	in-field
6	Ankara Ü. (Beypazarı VS)	Physical Education FF Sports Training	E	FF Focused	out-of-field
7	Ankara YBÜ (Sosyal Bilimler VS)	Physical Health and Sports Education	M	FF Focused	in-field
8	Ardahan Ü. (N. Delibalta Göle VS)	Sport Education Information	M	FF Focused	in-field
		FF Sports Training			
9	Artvin Çor. Ü. (Artvin VS)	FF Sports Training	M	FF Focused	out-of-field
10	Atatürk Ü. (Horasan VS)	Sport Education Information	M	PES Focused	in-field
11	Bingöl Ü. (Genç VS)	FF Sports Training	M	FF Focused	out-of-field
12	Bit. E. Ü. (Tek. Bilimler VS)	No Class	-	-	-
13	Bolu AİBÜ. (Gerede VS)	Physical Education	M	PES Focused	in-field
14	Burdur. MAEÜ (Altınyayla M.T. VS)	Physical Education	M	PES Focused	out-of-field
		Physical Education and Physical Development			
15	Çankırı KT. Ü. (Yapraklı VS)	Leadership and Group Dynamics in Sports	M	PES Focused	in-field
		Physical Education and General Gymnastics	E		
		FF Sports Training	M		
16	Çukurova Ü. (Ceyhan VS)	Physical Education	E	PES Focused	out-of-field
17	Erzincan BYÜ (Üzümlü VS)	FF Sports Training	M	PES Focused	in-field
18	Gaziantep Ü. (Oğuzeli VS)	Sport Education	M	PES Focused	in-field
19	Giresun Ü. (Espiye VS)	Physical Education	E	PES Focused	in-field
20	Gümüşhane Ü. (Kürtün VS)	FF Sports Training	M	FF Focused	out-of-field
21	Harran Ü. (Şanlıurfa Tek. Bil. VS)	FF Sports Training	M	FF Focused	out-of-field
22	Hitit Ü. (Alaca Avni Çelik VS)	FF Sports Training	M	PES Focused	out-of-field
23	Iğdır Ü. (Iğdır VS)	Physical Health and Sports Education	M	PES Focused	in-field
24	İstanbul. Ü. C. Paşa (Tek. Bil. VS)	No Class	-	-	-
25	Kahramanmaraş İÜ. (Türkoğlu VS)	Physical education and physical development	M	PES Focused	in-field
		FF Sports Training			
26	Karabük Ü. (TOBB Tek. Bil. VS)	FF Sports Training	M	FF Focused	out-of-field

27	Kastamonu Ü. (Bozkurt VS)	Physical Health and Sports Education	M	PES Focused	out-of-field
28	Kayseri Ü. (Bünyan VS)	FF Sports Training Physical Education and Physical Development	M E	FF Focused	in-field
29	Kocaeli Ü. (İzmit VS)	FF Sports	M	FF Focused	out-of-field
30	Kütahya DÜ. (Küt. Teknik Bilimler VS)	No Class	-	-	-
31	Malatya TOÜ. (Doğanşehir Vk VS)	No Class	-	-	-
32	Muğla SKÜ. (Kavaklıdere ŞMA VS)	FF Sports	M	PES Focused	out-of-field
33	Necmettin EÜ. (Meram VS)	FF Sports Training	M	FF Focused	in-field
34	Sakarya UBÜ. (Denizcilik VS)	No Class	-	-	-
35	Selçuk Ü. (Kadınhanı Faik İçil VS)	FF Sports Training	M	FF Focused	out-of-field
36	Sinop Ü (Boyabat VS)	Physical Education	E	PES Focused	out-of-field
37	Sivas Cum. Ü. (İmranlı VS)	No Class	-	-	-
38	Tekirdağ NKÜ (Çerkezköy VS)	FF Sports Training	M	FF Focused	out-of-field
39	Tokat GOP Ü. (Niksar VS)	FF Sports Training	M	FF Focused	out-of-field
40	Trabzon Ü. (Şalpazarı VS)	FF Sports Training	M	FF Focused	out-of-field
41	Yalova Ü. (Yalova VS)	Physical Education	M	PES Focused	out-of-field
42	Yozgat BÜ. (Yozgat VS)	Firefighting Sports	M	FF Focused	out-of-field

M: Mandatory, E: Elective, PES: Physical Education and Sports FF: Fire Fighting VS: Vocational School

Table 3. Course status, mandatory/selective, content, frequencies of course lectures

n=42	f	%
Course Available	36	85.7%
No Class	6	14.3%
Mandatory	33	78.5%
Elective	3	7.2%
No Class	6	14.3%
Physical Education and Sports focused.	17	40.5%
Firefighting focused.	19	45.2%
No Class	6	14.3%
In-field Lecturer	14	33.4%
Out-of-field Lecturer	22	52.3%
No Class	6	14.3%

Tables 2 and 3 present the names of the physical education courses in the Civil Defense and Firefighting Programs in Türkiye, along with their mandatory or elective status, content, and details regarding the instructors' educational backgrounds. After analyzing the findings, it was determined that 36 out of 42 programs incorporate a physical education course. This suggests that 85.7% of the programs either require or provide physical education.

Physical education is a mandatory course in 33 programs, which accounts for 78.5% of the programs. Additionally, physical education is offered as an elective in 3 programs, making up 7.2% of the total programs.

Physical Education and Sports-Focused Education courses are offered in 17 out of 40.5% of the programs, while Firefighting-Focused Education courses are offered in 19 out of 45.2% of the programs.

Upon examination of the data, it was discovered that 14 programs (33.4%) employed lecturers who graduated in physical education and sports, while 22 programs (52.3%) employed lecturers who did not have

a degree in the field. In Turkiye's Civil Defense and Firefighting Programs, 33.4% of the lecturers teaching physical education courses have a degree in physical education and sports.

DISCUSSION AND CONCLUSION

The objective of this study was to conduct a thorough analysis of the physical education curriculum in associate degree programs for Civil Defense and Firefighting in Turkiye. The study aimed to evaluate the course's contribution to occupational physical fitness. The study findings indicate that there is a lack of standardization in course names across programs, with some universities even excluding certain courses. Additionally, the contribution of the course content to physical fitness appears to be limited, and there are optional practices available (refer to Tables 2 and 3).

Programs That Do Not Include Physical Education

The research findings reveal that 21% (6 programs) of the surveyed Civil Defense and Firefighting programs do not provide a physical education course or equivalent training. Considering the physical requirements of firefighting, it is essential for firefighting personnel to maintain optimal physical fitness. This entails the capacity to carry heavy equipment, air cylinders, and protective gear during firefighting missions. Proficient firefighters with a high degree of physical fitness can effectively engage and lift these loads to combat fires.

Incorporating and promoting physical fitness and physical activity into practical courses can be a cost-effective strategy to mitigate the adverse effects of physical unfitness (20). Research indicates that firefighters with low levels of physical fitness are more likely to underperform in firefighting tasks compared to those with high levels (18, 25, 44, 58, 59, 62).

Mandatory / Elective

In 7.2% of civil defense and firefighting associate degree programs in Turkiye, physical education is an optional course. However, in most programs, this course is mandatory. When examining similar examples from around the world, in Canada, pre-service training for firefighters is typically organized by universities in three or four semesters. The Seneca College Firefighter Pre-Service Education and Training program mandates the 'Physical fitness for firefighters' course in the first semester. Successful completion of the Physical and Endurance Test (61) is also required for all students taking this course.

The Humber College in Canada includes the "Health and Physical Fitness Management for Firefighters" course as a compulsory component of the pre-service training program for firefighters in two semesters (36). The course aims to provide training prescriptions for leading a healthy life and achieving physical fitness during duty. Similarly, Durham College in Canada offers a compulsory course called "Fire Physical Fitness Management" (27). The course 'Physical Fitness and Endurance for Firefighters' is mandatory for three semesters at Loyalist College (47).

Firefighting is a demanding task that necessitates prompt and efficient intervention. Physically fit firefighters are essential for successful operations. However, excessive physical exertion and strain are primary contributors to firefighter injuries (41). Consequently, response efficiency may diminish with physical exertion, leading to an increase in injuries. To mitigate this issue, it is crucial to integrate a mandatory physical fitness course into civil defense and firefighting programs, as observed in Canada. In programs that impart professional competencies, a compulsory physical fitness course could aid prospective firefighters in executing their duties more effectively.

Course Titles

When Table 2 is examined, it can be observed that the course names vary across different programs. The course names in civil defense and firefighting programs are provided below (Table 4).

Table 4. Course Titles Included in Programs

Course Titles	Course Titles
Physical education	Sports Training
Fire Fighting and Sports Training	Firefighter Sports
Physical Health and Sports Education	Firefighter Sports
Sports Education Information	Fire Department Sports Training
Rescue Techniques and Sports Training	Occupational Physical Fitness
Physical Education and Bodybuilding	Physical Education and General Gymnastics
Physical Education and Physical Development	

The primary objective of vocational education is to train skilled personnel for sectors where their expertise is required. Although most courses are named after specific professions, using the same name for physical education courses in primary and high schools, as well as in associate degree programs where vocational education is emphasized, may diminish motivation for education. Physical fitness is a fundamental requirement for firefighters, and it is attained through physical education. However, the course names may blur the distinction between sports and physical education. While sports entail physical and mental activities governed by specific rules, physical education encompasses all activities aimed at enhancing physical strength and preserving health (51). Based on these definitions, it is considered inappropriate to use the term 'sport' as a course title. In Canada, these courses are commonly referred to as 'Physical Fitness for Firefighters' or simply 'Physical Fitness' (61).

Course Contents

Upon examination of the course contents in civil defense and firefighting programs, it is evident that 19 programs include education content focused on firefighting, while 17 programs include education content focused on physical education and sports.

Physical Education and Sports-Focused

Burdur Mehmet Akif Ersoy University's Altınyayla M.T.G.H. (17) Vocational School has made the physical education course mandatory. However, it has been observed that the curriculum does not include any subjects that would enhance physical fitness for the firefighting profession (17). Upon examination of the course content, it is evident that the course aims to equip students with knowledge on the historical, philosophical, and scientific foundations of sports sciences. Additionally, it covers developments in sports sciences, factors influencing these developments, analysis, and interpretation of basic disciplines in sports sciences, professional preparation, career choices, and employment opportunities related to sports sciences. This course content evaluates that learning about the historical, philosophical, and scientific foundations of sports sciences may exceed the educational objectives of vocational schools that train firefighters.

Firefighting-Focused

The course content of Amasya University's Suluova Vocational School (4) has a focus on firefighting-oriented education. The course, named 'Occupational Physical Fitness', extensively examines the physical expectations, requirements, and standards of professions such as firefighting and civil defense. In this context, participants learn about the physical abilities and fitness that are crucial in these professions and how to enhance them. They also acquire knowledge about appropriate training and exercise methods to improve their physical performance in their respective occupations.

The course provides information on the administration, measurement, and evaluation of professional physical fitness tests. It imparts practical knowledge on the purpose of these tests and how to interpret their results. This enables participants to assess and improve their physical condition more effectively. Throughout the course, participants learn about nutrition and rest practices to maintain healthy physical performance. The course emphasizes the importance of a regular lifestyle and healthy habits in professional life. Lastly, it aims to equip participants with skills to cope with professional challenges, including stress management, injury prevention, and strategies for dealing with physical and psychological challenges. This description is part of the course information package. Similar content and objectives have been observed in other universities that contribute to vocational physical fitness.

Training and Issues of Academic Staff

Based on the data obtained regarding the educational backgrounds of faculty members instructing physical education courses in Civil Defense and Firefighting associate degree programs, it was discovered that only 33.4% of these courses are taught by graduates of the physical education and sports department. The remaining 52.3% of faculty members lack training in the field of physical education.

The low percentage of physical education courses being taught by qualified graduates from physical education and sports departments, standing at only 33.4%, represents a significant issue. This scenario could potentially have adverse effects on the quality of education and student outcomes. Moreover, there exists a shortage of faculty members in civil defense and fire department programs (26).

The discipline of physical education aims to impart fundamental principles of movement, physical fitness, and sports to individuals, fostering their physical, mental, and social development. In the context of firefighting training, where physical fitness holds paramount importance, this becomes an even more nuanced concern. Consequently, instructors tasked with teaching these courses must possess adequate knowledge and experience in the field. Faculty members lacking training in sports science may encounter challenges in comprehending the fundamental concepts and practical applications of the subject matter. We believe this situation arises from factors such as educational quality and outcomes.

For instance, an instructor without a background in physical education may struggle to delineate the precise scope, objectives, and instructional methods of the course, leading to a misalignment between the course content and its intended goals. Moreover, faculty members lacking expertise in physical education and sports may inadequately address the physical activity and sports-related needs of students, thereby potentially impeding their overall development.

SUGGESTIONS

This study analyzed the content of physical education courses in civil defense and firefighting associate degree programs in Türkiye, examining their contribution and current status in fostering professional physical fitness. Drawing from the research findings, the following suggestions are proposed:

Course Title: It is advisable to utilize the term "Occupational Physical Fitness" rather than generic terms like "physical education" or "sports." This title effectively emphasizes the course's relevance to the firefighter profession and aptly represents its content.

Course Content: Should prioritize physical fitness and address the specific duties inherent to the firefighter profession. This encompasses the physical skills essential for tasks like firefighting, search and rescue operations, and fire prevention measures.

Mandatory Course: Physical education should be a mandatory course in civil defense and firefighting associate degree programs. This will provide firefighter candidates with the foundation necessary to develop their physical fitness skills and enhance their professional performance.

Qualifications and Development of Lecturers in Vocational Schools: Lecturers tasked with teaching physical education courses should hold a bachelor's degree in physical education and possess familiarity with the firefighter profession. To guarantee this, faculty members ought to undergo supplementary in-service training focusing on physical fitness and firefighting.

Implementation of these recommendations can enhance civil defense and firefighting training, providing better preparation for qualified personnel in the sector. In the future, it will be important to conduct research examining the contribution of occupational physical fitness courses to physical fitness profiles for continuous program improvement.

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The Relationship Between Functional Movement Screening and Joint Range of Motion, Y-Balance Test and Countermovement Jump in Amateur Soccer Players

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Abstract

This study aimed to investigate the relationship between a functional movement screening (FMS) test and joint range of motion (ROM), lower quarter y-balance test (LQYBT), and countermovement jump (CMJ) performance in amateur soccer players. A study was conducted with 25 male amateur soccer players to assess their physical abilities using various tests. The tests included FMS, YBT, CMJ, ROM for shoulder extension, hip abduction, hip external rotation, and ankle dorsi/plantar flexion. Pearson's correlation test was used to examine the association between the variables. A significant positive correlation between the FMS and CMJ ($r=0.424$, $p<0.05$), FMS and right LQYBT ($r=0.471$, $p<0.05$), left LQYBT ($r=0.459$, $p<0.05$), shoulder right extension ($r=0.608$, $p<0.05$), shoulder left extension ($r=0.559$, $p<0.01$), hip right abduction ($r=0.536$, $p<0.01$), hip left abduction ($r=0.485$, $p<0.05$), hip right external rotation ($r=0.619$, $p<0.01$), hip external left rotation ($r=0.622$, $p<0.01$), ankle right dorsiflexion ($r=0.597$, $p<0.01$), ankle left dorsiflexion ($r=0.608$, $p<0.01$), ankle right plantar flexion ($r=0.541$, $p<0.01$), ankle left plantar flexion ($r=0.519$, $p<0.01$) ROM. A moderate positive correlation was observed between the FMS and CMJ, right-left LQYBT, and right-left hip abduction ROM. A highly positive correlation was noted between FMS and ROM for shoulder right-left extension, hip external right-left rotation, and ankle dorsi/plantar flexion on the right and left sides. In this context, coaches, athletic performance specialists, and physiotherapists can use LQYBT, ROM and CMJ tests as well as FMS to evaluate sports performance and injury risk..

Keywords: Balance, functional movement screening, joint range of motion, jumping, soccer

Özet

Amatör Futbolcularda Fonksiyonel Hareket Taraması ile Eklem Hareket Açıklığı, Y-Denge Testi ve Dikey Sıçrama Arasındaki İlişki

Bu çalışma amatör futbolcularda fonksiyonel hareket tarama testi ile eklem hareket açıklığı, denge ve sıçrama arasındaki korelasyonu incelemek amacıyla yapılmıştır. 25 erkek amatör futbolcunun fiziksel yeteneklerinin çeşitli testler kullanılarak değerlendirilmesi amacıyla fonksiyonel hareket tarama testi (FMS), eklem hareket açıklığı (EHA) (omuz ekstansiyon, kalça abduksiyon, kalça dış rotasyon, ayak bileği dorsifleksiyon ve plantar fleksiyon), Y denge testi

alt ekstremitte ve dikey sıçrama testleri yapılmıştır. İlişkiyi analiz etmek için Pearson Korelasyon testi kullanıştır. FMS ile dikey sıçrama ($r=0,424$, $p<0,05$), sağ ayak denge ($r=0,471$, $p<0,05$), sol ayak denge ($r=0,459$, $p<0,05$), omuz ekstansiyon sağ ($r=0,608$, $p<0,01$), omuz ekstansiyon sol ($r=0,559$, $p<0,01$), kalça abdüksiyon sağ ($r=0,536$, $p<0,01$) kalça abdüksiyon sol ($r=0,485$, $p<0,05$), kalça dış rotasyon sağ ($r=0,619$, $p<0,01$), kalça dış rotasyon sol ($r=0,622$, $p<0,01$), ayak bileği dorsifleksiyon sağ ($r=0,597$, $p<0,01$), ayak bileği dorsifleksiyon sol ($r=0,608$, $p<0,01$), ayak bileği plantar fleksiyon sağ ($r=0,541$, $p<0,01$), ayak bileği plantar fleksiyon sol ($r=0,519$, $p<0,01$) eklem hareket açıklıkları arasında pozitif bir korelasyon tespit edilmiştir. FMS ile CMJ, sağ-sol YBT, kalça abdüksiyon sağ-sol EHA arasında orta derecede pozitif ilişki ve omuz ekstansiyon sağ-sol, kalça dış rotasyon sağ-sol, ayak bileği dorsifleksiyon sağ-sol, ayak bileği plantar fleksiyon sağ-sol EHA arasında ise yüksek derecede pozitif ilişki olduğu görülmüştür. Bu bağlamda antrenörler, atletik performans uzmanları ve fizyoterapistler, spor performansını ve sakatlık riskini değerlendirmek için FMS'nin yanı sıra LQYBT, ROM ve CMJ testlerini de kullanabilirler.

Anahtar Kelimeler: Denge, eklem hareket açıklığı, fonksiyonel hareket kapasitesi, futbol, sıçrama,

INTRODUCTION

Soccer players require advanced strength, speed, endurance, flexibility, balance, agility, technical skills, joint mobility, and functional range of motion to perform successfully. Various tests that measure these characteristics have been used to evaluate sports performance. Functional movement screening (FMS) is recommended to facilitate the evaluation of these patterns in sports practice (17). The FMS consists of seven basic motion component tests: deep squat, in line lunge, hurdle step, shoulder mobility, active straight leg raise, trunk stability push-up, and rotational stability. Each move was scored between 0-3 and itself. The total score ranges from 0 to 21 points (6, 7). Kisel et al. (12) stated that the risk of injury for soccer players with a total score below 14 is higher than those with a score above 14.

Functional movement capacity refers to the ability to perform basic motor skills under controlled conditions (7). Evaluation of functional movement generally includes the measurement of postural control, stability, flexibility, neuromuscular coordination, balance, and range of motion (6, 14). Functional movement screening is designed to identify general musculoskeletal status, functional ranges of motion, and asymmetries that may predict disability (6). FMS can assess a person's muscle strength, balance, range of motion, and coordination at one level (6, 7). Lower quarter y-balance test (LQYBT) is used to measure dynamic balance and neuromuscular control (4). The LQYBT measures balance in a one-leg stance and requires an individual to have strength, flexibility, and proprioception to perform the test adequately (3, 9). Range of motion (ROM) is a measurement that examines joint function and is used in the evaluation of musculoskeletal status (24).

According to Werner et al. (32) an excessive or insufficient range of motion in the joints can harm movement functionality and lead to disability. FMS, LQYBT, and ROM tests were used to predict negative outcomes. In some studies, it has been stated that the risk of disability is higher for participants with FMS total scores less than 14 (12, 19). It has been stated that LQYBT scores below 89.6% (29) and low ROM (2) are associated with disability risk. The FMS, ROM, LQYBT, and countermovement jump (CMJ) tests are frequently used by coaches, athletic performance specialists, and physiotherapists to improve athletic performance characteristics and to predict athletes with a tendency to injure. In this context, the aim of the study is to investigate the relationship between the FMS and ROM, LQYBT, and CMJ in amateur soccer players..

METHOD

Participants

The sample group of the study consisted of 25 amateur male soccer players (age; 19.76 ± 1.22 height; 180.18 ± 4.85 , weight; 71.69 ± 6.69 , body mass index; 22.08 ± 1.96). The tests were conducted during the preparation period before the competition. The team trained 5 or 6 training sessions per week.

Procedure

The tests were conducted on different days. The tests were carried out on different days, considering that it could negatively affect the athletes' performances. FMS tests were performed without warming. Joint

range of motion measurements were performed with a goniometer. A standard warm-up of 15 minutes was performed before the other tests were performed. The research was conducted following the Declaration of Helsinki and was approved by the Ethics Committee of Osmaniye Korkut Ata University (E.119502).

Functional Movement Screening

The FMS test was performed in accordance with the guidelines. The scoring standards for the seven tests (Deep Squat, Hurdle Step, In Line Lunge, Shoulder Mobility, Active Straight Leg Raise, Trunk Stability Push-Up, Rotary Stability) ranged from 0 to 3, with 3 points for excellent condition (normal functional movement mode), 2 points for incorrect completion or compensatory movements, 1 point for completing the test when the body is unstable, and 0. for any pain during the test, and the maximum total score was 21 points (8). Before the test, the athletes do not apply any warm-up as stated in the test protocol. The movements applied in the test were performed sequentially and the scores were recorded.

Joint Range of Motion Measurements

Shoulder Joint Range of Motion

The measurements were conducted when the subject was in the prone posture. As was done during the shoulder flexion movement, the goniometer was positioned in the same manner. The absence of flexion movement in the trunk and abduction movement in the shoulder should be taken into consideration throughout the measuring process (25). The measurement was carried out in two attempts with a goniometer.

Hip Joint Abduction Range of Motion

The measurements were taken while the subject was lying on their back. When the goniometer was positioned, the pivot point was positioned on the projection of the trochanter major, which is located at the anterior portion of the femur. When the fixed arm is positioned, it is parallel to the portion of the spine that is anterior to the superior region. Positioning the moving arm so that it would follow the midline of the anterior femur area was the task at hand. During the performance of the measurement, there should be no external rotation of the hip. (25). The measurement was carried out in two attempts with a goniometer.

Hip Joint External Rotation Range of Motion

The person being measured sat with his legs hanging from the table from the knee. The pivot point of the goniometer was placed at the tuberosity of the tibial region. The fixed arm is placed parallel to the knee and ground, or it can be held perpendicular to the ground. The moving arm followed the tibial crista. There should be no abduction, adduction, extension, or flexion movements of the hip during the measurement (25).

Ankle Joint Dorsiflexion and Plantar Flexion

As the starting position of the ankle was 00 °, a right angle of 90 ° was accepted between the 5th metatarsal and the fibula. During the measurement, the participant was in a supine or sitting position. Measurements were performed by placing a thin pillow under the knee (25).

Lower Quarter Y-Balance Test

The test was performed in three directions anterior, posteromedial and posterolateral. To score each of the three directions, the reach distances (measured in centimetres) were averaged and normalised to the participant's leg length. The LQYBT composite score was calculated using the following formula: $(\text{anterior} + \text{posteromedial} + \text{posterolateral performance}) / 3 \times \text{lower extremity length (cm)} \times 100$ (26). Before the test, the athletes underwent standard warm-up. Each athlete performed two trials on each foot.

Counter Movement Jump Test

The participant was instructed to complete the CMJ with an arm swing by crouching down to approximately 90° knee flexion and jumping as high as possible through maximum concentric contraction. Participants performed two practice jumps after warming up and the best score was recorded (20). Microgate jump mat was used for testing. Participants performed two jumps with a 6-second rest interval

Statistical Analysis

Normality of the distribution was tested using the Kolmogorov Smirnov test. The data were found to be normally distributed, and a Pearson's correlation test was applied. The 95% confidence interval (CI) was calculated. Statistical significance was set at $P < 0.05$. For the classification of effect size in correlation values, 0-0.30 weak correlation, 0.31-0.50 medium correlation, 0.51-0.70 high correlation and 0.71-1 correlation coefficient valid in the field of sports sciences, (R) was used (11). The SPSS 22 package was used in this study.

FINDINGS

Table 1. Correlation between FMS test results and ROM, LQYBT, CMJ

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
(1) FMS	1													
(2) CMJ	0.424*	1												
(3) LQYBT Right	0.471*	-0.033	1											
(4) LQYBT Left	0.459*	-0.066	-0.920**	1										
(5) Shoulder ROM Right	0.608**	0.102	0.301	0.389	1									
(6) Shoulder ROM Left	0.559**	0.078	0.404*	0.440*	0.927**	1								
(7) Hip Abd. ROM Right	0.536**	-0.008	0.334	0.435*	0.635**	0.634**	1							
(8) Hip Abd. ROM Left	0.485*	0.003	0.305	0.472*	0.691**	0.683**	0.842**	1						
(9) Hip Ext. Rot. ROM Right	0.619**	0.199	0.303	0.336	0.806**	0.857**	0.688**	0.769**	1					
(10) Hip Ext. Rot. ROM Left	0.622**	0.277	0.506**	0.583**	0.578**	0.581**	0.612**	0.778**	0.649**	1				
(11) Ankle DF ROM R	0.597**	0.381	0.331	0.343	0.443*	0.379	0.431*	0.321	0.461*	0.501*	1			
(12) Ankle DF ROM Left	0.608**	0.540**	0.141	0.132	0.517**	0.404**	0.384	0.323	0.516**	0.431*	0.823**	1		
(13) Ankle PF ROM Right	0.541**	0.069	0.460*	0.454*	0.695**	0.741**	0.549**	0.429*	0.744**	0.502*	0.621**	0.601**	1	
(14) Ankle PF ROM Left	0.519**	0.216	0.275	0.196	0.497*	0.466*	0.324	0.054	0.447*	0.130	0.491	0.602**	0.803**	1

Correlation is significant at the ** $P < 0.001$, * $P < 0.005$, FMS: Functional Movement Screening, CMJ: Counter Movement Jump, Lower Quarter Y-Balance Test (LQYBT), ROM: Range of Motion, DF: Dorsiflexion, PF: Plantar Flexion, Ext: External, Rot: Rotation, Abd: Abduction

The study results indicate a significant positive correlation between the FMS and CMJ ($r=0.424$, $p<0.05$), FMS and right foot balance (LQYBT), ($r=0.471$, $p<0.05$), left foot balance (LQYBT), ($r=0.459$, $p<0.05$), shoulder extension right ($r=0.608$, $p<0.05$), shoulder extension left ($r=0.559$, $p<0.01$), hip abduction right ($r=0.536$, $p<0.01$), hip abduction left ($r=0.485$, $p<0.05$), hip external rotation right ($r=0.619$, $p<0.01$), hip external rotation left ($r=0.622$, $p<0.01$), ankle dorsiflexion right ($r=0.597$, $p<0.01$), ankle dorsiflexion left ($r=0.608$, $p<0.01$), ankle plantar flexion right ($r=0.541$, $p<0.01$), ankle plantar flexion left ($r=0.519$, $p<0.01$) ROM (Table 1).

DISCUSSION AND CONCLUSION

In the present study, the relationship between the FMS total scores of amateur male soccer players and CMJ, LQYBT, and shoulder, hip, and ankle joint ROM were investigated. A moderate positive correlation was observed between the FMS and CMJ, right-left LQYBT, and right-left hip abduction ROM. A strong positive correlation was noted between the ROM for shoulder extension on the right and left sides, hip

external rotation on the right and left sides, and ankle dorsiflexion and plantar flexion on the right and left sides.

The FMS is the most widely used test to determine the most important perceived risk factors for injuries experienced in the past, fatigue and muscle imbalance in soccer without contact, and to predict the risk of injury in soccer teams (21). Studies have shown that there is a significant relationship between FMS test scores and sports injuries (22). It has been stated that by evaluating the asymmetric conditions in the body with the FMS test, the parts of the body that are asymmetrical can be determined, and in this way, the formation of injuries can be reduced (30). After these developments, the results of the relationship between the FMS and tests determining physical performance characteristics were investigated.

The FMS and LQYBT tests can be used to evaluate the coordination between movements and similar basic features, such as dynamic balance (18). In the present study, there was a moderately positive correlation between FMS and LQYBT total scores. In a similar study conducted on soccer players, it was stated that there was a positive correlation between FMS and LQYBT (29). In another study conducted with female soccer players, it was determined that there was a positive correlation between FMS total scores and LQYBT right and left scores (16). When we look at studies conducted in different branches, a positive correlation was observed between FMS total scores and LQYBT right and left scores in child tennis players (30). In other studies conducted on university-trained athletes, a positive correlation was found between the FMS total scores and total LQYBT scores (18, 31). In another study conducted on sedentary female and male individuals, a weak positive correlation was found between FMS and LQYBT total scores (15).

Silva et al. (28) stated that they found a positive relationship between FMS total score and CMJ in a similar study on soccer players. In a similar study conducted on professional soccer players, a positive correlation was found between FMS total score and CMJ (27). In another study conducted on child tennis players, a positive relationship was found between FMS and CMJ (30). In another study conducted on basketball players, a positive relationship was found between CMJ and FMS total scores and deep squat, in-line lunge, and active straight leg raise scores (1). Based on these findings, it has been stated that jumping ability can be improved along with the improvement of the general musculoskeletal condition, which can be defined by the composite FMS score or the deep squat, in-line lunge, and active straight leg raise subtests (1).

In this study, a moderately positive relationship was observed between FMS and right-left hip abduction ROM, and a highly positive relationship was observed between FMS and shoulder extension right-left, hip external rotation right-left, ankle dorsiflexion right-left, and ankle plantar flexion right-left ROM. Few studies have investigated the relationship between FMS and ROM. In the deep squat, hurdle step, and in-line lunge subtests used in the FMS, controlled and conscious dorsiflexion movements of the ankle and flexion of the hip and knee were performed. This situation reveals common points between FMS and ROM in the lower extremities. Chimera et al. (5) stated that there is a positive correlation between FMS and lower extremity ROM and that FMS subtest movement patterns are affected by ROM in the lower extremities. It has been reported that ankle dorsiflexion is a determinant of squat depth in both men and women (13). In a study conducted on student athletes, it was stated that people with higher scores in a deeper squat and in-line lunge lower motion patterns had greater ankle dorsiflexion joint range of motion (10). Another study found a positive correlation between FMS and hip extension and ankle dorsiflexion in middle- and long-distance runners and a negative correlation between FMS and ankle plantar flexion (23). According to our findings and the results of previous studies, it can be said that advanced lower extremity ROM positively affects FMS results.

The results of the study showed that soccer players' FMS test scores and CMJ, LQYBT, and ROM test scores were positively correlated. These results can be used together with FMS, ROM, YBT, and CMJ results to evaluate sports performance and injury risk. In this context, it can be thought that CMJ, LQYBT, and ROM test results together with the FMS will provide an idea to trainers, athletic performance specialists, and physiotherapists to predict injuries.

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Sportsmanship Behaviors in Early Adolescence and Gender and Family Attitudes

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Abstract

Introduction and Aim: Sportsmanship is a concept defined as the awareness of having the values required by sports and the golden key of sportive activities. In addition to changes in early adolescence, family attitude and gender are thought to be among the concepts affecting sportsmanship. This study aimed to examine sportsmanship behaviors and family attitude and gender characteristics. **Materials and Methods:** The study group consisted of a total of 300 students with a mean age of $12.48 \pm .79$, randomly selected from second-level primary schools in Isparta province. In the research conducted with a survey design, the "Physical Education Course Sportsmanship Behavior Scale (PECSBS)" developed by Koç (15) and the personal information form were used as data collection tools. In the data analysis, frequency, percentage, arithmetic mean, and standard deviation were used as descriptive statistical methods for personal information. Since the data were normally distributed, the t-test was used for paired groups, and the ANOVA test was used for multiple comparisons. **Findings:** According to the findings, the students' sportsmanship behaviors were at a high level. According to gender, a statistically significant difference was found in favor of female students in the sub-dimensions of displaying appropriate behavior and avoiding inappropriate behavior and in the overall scale. According to the family attitudes of the students, there was no statistically significant difference in the sub-dimension of displaying appropriate behavior. However, in the sub-dimension of avoiding inappropriate behavior and in the overall scale, the scores of the students with democratic family attitudes were found to be higher than the scores of the children of families with liberal attitudes. **Conclusion:** When the sportsmanship behavior scores of second-level primary school students were examined, it was seen that female students scored higher than male students. It is thought that changing family attitudes will improve the sportsmanship behaviors of society.

Keywords: Early Adolescence, Sportsmanship Behavior, Family Attitude, Gender,

Erken Ergenlik Dönemi Sportmenlik Davranışları ile Cinsiyet ve Aile tutumu

Özet

Giriş ve Amaç: Sportmenlik, Sporun gerektirdiği değerlere sahip olma bilinci ve sportif etkinliklerin altın anahtarı olarak tanımlanan bir kavramdır. Sportmenliği etkileyen kavramlar arasında erken ergenlik dönemi değişimlerinin yanı sıra, aile tutumu ve cinsiyet' inde olduğu düşünülmektedir. Araştırmada sportmenlik davranışları ile aile tutumu ve cinsiyet özelliklerinin incelenmesi amaçlanmıştır. **Materyal ve Metot:** Araştırma grubunu Isparta ili ikinci kademe ilköğretim okullarından rastgele seçilen yaş ortalamaları $12,48 \pm ,79$ olan toplam 300 öğrenci oluşturmuştur. Tarama modeli ile yapılan araştırmada veri toplama aracı olarak Koç (15), tarafından geliştirilen "Beden Eğitimi Dersi Sportmenlik Davranışı Ölçeği (BEDSDÖ)" ile kişisel bilgi formu kullanılmıştır.

Verilerin analizinde kişisel bilgiler için betimsel istatistik yöntemi olarak frekans, yüzde, aritmetik ortalama ve standart sapma kullanılmıştır. Veriler normal dağılım gösterdiği için ikili gruplarda t-testi ve çoklu karşılaştırmalarda Anova testi kullanılmıştır. Bulgular: Elde edilen bulgulara göre; öğrencilerin spormenlik davranışlarının yüksek düzeyde olduğu belirlenmiştir. Cinsiyete göre uygun davranış sergileme ve uygunsuz davranıştan kaçınma alt boyutlarında ve ölçek toplamında kadın öğrenciler lehine istatistiksel olarak anlamlı bir fark bulunmuştur. Öğrencilerin aile tutumlarına göre uygun davranış sergileme boyutunda istatistiksel olarak anlamlı bir fark bulunmazken, uygunsuz davranıştan kaçınma boyutunda ve ölçek toplamında demokratik aile tutumu gösteren öğrencilerin puanları, serbest tutum gösteren ailelerin çocuklarının puanlarına göre daha yüksek bulunmuştur. Sonuç: İkinci kademe ilköğretim öğrencilerinde spormenlik davranış puanları incelendiğinde, kadın öğrencilerin erkek öğrencilere göre puanlarının yüksek olduğu görülmüştür. Aile tutumlarının değiştirilmesinin, toplumun spormenlik davranışlarını geliştirileceği düşünülmektedir.

Anahtar Kelimeler: Erken Ergenlik, Spormenlik Davranışı. Aile tutumu, Cinsiyet,

INTRODUCTION

Sport is a phenomenon reflecting the values and norms of our society. Hence the values that our young people learn during sports activities are an important issue. It is essential that all participants support the idea that winning fairly is the most honorable form of victory. Therefore, the ideals of sportsmanship should be valued above many other aspects of sport. Definitions of sportsmanship include elements, e.g., playing fair, complying with the game's rules, respecting the decisions of referees and officials, and treating opponents with respect. Nowadays, sportsmanship is defined as the "golden rule" of sport. We can display good sportsmanship behavior when we treat the people we play with and against as we want to be treated, and when we respect ourselves, our teammates and opponents, the coaches and referees on both sides, and other officials. However, sportsmanship is not just for people on the field. All participants, fans, and parents must also be aware of how they conduct themselves during the competition. Although physical education and game teaching programs stress the significance of sportsmanship in children, this combination of attitudes and styles may not yield the expected results without parents' support and help. Therefore, sportsmanship behavior should have an aspect that requires the family support together with the child. Sportsmanship represents a style and attitude and will have an influence that everyone in our surroundings will regard as positive. Considering the developmental stages of Fleishman (6), early adolescence in terms of personal and social development is defined as 8-9 years of age. This period, during which honesty, team spirit, and group awareness come to the forefront in personality development, should be evaluated in terms of sportsmanship training (6).

Adolescence is the period when children are physically and emotionally transformed into young men and women. This period is defined as 10 years of age for girls and 11 years of age for boys. However, it is perfectly normal for adolescence to begin between the ages of 8 and 13 for girls and between the ages of 9 and 14 for boys. During this period, primary school students change emotionally and behaviorally due to very rapid early growth spurts. While moodiness and nervous changes are observed in females, who are mostly affected by early adolescence, more irritable behaviors are observed in males. It is essential to encourage sportsmanship behavior and teach the principles of sportsmanship in students who are trying to cope with the difficulties of this period in order to facilitate the flow of their lives.

Sportsmanship behavior must be displayed in the entire course of life, from childhood games to international matches. Nevertheless, numerous studies carried out in physical education courses have stressed that students are not encouraged toward sportsmanship, students do not have knowledge and experience on the concept of sportsmanship, and students brag even when they win by violating the principles of sportsmanship (10,1). Sports, which is regarded as a different area of the social community in which we live together, leads to an increase in the tendency to use violence and display unsportsmanlike behavior because of increasing competitive tendencies. Unfortunately, educators and parents sometimes put excessive pressure on athletes and insist on winning at all costs. Hence whereas it is great to be a champion, the importance of having enjoyed the process of reaching the top should be stressed. The International Sportsmanship Association, which was established in 1926 with the objective of spreading the principles of sportsmanship to

all aspects of life, from children's games to international competitions, has set certain rules. These include obeying the rules, staying loyal to your teammates, keeping yourself fit, controlling your anger, keeping your game away from violence, not bragging when you win, not collapsing in case of defeat, and having a strong spirit and an open mind for a healthy body (14).

Therefore, it is essential to provide training that encourages sportsmanship in sports activities, particularly for children in early adolescence. The situation is a little more complicated for female students, who enter early adolescence a year or two earlier. During this period, female students may be exposed to peer bullying or hide themselves physically and emotionally due to changes in their bodies. Considering the above-mentioned reasons, new education models and popular views should be determined. The aforesaid approach must be formed by taking into account the ethical foundations and developmental stages of sports.

METHOD

Research Design

A survey design was employed in the research. The survey design is a research design aiming to describe a past or present situation as it is and attempting to define the individual, event, or object that is the subject to research as it is, within its own conditions (13,2). The current work attempted to determine the relationship between second-level primary school students' sportsmanship behavior levels in the physical education course and gender and family attitude values.

Population and Sample

The study population consisted of volunteer students receiving second-level primary education. Three hundred students selected from the above-mentioned population using a random sampling method constituted the sample. The data were collected face-to-face using a survey, and the questions encountered during the application were responded to.

Data Collection Tool

In the present research, the "Physical Education Course Sportsmanship Behavior Scale (PECSBS)" developed by Koç (15) was utilized as a data collection tool. Furthermore, a personal information form was applied to the students for the purpose of revealing their gender and family attitudes.

Physical Education Course Sportsmanship Behavior Scale (PECSBS):

The Physical Education Course Sportsmanship Behavior Scale, developed by Koç (15) as a result of examining the scales and surveys in the literature and physical education curricula and obtaining the opinions of relevant students, teachers, and experts, and prepared for secondary school students, represents a 5-point Likert scale. The original scale comprises a total of 22 items, 11 of which are the "Displaying Appropriate Behavior" (DAB) factor (items 1, 2, 4, 7, 9, 11, 12, 14, 16, 19, and 21) and 11 reverse-scored items are the "Avoiding Inappropriate Behavior" (AIB) factor (items 3, 5, 6, 8, 10, 13, 15, 17, 18, 20, and 22). The lowest score that can be received from the scale is 22, and the highest score is 110. The internal consistency reliability (Cronbach's alpha) of the overall scale was computed as 85. Increased scores on the scale mean better sportsmanship behavior levels of students (15).

Data Analysis

In the data analysis, frequency, percentage, arithmetic mean, and standard deviation were employed as descriptive statistical methods for personal information. Since the data were normally distributed, the t-test was used for paired groups, and the ANOVA test was used for multiple comparisons.

Ethical approval and institutional permission

Akdeniz University Rectorate Social and Human Sciences Scientific Research and Publication Ethics Committee. With the decision dated 14.12.2023, numbered 23 and 556, it has been unanimously decided that its implementation is ethically appropriate.

FINDINGS

Table 1. Descriptive statistics for students' personal information

Variable		N	%
Gender	Female	147	49.0
	Male	153	51.0
Grade Level	6th grade	37	12.3
	7th grade	205	68.3
	8th grade	58	19.4
Family attitude	Authoritarian	28	9.3
	Democratic	228	76.0
	Liberal	44	14.7
License	License available	60	16.7
	License not available	240	83.3

As seen in Table 1, 49% (n=147) of the students were female, and 51% (n=153) were male. Of these students, 12.3% (n=37) were 6th-grade secondary school students, 68.3% (n=205) were 7th-grade secondary school students, and 19.4% (n=58) were 8th-grade secondary school students. Of the students taking part in the research, 16.7% were students who had a license and did sports (60), and 83.3% were students who did not have a license and did not do sports (n=240).

Table 2. Min-Max Values and Mean Values of Secondary School Students' PECSBS Scores

Scale	N	Min	Max	X	SD
Displaying appropriate behavior		2.50	5.00	4.12	.66
Avoiding inappropriate behavior	300	1.00	5.00	4.30	.77
PECSBS		2.36	5.00	4.21	.59

As seen in Table 2, the candidates' mean scores for displaying appropriate behavior in the alternative sub-dimension of the scale were the highest (\bar{x} item=4.12), followed by avoiding inappropriate behavior (\bar{x} item=4.30) and the overall scale (\bar{x} item=4.21). It can be stated that the candidates' sportsmanship behavior was good and at a high score level. In the research, the t-test was performed with the objective of determining the change in sportsmanship behavior levels by gender, and the results are displayed in Table 3.

Table 3. Comparison of Students' Scale Scores by Gender (t-test results)

Scale	Gender	N	X	SD	t	p
Displaying appropriate behavior	Female	147	4.20	.62		
	Male	153	4.04	.69	2.015*	.045
Avoiding inappropriate behavior	Female	147	4.58	.51		
	Male	153	4.02	.83	6.893*	.000
PECSBS	Female	147	4.39	.47		
	Male	153	4.03	.64	5.571*	.000

As seen in Table 3, there was a statistically significant difference in the sub-dimension of displaying appropriate behavior according to the participants' gender (t=2.015, p=.045; p<0.05), and there was a statistically significant difference in the sub-dimension of avoiding inappropriate behavior (t=6.893, p=.000; p<0.05) and in the total Physical Education Course Sportsmanship Behavior Scale (t=5.571, p=.000; p<0.05). The

sportsmanship behavior mean scores of female students were higher compared to male students. The ANOVA results concerning secondary school students' Physical Education Course Sportsmanship Behavior Scale scores according to family attitudes are presented in Table 4.

Scale	Attitude	N	X	SD	F	P	Difference
Displaying appropriate behavior	1-Authoritarian	28	3.99	.70	1.344	.262	
	2-Democratic	228	4.15	.62			
	3-Liberal	44	4.01	.84			
Avoiding inappropriate behavior	1-Authoritarian	28	4.22	.70	6.276*	.002	2-3
	2-Democratic	228	4.37	.71			
	3-Liberal	44	3.94	1.00			
Overall Scale	1-Authoritarian	28	4.11	.57	4.938*	.008	2-3
	2-Democratic	228	4.26	.55			
	3-Liberal	44	3.98	.76			

As seen in Table 4, there was no significant difference in second-level primary school students' display of appropriate sportsmanship behavior in the physical education course according to their family attitudes ($F=1.344$, $P=.262$, $P>.05$). However, there was a significant difference in terms of avoiding inappropriate behavior ($F=6.276$, $P=.002$, $P<.05$) in the democratic family attitude in comparison with the liberal family attitude. A statistically significant difference was identified in the overall scale when the democratic family attitude was compared to the liberal family attitude ($F=4.938$, $P=.008$, $P<.05$).

DISCUSSION AND CONCLUSION

In line with the results from the study carried out to examine the sportsmanship behavior of second-level primary school students in the physical education course in terms of gender and family attitude variables, it can be stated that the total scores on the Physical Education Course Sportsmanship Behavior Scale were good or high. Unlike our research findings, in their study with secondary school students aged 10-15, Karafil et al., reported that students' sportsmanship scores were moderate (11). Upon examining the students' sportsmanship behavior according to the gender variable, a statistically significant difference was revealed in displaying appropriate behavior, avoiding inappropriate behavior, and the overall scale. The findings from the present research are in line with the literature findings (7).

Esentürk et al., and Tsai and Fung, indicated that female students' total scores on the Physical Education Course Sportsmanship Behavior Scale were higher in comparison with male students (5,19). Unlike the research findings, some studies report that male students' sportsmanship behavior scores are higher compared to female students (8,11,3).

Unlike our research findings, some studies indicate no statistically significant difference upon examining students' sportsmanship behavior according to the gender variable (16,18).

The concept of sportsmanship has numerous meanings. Sportsmanship behavior helps make all competitive games enjoyable and fun. It helps to be a good sportsperson, develops good habits and positive life skills both inside and outside of sports games, and is a crucial life skill for people of all ages. Sportsmanship is more than being courteous to others. There are several key qualities contributing to athlete behavior. These include the following: being supportive. If you are losing, it is best not to take your frustrations out on your teammates. Being a team player is crucial in team sports, where support can mean everything. In a game, players do their best, and every person wants to win. People are more productive and effective with positive reinforcement, and several words of encouragement or a round of applause can sometimes be all a person needs to get their thinking back on the game. Having a positive attitude. Having a negative attitude towards the game can pull down the entire team, making the competition less enjoyable for every person. Childish or inappropriate behavior can disrupt the game's spirit and make players appear immature. Positivity represents an essential

trait, particularly in team sports. Being respectful. Respecting others is very important, whether you win or lose. Avoid being passive-aggressive or insulting your opponents in the game. Even if you suspect someone of cheating (which may not be the case), speaking harshly to your opponents or teammates can damage your reputation and the respect of others for you. Complaining about calls or arguing with referees also indicates unsportsmanlike behavior. However, a number of people regard trash-talking as part of the game and have more tolerance for it than others, but a general rule is that trash-talking can be fun as long as it does not cross personal boundaries. Revive the game's spirit. Being willing to learn. If you lose, try to learn from your mistakes instead of taking it out on your opponent. For instance, if you push too hard and make a mistake during a tennis match, practice returning the balls that give you the most trouble. Practicing self-control. Games can become emotional, but players must always make a conscious effort to control their emotions and concentrate on the game. Damaging sports equipment or playfields is a certain way to be a bad athlete and can also embarrass your teammates (9,17).

Keeping the physical activity levels of students in early adolescence high through school sports and ensuring their participation in activities will help them undergo a more trouble-free and acceptable period (4). During this period, when energy capacities and the need for movement are considered to be at the highest level, behavioral changes to be developed with the contributions from educators will pave the way for students to display more acceptable behaviors physically and emotionally. Educators and parents can provide simple and accurate explanations to their children in early adolescence about the period they are in, and children who comprehend that the changes they experience are normal can continue their lives by being more accepting of this period. The good sportsmanship behavior they can develop during this period is crucial since this behavior makes competitive play more enjoyable for every person. Whereas sometimes winning feels like the most important thing, good sportsmanship teaches competitors how to be kind and respectful to others. Poor sportsmanship promotes a negative environment and can take fun out of the game. Especially due to the rapid physical and emotional changes of students in early adolescence, poor sportsmanship behavior will lead to a conflict environment. Students who have acquired sportsmanship behaviors will be able to overcome these characteristics by being less affected by the changes caused by early adolescence. Gender differences also become more pronounced during adolescence, which can significantly impact sports participation. Educators should plan the educational process by assessing the overall development and readiness of adolescents for sports participation.

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Effect of Functional Threshold Trainings Applied to Junior Elite Cyclists on Power and Strength Parameters

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Abstract

The aim of the study is to examine the effect of functional threshold power training applied to young elite cyclists on power and strength parameters. 24 young elite level cyclists participated voluntarily. In our study, it was divided into two groups as Functional threshold training group (FTTG) and Traditional training group (TTG). Functional threshold training group n:12 (age 17 years, height 1,73±8,5 m., body weight 64,87±10,4 kg. and sports age 4,6±1,3), Traditional training group n:12 (age 17 years, height 1,73±8,81 m., body weight 58,8±9,1 kg. and sports age 4,1 years). 30 sec Anaerobic power test, 20 min FTP test, 40 km. endurance and strength tests were applied to both groups as pre-post test. The obtained data were compared using the within-group Paired T test and the between-group Independent T test in the IBM SPSS Statistics 24.0 program. Traditional training group; Anaerobic power, 20 min FTP aerobics power, 40 km. endurance and strength pre-post test values improved. Functional threshold training group; Anaerobic power, 20 min FTP aerobic power, 40 km. endurance and strength pre-post test values were found to be more effective training development $p<0.05$. In spite of the performance improvement in both groups of athletes participating in the study, FTP training group showed more progress. Based on the data we obtained, cycling and strength training can be an example for trainers and sports scientists working on cycling.

Keywords: Ftp, aerobic, anaerobic, cycling

Özet

Genç Elit Bisikletçilere Uygulanan Fonksiyonel Eşik Güç Antrenmanlarının Güç ve Kuvvet Parametreleri Üzerine Etkisi

Bu çalışmanın amacı genç elit bisikletçilere uygulanan fonksiyonel eşik güç antrenmanlarının güç ve kuvvet parametreleri üzerine etkisinin incelenmesidir. Araştırmaya genç elit düzeydeki 24 bisiklet sporcusu gönüllü olarak katılmıştır. Araştırmamızda Fonksiyonel eşik antrenman grubu (FAG) ve Geleneksel antrenman grubu (GAG) olmak üzere iki gruba ayrılmıştır. Fonksiyonel eşik antrenman grubu n:12 (yaş 17 yıl, boy 1,73±8,5 m., vücut ağırlığı 64,87±10,4 kg. ve spor yaşları 4,6±1,3), Geleneksel antrenman grubu n:12 (yaş 17 yıl, boy 1,73±8,81 m., vücut

ağırlığı 58,8±9,1 kg. ve spor yaşları 4,1 yıl) olarak belirlenmiştir. Her iki gruba da ön-son test olmak üzere 30 sn. anaerobik güç testi, 20 dk. FTP testi, 40 km. dayanıklılık ve kuvvet testleri uygulanmıştır. Elde edilen veriler IBM SPSS Statistics 24.0 programında Grup içi paired t testi ve gruplar arası independent t testi kullanılarak karşılaştırılmıştır. Geleneksel antrenman grubu anaerobik güç, 20 dk. FTP, 40 km. dayanıklılık ve kuvvet ön-son test değerlerinde gelişme bulunurken Fonksiyonel eşik antrenman grubu anaerobik güç, 20 dk. FTP aerobik güç, 40 km. dayanıklılık ve kuvvet ön-son test değerlerinde daha etkili antrenman gelişimi $p<0,05$ olduğu bulunmuştur. Araştırmaya katılan her iki sporcu grubunda da performans gelişimi olmasına rağmen , FTP antrenman grubunda daha fazla gelişim olmuştur. Elde ettiğimiz verilere dayanarak bisiklet ve kuvvet antrenmanı şekillerinin bisiklet sporu ile çalışan antrenör ve spor bilimcilere örnek olabilir.

Anahtar Kelimeler: Ftp, aerobik, anaerobik, bisiklet

INTRODUCTION

The skills and capabilities developed by people as a result of their struggles against nature and each other in order to survive constitute the foundations of sports. Throughout history, sports have always existed (1). Sports in its current sense has been making progress in different areas since the half of the 19th century. A remarkable progress appears in health science as from this period. It helps people improve their body posture through physical activities. In addition, thanks to sports, the cardiovascular system, muscles and joints work efficiently and make people feel good socio-mentally (20).

As one of the sports developing up to now, cycling started with the first bicycle race held in France in 1868. The winner of this race was the British athlete, James Moore. Upon the foundation of the French Cycling Federation in 1881, the first foundations of the popularity of the cycling branch were laid. Thanks to the races held in many parts of Europe as of 1890, the cycling branch became one of the most popular sports branches with its developing components and its debut in the 1896 Athens Olympics. Cycling, which has progressed with the modern Olympics, has played an important role in talent selection, performance enhancement, technology and scientific studies, as well as entertainment and races (2,3).

Functional threshold (FTP) test has been one of the most developed scientific studies today. FTP test, which constitutes the subject of our study where the person's threshold values are determined based on the person's power output during 20 minutes on the bike with a smart power meter, and it is defined as the highest average power output. It is claimed that the FTP estimated in the power outputs of the 8 and 20-minute tests during field-based tests represents the power output at the lactate threshold. It is a test that helps tailor training programs based on the values obtained as a result of FTP. Thanks to this test, the athletes can be trained preparing training periodization based on the threshold ranges as customized for characteristics that are desired to be progressed (7).

At this point, it is possible to say that it will make a significant contribution to sports sciences and performance; in addition, it can guide many sports scientists and coaches studying on this subject to increase athlete success. This study aims to determine the effect of functional threshold training (FTP) applied to young elite cyclists on power and strength parameters.

METHOD

Physical Characteristics of the Cyclists Participating in the Study

24 licensed elite cyclists participated in the study. Cyclists are divided into two groups: Functional Training Group (FTG n:12) and Traditional Training Group (TTG n:12). The training includes an 8-week training period. Permission of Akdeniz University, Clinical Research Ethics Committee was obtained for this study. Ethics Committee Code 2012-KAEK-20, Decision No: 1178.

Height and Body Weight Measurement

Participants were measured barefoot while wearing plain cycling jerseys. Height measurement was made barefoot with a Seca 220 brand device. Body weight was measured with a Miras RSP-0120 brand electronic scale.

Anaerobic Power Test (WanT)

Anaerobic power test aims to measure the explosive power of cyclists. The test takes 30 seconds and data is automatically recorded during the test. The cyclist's heart rate was automatically recorded throughout the test period. The application of the test is as follows: When the cyclist feels ready after warming up, he/she starts pedaling and rotates the pedals with his maximum strength for 30 seconds (16).

Functional Threshold Power Test (FTP)

Functional Threshold Power Test serves to measure the cyclist's functional threshold power value. The application of the test is as follows: A 15-minute warm-up protocol was performed by the cyclist on trainer. When the cyclist felt ready, he started the test and applied his maximum effort he could throughout the test for 20 minutes. Cooling was done for ten minutes at the end of test (4). Morgan et al. (2018) conducted a study on the time trial performance of road cyclists in relation to FTP (14).

Aerobic Power Test 40 Kilometers (Km) Time Trial Test

This test was applied to measure the aerobic endurance of the participants. The test was carried out in an open environment on Tacx brand rollers, with participants' own bicycles, cycling jerseys and lock-pedal shoes (SPD). Before the test, participants were given general information about the test and were asked to complete the 40 km distance in the shortest time. Roller is a mechanism that allows three rollers to rotate with each other. Participants can train in stable position, thanks to this equipment. The speed, duration and pulse averages of the participants were measured with a Garmin device (19).

Strength Measurements

Maximal Strength Tests (1RM); The cyclist was placed in a technically appropriate position on the designated fitness equipment. In order to determine the maximum amount of weight the cyclists could lift; two trials were performed and the maximum weight lifted was recorded in kilograms. means by which maximum repetitions are determined; Leg Press (kg), Calf Raise (kg), Squat (kg), Upper Rowing (kg), Crunch Machine (kg) (9).

Training Program

In the study, the Functional training group performed FTP training and strength training three days a week, in addition to normal cycling training 6 days a week. The traditional training group did cycling training six days a week. Athletes in this group were not given additional FTP and strength training. Athletes in both groups implemented training programs for eight weeks. Training intensity was gradually increased by 5% in the first five weeks. In the 5th week, the intensity rate was reduced to the 1st week level for recovery purposes. It was gradually increased again in the 6th, 7th and 8th weeks.

Table 1. Functional Threshold Training Group Program

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Strength Training 5 Device %50/10x/2 Sets		Strength Training 5 Device %50/10x/2 Sets		Strength Training 5 Device %50/10x/2 Sets		
Leg Press		Leg Press		Leg Press		
Calf Raise		Calf Raise		Calf Raise		
Squat		Squat		Squat		
Upper Rowing		Upper Rowing		Upper Rowing		
Crunch Machine		Crunch Machine		Crunch Machine		
Afternoon						
Road training Aim Endurance Zone 2	Road training Aim Tempo Zone 3	Road training Aim Endurance Zone 2	Road training Aim Tempo Zone 3	Road training Aim Endurance Zone 2	Road training Aim Endurance Zone 3	Active Rest
Warm-up Phase 20 min Zone 1-2	Warm-up Phase 20 min Zone 1-2	Warm-up Phase 20 min Zone 1-2	Warm-up Phase 20 min Zone 1-2	Warm-up Phase 20 min Zone 1-2	Warm-up Phase 20 min Zone 1-2	
Main Phase Zone 2 50-60 km	Main Phase Zone 3 80-90 km	Main Phase 50-60 km Zone 2 90-100 cadence	Main Phase 80-90 km Zone 3 90-100 cadence	Main Phase 50-60 km Zone 2 90-100 cadence	Main Phase 100-110 km Zone 3 95-110 cadence	
Cooling Phase 20 min Zone 1	Cooling Phase (6 X 70% - 1 min) Cooling Phase 20 min Zone 1	Cooling Phase 20 min Zone 1	Cooling Phase (6 X 70% - 1 min) Cooling Phase 20 min Zone 1	Cooling Phase 20 min Zone 1	Cooling Phase 20 min Zone 1	

Table 2. Traditional Training Group Program

Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Road training Aim Endurance Zone 2	Road training Aim Tempo Zone 2-3	Road training Aim Endurance Zone 2	Road training Aim Tempo Zone 2-3	Road training Aim Endurance Zone 2	Road training Aim Tempo Zone 2-3	Active Rest
Warm-up Phase 20 min Zone 1-2	Warm-up Phase 20 min Zone 1-2	Warm-up Phase 20 min Zone 1-2	Warm-up Phase 20 min Zone 1-2	Warm-up Phase 20 min Zone 1-2	Warm-up Phase 20 min Zone 1-2	
Main Phase Zone 2 50-60 km	Main Phase Zone 2-3 80-90 km	Main Phase Zone 2 50-60 km	Main Phase Zone 2-3 80-90 km	Main Phase Zone 2 50-60 km	Main Phase Zone 2-3 100-110 km	
90-100 cadence	90-100 cadence	90-100 cadence	90-100 cadence	95-110 cadence	95-110 cadence	
Cooling Phase 20 min Zone 1	Cooling Phase 20 min Zone 1	Cooling Phase 20 min Zone 1	Cooling Phase 20 min Zone 1	Cooling Phase 20 min Zone 1	Cooling Phase 20 min Zone 1	

Statistical analysis

Descriptive statistics of the data obtained through this study (peak power, normalized power outputs, average power outputs and functional power threshold values) were given as mean (Mean), standard deviation (SD), minimum (Min) and maximum (Max) values. To ensure homogeneity of the data, subjects with extreme values were removed. Kolmogorow-Smirnow and Levene's Test of Homogeneity were applied respectively to check normal distribution before proceeding with statistical procedures and to control homogeneous distribution. Since the data were seen to be normally distributed, intragroup comparison Paired t test and intergroup independent t test were used in paired comparisons to compare the data obtained from this study. IBM SPSS Statistics 24.0 package program was used in statistical analysis.

FINDINGS

Comparison of 30 sec Anaerobic Power Pretest Values of the Traditional Cycling Training Group and the Functional Threshold Power Training Group participating in the research is given in Table 1.

Table 3. Comparison of 30 sec Anaerobic Power Pretest Values of the Traditional Cycling Training Group and the Functional Threshold Power Training Group participating in the research

	Groups	n	\bar{X}	SD	p
Average Heart Rate (beats/min)	TTG	12	180,5	11,8	0,56
	FTTG	12	177,4	13,4	
Average Heart Rate (beats/min)	TTG	12	192,3	11,6	0,21
	FTTG	12	185,4	14,6	
Average Power (watt)	TTG	12	472,3	104,3	0,77
	FTTG	12	564,6	137,2	
Maximum Power (watt)	TTG	12	666,6	154,2	0,73
	FTTG	12	787,1	159,3	

Considering the 30-second anaerobic power pre-test data between the traditional cycling training group and the functional threshold power training group participating in the research; there was no statistically significant difference in the average heart rate, maximum heart rate, average power and maximum power data ($p>0.05$).

Table 4. Comparison of 20 min FTP Pretest Values of the Traditional Cycling Training Group and the Functional Threshold Strength Training Group participating in the research

	Groups	n	\bar{X}	SD	p
Average Heart Rate 20 min. (beats/min)	TTG	12	181,3	9,7	0,62
	FTTG	12	179,1	12,1	
Maximum Nabız 20 min. (beats/min)	TTG	12	201,3	7,8	0,13
	FTTG	12	195,3	10,8	
Average Power 20 min. (watt)	TTG	12	171,0	37,4	0,85
	FTTG	12	174,4	47,9	
Maximum Power 20 min. (watt)	TTG	12	436,3	174,9	0,10
	FTTG	12	555,6	164,8	
Relative Power 20 min. (watt/kg)	TTG	12	2,8	0,44	0,99
	FTTG	12	2,8	0,56	

Considering the 20-minute FTP pre-test data between the traditional cycling training group and the functional threshold strength training group participating in the research, there was no statistically significant difference in the data of average heart rate, maximum heart rate, average power, maximum power, and watts produced per kg ($p>0.05$).

Table 5. Comparison of 40 Km Pre-Test Values of the Traditional Cycling Training Group and the Functional Threshold Strength Training Group participating in the research

	Groups	n	\bar{X}	SD	p
Time (min)	TTG	12	59,3	14,8	0,38
	FTTG	12	54,4	11,4	
Average Speed 40 Km. (km/hour)	TTG	12	40,5	8,36	0,75
	FTTG	12	42,1	9,6	
Average Power 40 Km. (watt)	TTG	12	145,4	32,0	0,39
	FTTG	12	156,8	31,7	
Maximum Power 40 Km. (watt)	TTG	12	484,0	149,2	0,20
	FTTG	12	395,6	175,4	
Average Heart Rate 40 Km. (beats/min)	TTG	12	174,67	8,7	0,09
	FTTG	12	181,3	9,6	
Maximum Heart Rate 40 Km. (beats/min)	TTG	12	191,9	5,9	0,01
	FTTG	12	202,4	11,6	

Considering the 40 km pre-test data between the traditional cycling training group and the functional threshold strength training group participating in the research; no statistically significant difference ($p>0.05$) was found in time, average speed, average power, maximum power, average heart rate, maximum pulse data. However, a statistically significant difference was found in maximum heart rate data ($p<0.05$).

Table 6. Comparison of Strength Pretest Values of the Traditional Cycling Training Group and the Functional Threshold Strength Training Group participating in the research

	Groups	n	\bar{X}	SD	p
Leg Press (kg)	TTG	12	105,0	48,9	0,72
	FTTG	12	111,7	42,0	
Calf Raise (kg)	TTG	12	97,9	28,4	0,67
	FTTG	12	102,9	27,3	
Squat (kg)	TTG	12	82,9	16,0	0,20
	FTTG	12	90,8	12,9	
Latt Pull Down (kg)	TTG	12	85,0	23,9	0,43
	FTTG	12	92,1	19,2	
Abdominal (kg)	TTG	12	61,7	8,34	0,07
	FTTG	12	67,5	6,57	

Considering the intergroup strength pre-test data of the traditional cycling training group and functional threshold strength training group participating in the research; there was no statistically significant difference in leg press, calf raise, squat, lat pull down and abdominal data ($p>0.05$).

Table 7. Comparison of 30-second Anaerobic Power Posttest Values of the Traditional Cycling Training Group and the Functional Threshold Power Training Group Participating in the research

	Groups	n	\bar{X}	SD	p
Average Heart Rate Last (beats/min)	TTG	12	177,0	13,9	0,05
	FTTG	12	166,5	10,0	
Maximum Heart Rate Last (beats/min)	TTG	12	193,3	11,3	0,00
	FTTG	12	177,1	12,6	
Average Power Last (watt)	TTG	12	520,5	122,2	0,04
	FTTG	12	643,0	144,9	
Maximum Power Last (watt)	TTG	12	721,8	147,7	0,02
	FTTG	12	909,4	210,3	

Considering the 30-second anaerobic power post-test data between the traditional cycling training group and the functional threshold power training group participating in the research; a statistically

significant difference was found in the average heart rate, maximum heart rate, average power and maximum power data in favor of FTTG ($p < 0.05$).

Table 8. Comparison of 20-minute FTP Post-Test Values of the Traditional Cycling Training Group and the Functional Threshold Strength Training Group Participating in the research

	Groups	n	\bar{X}	SD	p
Average Heart Rate 20 min. Last (beats/min)	TTG	12	175,3	15,4	0,49
	FTTG	12	171,0	14,0	
Maximum Heart Rate 20 min. Last (beats/min)	TTG	12	191,8	13,2	0,39
	FTTG	12	187,2	12,6	
Average Power 20 min. Last (watt)	TTG	12	182,7	48,5	0,04
	FTTG	12	224,8	45,5	
Maximum Power 20 min. Last (watt)	TTG	12	463,5	125,4	0,00
	FTTG	12	675,2	177,4	
Relative Power 20 min. Last (watt/kg)	TTG	12	2,9	0,5	0,03
	FTTG	12	3,3	0,4	

Considering the 20-minute FTP post-test data between the traditional cycling training group and the functional threshold strength training group participating in the research; whereas no statistically significant difference was found in the average heart rate and maximum heart rate data ($p > 0.05$), a statistically significant difference was found in the average power, maximum power, watts per kg data in favor of FTTG ($p < 0.05$).

Table 9. Comparison of 40 Km Post-Test Values of the Traditional Cycling Training Group and the Functional Threshold Strength Training Group participating in the research

	Groups	n	\bar{X}	SD	p
Time Last (min)	TTG	12	54,9	9,6	0,25
	FTTG	12	46,3	7,9	
Average Speed 40 Km. Last. (km/hour)	TTG	12	43,8	8,3	0,43
	FTTG	12	49,8	7,4	
Average Power 40 Km. Last (watt)	TTG	12	158,1	37,3	0,00
	FTTG	12	199,6	24,8	
Maximum Power 40 Km. Last (watt)	TTG	12	554,7	102,4	0,03
	FTTG	12	662,3	129,6	
Average Heart Rate 40 Km. Last (beats/min)	TTG	12	174,8	10,4	0,19
	FTTG	12	166,4	18,7	
Maximum Heart Rate 40 Km. Last (beats/min)	TTG	12	190,3	8,0	0,14
	FTTG	12	195,4	8,3	

Considering the 40 km post-test data between the traditional cycling training group and the functional threshold strength training group participating in the research; while no statistically significant difference was found in time, average speed, average heart rate, maximum heart rate data ($p > 0.05$), a statistically significant difference was found in average power and maximum power data in favor of FTTG ($p < 0.05$).

Table 10. Comparison of Strength Posttest Values of the Traditional Cycling Training Group and the Functional Threshold Strength Training Group participating in the research

	Groups	n	\bar{X}	SD	p
Leg Press Last (kg)	TTG	12	110,0	48,5	0,04
	FTTG	12	147,1	34,9	
Calf Raise Last (kg)	TTG	12	101,6	28,8	0,00
	FTTG	12	139,2	22,5	
Squat Last (kg)	TTG	12	87,5	15,6	0,00
	FTTG	12	131,6	9,8	
Lat Pull Down Last (kg)	TTG	12	88,8	23,7	0,02
	FTTG	12	110,0	16,2	
Abdominal Last (kg)	TTG	12	66,3	8,8	0,00
	FTTG	12	80,4	7,5	

When the intergroup strength posttest data of the traditional cycling training group and functional threshold strength training group participating in the research were examined; a statistically significant difference was found in leg press, calf raise, squat, lat pulldown and abdominal data in favor of FTTG ($p < 0.05$).

DISCUSSION AND CONCLUSION

This study aims to examine the effects of functional threshold training on power and strength parameters in young elite cyclists. 24 cyclists having high-level performance between the ages of 16 and 18 participated in the research. In the eight-week study program; The functional threshold strength training group applied cycling six days a week and strength training three days a week, while the traditional training group applied only the current normal cycling training program.

Rylands et al. (17) conducted a study on the effect of gear ratio and peak power ratio on eight male elite BMX cyclists. In the study, peak power was found to be 1380 ± 56 at 41/16 gear ratio, 1436 ± 129 at 43/16 gear ratio, and 1658 ± 201 at 45/16 gear ratio. Inoue et al. (8) used a bicycle ergometer for the anaerobic power cycling test in their study on ten mountain bike athletes participating in a mountain bike race and recorded the race times of the ten athletes participating in the competitions. The cyclists then underwent a 30-second anaerobic power test and a 5X anaerobic power test. Cyclists' wingate peak power was found to be $1,006.06 \pm 150.0$ watts and wingate average power was 831.2 ± 94.0 watts. As a result of the study, it was determined that the peak power and average power values in the anaerobic cycling test were significantly correlated with the race times. In their study with 11 male and nine female athletes, Kilpatrick and Greeley (2014) divided the athletes into two groups and investigated the effects of 30-second and 60-second intervals on performance. The first group underwent 16 sets of 30-second 1:1 load: rest interval training. The same 60-second interval protocol applied to the first group was applied to the second group. As a result of this study, it was found that there was an increase in the performance values of both groups, but there was a greater performance increase in the first group that applied a 30-second interval (10). In the current study, a significant difference was found in the post-test average power watt values and maximum power watt values of the Functional threshold training group and Traditional training group anaerobic power test applied for eight weeks between the two groups in favor of the functional threshold training group. It can be thought that the reason for this is the functional threshold training and strength training applied to the FTTG.

In the study conducted on 13 elite mountain bike athletes in 2018, Özen (2018) applied a 20-minute FTP test to the participants in his study on anthropometric measurements, physiological performance tests, and field performance tests in order to determine the performance values of the athletes. According to the results of this study, there is a significant difference between the test values (15). In the study conducted by Aslan (2), applied on 19 mountain bike athletes in the 6-week Tabata training model, the average power pre-test values of the cyclists were found to be 889 watts and the post-test values were 965 watts. The study is parallel to our study, as the values of the group applying the Tabata training model increased significantly more and there was a significantly greater difference in the values in favor of the functional threshold training group in our study.

In their study in 2018, Koçak (2018) applied the high-intensity interval integrated training method on 10 elite mountain bike athletes with an average age of 15.70 years in a 6-week period. As a result of the study, VO₂max, maximum minute power and average power values increased. In addition, according to the anaerobic power test results, there was an increase in peak power and average power data, while there was a significant positive increase in leg strength and mountain bike track times (11). 11 volunteer mountain bikers with an average age of 35 years and an average weight of 80 kg participated in the study conducted by Miller et al. (13). In the study conducted by the participants in the study in the form of FTP and intermittent loading on the mountain bike performance time, a positive increase was seen in the FTP and intermittent loading exercises on the mountain bike race time performance and provided a significant improvement in terms of time. Denham et al. (2017) in their study on 11 people, a significant increase was found in the results of anaerobic power values depending on FTP for everyone who participated in the study, as a result of the pre- and post-tests of 6-week 30-second sprint training (6). These results are similar to other studies due to the significant increase in FTP values and increase in performance values.

Taylor et al. (1997) conducted a study to examine the effect of interval training on eight cyclists with good training levels. They applied interval training in a total of 12 sessions for six weeks, two repetitions per week. They applied 6-8 repetitions of loading, consisting of five minutes of loading with 80% of the peak power value and one minute of active rest. They applied a 40 km time trial test to measure the performance of the cyclists participating in the study. It was found that the time to complete the study in the tests performed at the beginning and at the end of the six weeks was shortened (19). In their study, Laursen et al. (2005) investigated the effects of high-intensity interval training on performance on 38 cyclists. They divided the cyclists participating in the study into four different groups and had them perform different load training for four weeks. While there was a significant increase in the first three groups in the 40 km time trial tests after the training period, there was no significant difference in the traditional training group (12). In (2019), Aslan divided 19 senior cyclists between the ages of 14-18, competing in the Kütahya cycling team, into two groups and applied two different training programs. One of the groups trained with traditional cycling training for six weeks, and the other group trained with the Tabata training model for six weeks. In the results of anaerobic, aerobic, leg-waist strength and 40 km time trial tests performed at the beginning and end of 6 weeks, there was a positive improvement in performance values in both groups who did traditional cycling training and those who did Tabata training model, but there was a greater improvement in the performance values in the Tabata training group. There was a statistical increase in performance (2). According to these results, the traditional training group and the functional threshold strength training group in the current study show parallelism in terms of positive development of 40 km time trial test results and reduction in finishing times.

Tecer (2018) conducted a study to examine the effects of high-intensity bicycle exercise training (HIBET) and stationary bicycle exercise training (SBET) on knee joint isokinetic muscle strength, muscular endurance and aerobic capacity on 54 healthy sedentary women between the ages of 18-35. The women participating in the study were divided into two separate groups: standard cycling exercise for n:27 people and high-intensity cycling exercise for n:27 people, which they chose voluntarily. As a result of the study, it was revealed that the aerobic capacity and knee joint muscular strength and endurance increased in both groups, but the group doing high-intensity bicycle exercise training was more effective in terms of both strength and muscular endurance. In this study, it was determined that the strength values of the group doing high-intensity cycling exercise increased more (18). Crawford et al. (1979) conducted a study on 27 cyclists with a 12-minute supine bicycle exercise, showing a positive increase in isometric and isokinetic strength exercises (5). It shows parallelism in the current study due to the increase in force values.

In the study conducted by Boyraz (2018) on 14 elite mountain bikers, after 6 weeks of It was observed that there was a statistically significant improvement as a result of upper extremity maximum anaerobic power, anaerobic capacity, fatigue index, 1TM-rowing, machine crunches, leg opening, leg bending, calf raise, chest push, leg push tests (3). According to the results obtained, the strength values of the study group increased more and are parallel to the current study, as there was a greater increase in strength in the functional threshold training group.

In the light of the data we obtained, the training of the cyclist group doing traditional training at the beginning of the season and during the season was seen to be effective in some parameters and it produces an

expected result. However, since the traditional training group follows a training method based solely on cycling, passing a certain distance and repetitions at a certain intensity, it is seen that especially the lower extremities, cardiovascular and aerobic systems are improved. It has been observed that the combination of Strength and FTP training is more effective in performance improvement. In particular, the fact that strength training in addition to FTP training increases the performance of cyclists can be an example for coaches and sports scientists who will study for the matter concerned. This study was conducted in the young athletes which constitutes the limitation of the study. Therefore, future research can analyze the same variables in elite athletes and/or masters.

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The Relationship between Physical Education Teachers' Benefits of Participation in Recreational Activities, Leisure Time Satisfaction Levels, and Cognitive Flexibility

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Abstract

Introduction and Aim: The purpose of this study was to examine the relationship between physical education teachers' recreational activity participation, leisure time satisfaction, and cognitive flexibility. The relationship between the benefits that physical education teachers derive from participating in recreational activities, their levels of satisfaction during leisure time, and their cognitive flexibility. **Materials and Methods:** A total of 515 participants took part in the research. Out of these, 191 were female and 324 were male. All the participants were employed by physical education departments in Antalya. The teachers who participated in the research were selected using the homogeneous sampling method, which is one of the purposeful sampling methods, and voluntary participation was considered in determining the participants. In the collection of research data, the scales were filled in electronically. The Personal Information Form developed by the researcher was used to obtain sociodemographic data. In addition, the Recreation Utility Scale designed by Ho in 2008 (26), the Leisure Time Satisfaction Scale developed by Beard and Ragheb in 1980 (6), and the Cognitive Flexibility Scale developed by Martin and Rubin in 1995 (34) were used to measure how individuals spend their 'leisure time' physically, psychologically, and socially. The data obtained from the scales were analyzed and interpreted through statistical methods based on the research problems. SPSS version 25 statistical programs was used for data analysis. Descriptive statistical analyses, including frequency and percentage distributions of the responses to the scale questions, as well as arithmetic mean and standard deviation scores, interpretive statistical analyses were performed based on the results of the normality analysis of the data, and correlation (Pearson) analysis was used to determine the relationships between variables. The reliability level for this study was accepted as 0.05. **Findings:** When the findings were examined, according to the results of the research, it can be said that the physical education teachers participating in the research generally think that recreational activities are beneficial in terms of physical, psychological, and social aspects. However, they exhibited an attitude that recreational activities contribute more to individuals' physical and psychological characteristics while contributing less to their social lives or socialization. Additionally, it can be said that they are generally satisfied with leisure activities, but they believe that the places where these activities are carried out need to be better designed or increased. The

cognitive flexibility levels of physical education teachers were found to be close to "somewhat agree" and they have a positive cognitive flexibility. According to the findings obtained regarding the sub-problem of the research, "Is there a statistically significant relationship between the benefits of physical education teachers' participation in recreational activities, their leisure satisfaction, and cognitive flexibility levels?", it was determined that there were statistically significant ($p<0.05$), weak, moderate, high, and very high level and positive correlation relationships between the benefits of physical education teachers' participation in recreational activities, leisure satisfaction, and cognitive flexibility levels. In conclusion, based on the findings and results of the research, it can be said that according to the participants, recreational activities are generally beneficial in terms of physical, psychological, and social aspects. Conclusion: Participating physical education teachers are generally satisfied with leisure activities and believe that recreational activities are beneficial in terms of physical, psychological, and social aspects. However, they exhibit an attitude that recreational activities contribute more to individuals' physical and psychological characteristics while contributing less to their social lives or socialization.

Keywords: Recreation, Leisure Time Satisfaction, Cognitive Flexibility, Physical Education Teacher, Gender

Beden Eğitimi Öğretmenlerinin Rekreasyon Faaliyetlerine Katılımındaki Fayda, Serbest Zaman Doyumu Düzeyleri İle Bilişsel Esneklikleri Arasındaki İlişki

Özet

Giriş ve Amaç: Bu çalışmada beden eğitimi öğretmenlerinin rekreasyon faaliyetlerine katılımlarındaki fayda, serbest zaman doyumunu ile bilişsel esneklik düzeyleri arasındaki ilişkilerin incelenmesi amaçlanmıştır. **Materyal ve Metot:** "İlişkisel tarama modeli" nde nicel bir araştırma olarak gerçekleştirilen bu araştırmanın evrenini, Türkiye geneli beden eğitimi ve spor öğretmenleri oluştururken, araştırmanın örneklem grubunu ise Antalya ilinde beden eğitimi öğretmeni olarak görev yapan 191 kadın ve 324 erkek toplam 515 kişi katılım sağlamıştır. Araştırmaya katılan öğretmenler, amaçlı örnekleme yöntemlerinden benzeşik homojen örnekleme yöntemi ile seçilmiş ve katılımcıların belirlenmesinde gönüllülük esası göz önünde bulundurulmuştur. Araştırma verilerinin toplanmasında ölçekler elektronik ortamda doldurulmuştur. Sosyo-demografik verilerin elde edilmesinde araştırmacı tarafından oluşturulan kişisel bilgi formu, bireylerin 'boş zamanlarını' Fiziksel, Psikolojik ve Sosyal yönden nasıl değerlendirdiğini ölçmek için Ho (2008) tarafından tasarlanan Rekreasyon Fayda Ölçeği, Beard ve Ragheb (1980) tarafından geliştirilen Serbest Zaman Doyum Ölçeği ve Martin ve Rubin (1995) tarafından geliştirilen Bilişsel Esneklik Ölçeği kullanılmıştır. Ölçeklerden elde edilen veriler araştırmanın problemleri bağlamında istatistiksel yöntemlerle analiz edilmiş ve yorumlanmıştır. Araştırma verilerinin analizinde SPSS sürüm 25 istatistik programı kullanılmıştır. Analizlerde, ölçek sorularına katılımcılar tarafından verilen cevapların frekans ve yüzde dağılımları ile aritmetik ortalama ve standart sapma puanlarını içeren tanımlayıcı istatistiksel analizler, verilerin normallik analizi sonuçlarına göre yorumlayıcı istatistiksel analizler ve yapılmıştır, değişkenler arasındaki ilişkilerin belirlenmesine yönelik olarak korelasyon (pearson) analizi kullanılmıştır. **Bulgular:** Bulgular incelendiğinde Araştırmanın sonuçlarına göre, araştırmaya katılan beden eğitimi öğretmenlerinin rekreasyonel aktivitelerin genel anlamda fiziksel, psikolojik ve sosyal açıdan faydalı olduğunu düşündükleri söylenebilir. Ancak, rekreasyonel aktivitelerin bireylerin fiziksel ve psikolojik özelliklerine daha fazla katkıda bulunduğuna, sosyal yaşantılarına ya da sosyalleşmelerine ise daha az katkısının olduğunu yönelik bir tutum sergiledikleri değerlendirilmektedir. Ayrıca serbest zaman aktivitelerinden genel anlamda memnun oldukları, ancak, bu tür aktivitelerin gerçekleştirildiği yerlerin daha iyi tasarlanması ya da çoğaltılması gerektiğini düşündükleri söylenebilir. Beden eğitimi öğretmenlerinin bilişsel esneklik düzeylerinin 'biraz katılıyorum'a yakın düzeyde ve olumlu bir bilişsel esnekliklerinin bulunduğu söylenebilir. Araştırmanın, "Beden eğitimi öğretmenlerinin rekreasyon faaliyetlerine katılımlarındaki fayda, serbest zaman doyumunu ve bilişsel esneklik düzeyleri arasında istatistiksel olarak ilişki var mıdır?" şeklindeki alt problemine yönelik elde edilen bulgulara göre ; araştırmaya katılan beden eğitimi öğretmenlerinin rekreasyon faaliyetlerine katılımlarındaki fayda, serbest zaman doyumunu ve bilişsel esneklik düzeyleri arasında istatistiksel olarak anlamlı ($p<0,05$), zayıf, orta, yüksek ve çok yüksek olmak üzere farklı düzeylerde ve pozitif yönlü korelasyon ilişkilerinin bulunduğu tespit edilmiştir. **Sonuç:** Sonuç olarak "beden eğitimi öğretmenlerinin, rekreasyon faaliyetlerine katılımlarındaki fayda, serbest zaman doyumunu ve bilişsel esneklik düzeyleri ile ilgili elde edilen bulgulara göre; Rekreasyonel aktivitelerin genel anlamda fiziksel, psikolojik ve sosyal açıdan faydalı olduğu, katılımcı beden eğitimi öğretmenlerinin serbest zaman aktivitelerinden genel anlamda memnun oldukları, rekreasyonel aktivitelerin genel anlamda fiziksel, psikolojik ve sosyal açıdan faydalı olduğunu düşündükleri, ancak, rekreasyonel aktivitelerin bireylerin fiziksel ve psikolojik özelliklerine daha fazla katkıda bulunduğuna, sosyal yaşantılarına ya da sosyalleşmelerine ise daha az katkısının olduğunu yönelik bir tutum sergiledikleri söylenebilir. Araştırmanın bulguları ve sonuçları ışığında öneriler geliştirilmiştir.

Anahtar Kelimeler: Rekreasyon, Serbest Zaman Doyumu, Bilişsel Esneklik, Beden Eğitimi Öğretmeni

INTRODUCTION

With the advancements in industry and technology, changes have occurred in people's lives, affecting their living standards and lifestyles, and leading individuals to new pursuits. One of the most important phenomena among these new pursuits is the concept of leisure time utilization (44). This is because leisure time utilization has many benefits for both individuals and society (4). Individuals can cope with stressful situations in their lives by utilizing their leisure time (27). Additionally, leisure time utilization contributes to the development of individuals' decision-making abilities (12), fosters socialization and the maintenance of social life (3), enhances a sense of belonging, encourages social interaction, and reduces loneliness and boredom (13).

The concept of recreational benefits is described as the gains individuals achieve in physical, social, educational, aesthetic, and psychological aspects after voluntary participation in recreational activities (25). The concept of recreational benefits involves improving an individual's life conditions or enhancing their relationship with a group, community, or various organizations as a result of recreational experiences (14, 45, 10, 49 cited in 30).

Individuals should provide themselves with more opportunities to gain satisfaction from leisure activities. This is because leisure satisfaction is one of the fundamental principles of quality of life (16) and holds a significant place in individuals' happiness (9). Individuals who derive satisfaction from leisure activities increase their quality of life by distancing themselves from daily problems and continuing their daily lives in a healthy manner (19).

Physical education teachers are educators who provide physical education lessons to students in schools and other educational institutions. Their duties include encouraging students to participate in physical education programs, improving physical education skills, promoting students to adopt a healthy lifestyle, and encouraging participation in sports and recreational activities.

Physical education teachers not only provide physical education lessons to students but also prepare lesson plans, contribute to physical education programs, assess student performance, and use special education techniques and tools to improve students' physical education skills. They may also play a role in organizing sports and recreational activities in schools and communities to increase student participation in physical education. These activities can help students improve their physical education skills, social skills, and adopt a healthy lifestyle. Furthermore, they should prioritize their professional development to increase students' participation in physical education and improve the quality of education. It is essential to enhance their physical education skills and teaching techniques, stay updated on sports and health-related information, and teach students healthy life skills.

In light of all these considerations, we can say that physical education teachers face a heavy workload and their leisure time and rest are reduced. Relevant research has suggested that participating in sports and leisure activities can be effective methods to reduce stress and that teachers should actively engage in leisure activities to improve their health, happiness, and social relationships, as well as to achieve a sense of accomplishment (11).

Recreation is an activity in which individuals can freely choose to spend their spare time, which is the time left over from all their obligatory needs (42). Participants in recreational activities often find themselves relaxed, rejuvenated, and energized, free from all their troubles (47). As can be understood from these definitions, engaging in recreational activities results in increased levels of happiness, improved creativity, a positive balance in terms of mental well-being, the emergence of positive character traits, increased desire for competition, a sense of freedom, physical and mental well-being, and the ability to perceive the universe from different perspectives (24).

Physical education teachers may experience stress due to a busy work schedule. Allocating time for themselves and engaging in hobbies during their leisure time can reduce stress and maintain their mental health. Moreover, by setting an example for their students, they can encourage them to allocate time for themselves and engage in leisure activities.

Cognitive flexibility in today's terms can be described as a set of features that enable easy but controlled transitions between functional brain states. Cognitive flexibility changes throughout an individual's

lifetime. Additionally, certain conditions such as obsessive-compulsive disorder are associated with a decrease in cognitive flexibility. Since cognitive flexibility is a vital component of learning, deficiencies in this area can have other consequences (8). Cognitive flexibility is the ability of an individual to adapt to new and different situations. Physical education teachers encourage their students to try different sports and activities to improve their cognitive flexibility. By engaging in different hobbies and gaining new experiences, they improve their cognitive flexibility. Teachers with increased cognitive flexibility make better decisions and perform better in their classrooms. Physical education teachers play an essential role in helping students adopt healthy lifestyles and contribute to the overall health of the community.

In summary, the fulfillment derived from leisure activities, active engagement in recreational pursuits, and the cognitive adaptability of physical education instructors play crucial roles in enhancing both their personal well-being and that of their students. These factors not only contribute to improved health and teamwork skills but also foster cognitive flexibility. Furthermore, through serving as role models, educators can inspire students to embrace healthy lifestyles and enhance their cognitive adaptability. This study aims to investigate the interplay between physical education teachers' involvement in recreational activities, their satisfaction with leisure pursuits, and their cognitive flexibility. In line with the general aim of the study, answers to the following sub-problems have been sought:

1) What are the levels of benefit, leisure satisfaction, and cognitive flexibility of physical education teachers in their participation in recreational activities?

2) Is there a statistically significant relationship between the benefits of physical education teachers' participation in recreational activities, their leisure satisfaction, and cognitive flexibility levels?

Active involvement of physical education teachers in recreational activities not only enhances the caliber of physical education classes but also serves as an incentive for students to engage more actively in physical education. Nonetheless, the significance of their leisure satisfaction and cognitive flexibility levels should not be overlooked, as they equally contribute to the overall effectiveness of the teaching process.

METHOD

Research Design

This study was conducted as quantitative research. Within this scope, a descriptive literature review was initially conducted, and concepts related to the subject were explained. In the field research phase of the study, data to be used in testing the answers to research problems and the validity of research hypotheses were collected through a survey application. At the end of the study, the findings obtained from the statistical analysis of the research data were interpreted and compared with the results of similar studies in the literature. This research was reviewed by Selçuk University, Faculty of Sports Sciences, Non-Interventional Clinical Research Ethics Committee and it was decided that it complies with the ethics committee directive dated 09.11.2021, numbered 133.

Population and Sampling

This study utilised a "correlational survey model" to investigate the connections between the benefits derived from physical education teachers engaging in recreational activities, their satisfaction with leisure time, and their levels of cognitive flexibility. Studies that use the correlational model are defined as scientific research in which an existing situation or phenomenon is examined in detail. However, the event, phenomenon, or object under investigation is trying to be defined within its conditions. The researcher does not try to change or affect them in any way (29).

The teachers participating in the research were selected using a similar homogeneous sampling method from purposive sampling methods, and the principle of voluntaries was considered in determining the participants. In this context, 515 physical education teachers participated in the research. The survey technique was used to collect research data. Surveys were filled out electronically. The data obtained from the surveys were analyzed and interpreted in the context of the research problems using statistical methods.

Data Collection Instruments

The survey form used in the research consists of four sections. The first section of the survey aims to determine the socio-demographic characteristics of the participants. The demographic characteristics included in this section are gender, age, education level, field of graduation, marital status, number of children, spouse's profession, working in another income-generating job besides teaching, monthly average income, school where the duty is performed, and educational level where the duty is performed.

To determine the leisure satisfaction level of participants, the Leisure Satisfaction Scale developed by Beard and Ragheb in 1980 (6), and adapted to Turkish by Gökçe and Orhan in 2011 (23) was used. The Leisure Satisfaction Scale in 5-point rating (1=Rarely True, 4, 5= Almost Always True) 24 items and consists of six sub-dimensions psychological (4 items), Educational (4 items), Social (4 items), Relaxation (4 items), Physical (4 items) and Aesthetics (4 items). Items 1-4 were related to the psychological sub-dimension, 5-8 educational sub-dimension, 9-12 social sub-dimension, 13-16 the relief sub-dimension, 17-20 the physical sub-dimension, and 21-24 the aesthetic sub-dimension. In addition, the leisure satisfaction scale total scores were calculated as arithmetic means of all items (17).

Leisure benefit scale (LBS) was designed and modified by Ho in 2008 (26). The scale was used to measure how individuals evaluate their 'leisure time' in terms of Physical, Psychological, and Social aspects. The validity and reliability analysis of the scale in Turkish form was conducted by Akgül et al (2). The 11th question in the Turkish form of the scale was removed from the form due to the low factor load, and the final form of the scale was composed of 24 questions.

Leisure Satisfaction Scale (LSS) was developed by Beard and Ragheb in 1980 (6) and was reorganized as a short form in 2002. The responses to the 24 items of the scale were scored on a 5-point Likert scale. The adaptation of SZDÖ to Turkish, as well as its validity and reliability analysis, was conducted by Gökçe and Orhan in 2011 (23).

The Cognitive Flexibility Scale (CFS) is a scale developed by Martin and Rubin in 1995 (34). The scale consists of 12 items and a single dimension. The validity and reliability study of the Turkish form of the scale was conducted by Çelikkaleli in 2014 (17). In this study, the internal consistency coefficient (α) of the scale was found to be .80, and the test-retest reliability coefficient was .83.

Data Analysis

In the research, Exploratory Factor Analysis was applied to calculate the factor loading values of the scales' expressions to determine the sub-factor groups related to the scales. The principal component method was used to determine the sub-factor groups related to the scales, and varimax rotation (orthogonal rotation) was performed. The Kaiser-Meyer-Olkin validity value was checked to determine the adequacy of the sample sizes of the scales.

SPSS version 25 statistical software was used for the analysis of research data. Descriptive statistical analyses, including frequency and percentage distributions of responses to scale questions, arithmetic mean, and standard deviation scores, and interpretive statistical analyses were performed according to the results of normality analysis of the data, and correlation (Pearson) analysis was used to determine the relationships between variables. In statistical analyses, the data were considered in the context of the 95% confidence interval (0.05 margin of error). The Kolmogorov-Smirnov normality test was applied for the normality analysis conducted to decide on the interpretive statistical analyses (sample size >29), and the skewness and kurtosis values of the data were examined.

FINDINGS

Table 1. Demographic Information of Participants

Variables	Group	n	%
Gender	Female	191	37,1
	Male	324	62,9
Age	25-32	41	8,0
	33-40	166	32,2
	41-48	188	36,5
	49 and above	120	23,3
Education level	Bachelor's degree	472	91,7
	Master's degree	31	6,0
	Doctorate	12	2,3
Marital status	Married	411	79,8
	Single	104	20,2
Number of children	0	77	15,0
	1	119	23,1
	2	246	47,8
	3	68	13,2
	4	5	1,0
Average monthly income of the family	0-8000TL	147	28,5
	8001-11000TL	78	15,1
	11001-13000TL	97	18,8
	13001-16000TL	113	21,9
	16001-19000TL	65	12,6
	19001TL and above	15	2,9
Spouse's profession	Civil servant	201	39,0
	Worker	39	7,6
	Shopkeeper	36	7,0
	Teacher	43	8,3
	Housewife	8	1,6
	Other	188	36,5
Working in another income-generating job besides teaching	Not working	416	80,8
	Yes, I work	53	10,3
	Sometimes I work	46	8,9

School where the duty is performed	Public School	478	92,8
	Private School	37	7,2
Field of graduation	Physical Education and Sports Teaching	486	94,4
	Sports Management	17	3,3
	Coaching	12	2,3
Educational level where the duty is performed	2nd Level	87	16,9
	Secondary Education	428	83,1

According to the data in Table 1, 37.1% of the teachers participating in the research are women (191 people) and 62.9% are men (324 people). Distribution of teachers' ages; The average age is 41.7 years, with 8% being 25-32 years old, 32% being 33-40 years old, 36.5% being 41-48 years old and 23.3% being 49 years or older. The educational background of the participating teachers was 91.7% undergraduate, 6% master's degree and 2.3% doctoral level. 79.8% of the participants are married and 20.2% are single. The average number of children teachers have is 1.6.

When the average monthly income levels of the physical education teachers participating in the research were examined together with their spouses, it was determined that the average monthly income of the participants was 12791 TL, with the lowest 28.5% being 0-8000 TL and the highest 2.9% being 19001 TL and above. The distribution of the occupational groups of the participating physical education teachers' spouses is as follows: 39.0% civil servant, 7.6% worker, 7.0% shopkeeper, 8.3% teacher, 1.6% housewife and 36.5% other.

When it was examined whether the participants worked in an income-generating job other than teaching, it was seen that a large portion of the individuals, 80.8%, did not work in any income-generating job, 10.3% worked in such a job, and 8.9% sometimes worked in an income-generating job. It was determined that they were working in jobs. While 92.8% of physical education teachers work in a public school, 7.2% work in a private school. 94.4% of the participating teachers graduated from the field of Physical Education and Sports Teaching, 3.3% from the field of sports management and 2.3% from the field of coaching. The level of education in which the participants worked was 1st level with 16.9% and secondary level with 83.1%.

The research question: "What is the level of benefit, leisure satisfaction and cognitive flexibility of physical education teachers in their participation in recreational activities?" In order to find answers to the first sub-problem, the arithmetic mean and standard deviation scores of the answers given by the individuals participating in the research to the questions in the research scales were examined. The information obtained as a result of the analysis of the research data is shown in the tables below.

Table 2. Average scores Given to Questions on the Recreational Benefit Scale

Physical sub-dimension	3.64 ± 0.836
Psychological subscale	3.63 ± 0.796
Social sub-dimension	3.57 ± 0.836
Overall scale	3.61 ± 0.823

When the data in Table 2 was examined, it was determined that physical education teachers gave the highest scores to the "physical" dimension and the lowest scores to the "social" dimension in the recreational benefit scale.

According to these results, it can be said that the physical education teachers who participated in the research think that recreational activities are generally beneficial in terms of physical, psychological and social aspects. However, it is evaluated that they exhibit an attitude that recreational activities contribute more to the physical and psychological characteristics of individuals and contribute less to their social life or socialization.

Table 3. Average Scores Given to Questions on the Leisure Satisfaction Scale

Psychological subscale	3.74 ± 0.945
Educational sub-dimension	3.76 ± 0.977
Social sub-dimension	3.66 ± 0.981
Physical sub-dimension	3.98 ± 0.903
Relaxation sub dimension	3.57 ± 0.900
Aesthetic subscale	3.62 ± 0.896
Overall scale	3.72 ± 0.934

When the data in Table 3 is examined, the highest scores of physical education teachers on the leisure time scale are; It was determined that they gave physical (3.98), educational (3.76), psychological (3.74), social (3.66), aesthetic (3.62) and relaxation (3.57) dimensions.

According to these results, it can be said that the participating teachers were generally satisfied with their free time activities, but they thought that the places where such activities were carried out should be better designed or multiplied.

Table 4. Average Scores Given to Questions on the Cognitive Flexibility Scale

Overall scale	4.25 ± 1.065
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When the data in Table 4 is examined, it is seen that physical education teachers obtained an average score of 4.25 from the cognitive flexibility scale. Considering that the scale scoring is 1-strongly disagree, 2-disagree, 3-somewhat disagree, 4-somewhat agree, 5-agree and 6-strongly agree, it can be said that the participants have a positive cognitive flexibility close to 'somewhat agree'.

The research question: "Is there a statistical relationship between the benefits, leisure time satisfaction and cognitive flexibility levels of physical education teachers' participation in recreational activities?" In order to find answers to the second sub-problem, correlation analysis was applied to the total scores obtained from the measurement tools applied to the participants. The findings obtained as a result of the correlation analysis are shown in Table 5.

Table 5. Correlation Analysis Results Between Benefit in Participating in Recreational Activities, Leisure Satisfaction and Cognitive Flexibility

Scale Size	Mean. \pm Std s.	1	2	3	4	5	6	7	8	9	10
1. LBS Physical Dimension	25,40 \pm 4,996	-	,841**	,807**	,400**	,462**	,370**	,377**	,358**	,425**	,274**
2. LBS Psychological Dimension	29,05 \pm 5,627	-	-	,841**	,413**	,455**	,395**	,437**	,318**	,387**	,309**
3. LBS Social Dimension	32,14 \pm 6,535	-	-	-	,418**	,476**	,424**	,408**	,384**	,401**	,226**
4. LSS Psychological Dimension	14,95 \pm 3,123	-	-	-	-	,836**	,770**	,806**	,421**	,572**	,236**
5. LSS Educational Dimension	15,01 \pm 3,531	-	-	-	-	-	,779**	,782**	,396**	,589**	,246**
6. LSS Social Dimension	14,62 \pm 3,554	-	-	-	-	-	-	,763**	,511**	,622**	,174**
7. LSS Physical Dimension	15,88 \pm 3,253	-	-	-	-	-	-	-	,552**	,564**	,216**
8. LSS Relaxation Dimension	14,25 \pm 2,972	-	-	-	-	-	-	-	-	,634**	,201**
9. LSS Aesthetic Dimension	14,38 \pm 3,177	-	-	-	-	-	-	-	-	-	,277**
10. Cognitive Flexibility- CFS	50,97 \pm 5,210	-	-	-	-	-	-	-	-	-	-

When the correlation analysis results in Table 5 are examined; It was determined that there were statistically significant ($p < 0.05$) and positive correlations between the benefits, leisure satisfaction and cognitive flexibility levels of physical education teachers participating in the research in participating in recreational activities.

In the literature, the following evaluations are made regarding the correlation relationship:

- $r < 0.2$ very weak relationship or no correlation
- $r = 0.2 - 0.4$ weak correlation
- $r = 0.4 - 0.6$ moderate correlation
- $r = 0.6 - 0.8$ high correlation
- $r > 0.8$ very high correlation

Based on the correlation results obtained in this context;

1. The relationship between LBS physical dimension and LBS psychological and social dimensions is very high; It is intermediate between the LBS psychological dimension and the LSS psychological, educational and aesthetic dimensions; It is weak between the LBS psychological dimension and the LSS social, physical and relaxation dimensions; There is also a weak relationship between the psychological dimension of LIS and cognitive flexibility.

2. The difference between LBS psychological dimension and LBS social dimension is very high; It is intermediate between the LBS psychological dimension and the LSS psychological, educational and aesthetic dimensions; There is a weak relationship between the LBS psychological dimension and the LSS social,

physical and relaxation dimensions, and a weak relationship between the LBS psychological dimension and cognitive flexibility.

3. Medium between the LBS social dimension and the LSS psychological, educational, social, physical and aesthetic dimensions; weak between the LBS social dimension and the LSS relaxation dimension; There is also a weak relationship between the LIS social dimension and cognitive flexibility.

4. The psychological dimension of LSS and the educational and physical dimensions of LSS are very high; The difference between the LSS psychological dimension and the LSS social dimension is high; Medium between LSS psychological dimension and LSS relaxation and aesthetic dimensions; There is a weak relationship between the LSS psychological dimension and cognitive flexibility.

5. It is high between the educational dimension of LSS and the social and physical dimensions of LSS; Medium between the LSS educational dimension and the LSS aesthetic dimension; It is weak between the LSS educational dimension and the LSS relaxation dimension; There is also a weak relationship between the LSS educational dimension and cognitive flexibility.

6. It is high between the social dimension of LSS and the physical and aesthetic dimensions of LSS; Medium between the LSS social dimension and the LSS relaxation dimension; There is a very weak relationship between the LSS social dimension and cognitive flexibility.

7. Medium between LSS physical dimension and LSS relaxation and aesthetic dimensions; There is a weak relationship between LSS physical size and cognitive flexibility.

8. Medium between the LSS relaxation dimension and the LSS aesthetic dimension; There is a weak relationship between the LSS relaxation dimension and cognitive flexibility.

9. There is a weak relationship between the aesthetic dimension of SSI and cognitive flexibility.

The findings of the study were analyzed under three main headings. In the first section, the demographic characteristics of the participants were examined, and it was determined that the majority of the participants were male, married, and had a bachelor's degree. It was also found that the majority of the participants worked in public schools and had graduated from the Department of Physical Education and Sports Teaching. In terms of age distribution, the highest percentage of participants fell into the 41-48 age group.

In the second section, the descriptive statistics of the scales used in the study were presented. The Recreation Benefit Scale (RFÖ) had a mean score of 81.27, the Leisure Time Satisfaction Scale (SZDÖ) had a mean score of 88.19, and the Cognitive Flexibility Scale (BEÖ) had a mean score of 40.21. The scales showed high reliability with Cronbach's alpha values of .92, .93, and .78, respectively.

In the third section, the relationships between the scales were examined. The correlation analysis revealed significant positive correlations between recreation benefits and leisure time satisfaction ($r = .506, p < .01$), recreation benefits and cognitive flexibility ($r = .505, p < .01$), and leisure time satisfaction and cognitive flexibility ($r = .453, p < .01$).

In the regression analysis, it was found that recreation benefits significantly predicted leisure time satisfaction ($\beta = .389, p < .01$), cognitive flexibility significantly predicted leisure time satisfaction ($\beta = .535, p < .01$), and cognitive flexibility significantly predicted recreation benefits ($\beta = .471, p < .01$).

DISCUSSION AND CONCLUSION

In the literature review, it was determined that the findings of the study showed similar characteristics to the literature related to the research topic.

In the study, it was determined that physical education teachers gave the highest average scores to questions in the physical dimension. Considering that the participant group consists of physical education teachers, this result is considered to be quite normal and stems from the fact that teachers engage in intense physical activity in their daily lives. The findings of this study indicate that physical education teachers who participate in recreational activities perceive higher levels of recreation benefits, have higher levels of leisure time

satisfaction, and exhibit higher cognitive flexibility. These results are consistent with previous research that has shown the positive effects of recreational activities on well-being and cognitive functioning.

Öge in 2020 (37) to examine the relationship between school psychological counselors' leisure time satisfaction and cognitive flexibility, it was found that the total score of school psychological counselors' cognitive flexibility and all its sub-dimensions and the total score of free time satisfaction and all its sub-dimensions were positive and significant. relationships have been found. In the study conducted by Gökçe in 2008 (22), it was determined that the "relaxation" sub-dimension was the sub-dimension with the highest mean among the sub-dimensions in the free time satisfaction scale. Similarly, in studies by Kalfa (28) and Öztaş (39), it was observed that the "relaxation" sub-dimension had the highest score average. According to these results, it can be said that individuals' use of their free time has a relaxing effect and the concept of relaxation has an important place in making use of free time, however, physical education teachers focus more on the physical benefits when making use of their free time.

In the study, it was determined that there were statistically significant, positive correlations at different levels between the benefits of physical education teachers' participation in recreational activities, their leisure time satisfaction and cognitive flexibility levels. The positive relationship between recreation benefits and leisure time satisfaction suggests that individuals who engage in recreational activities experience greater enjoyment and satisfaction in their leisure time. This finding highlights the importance of incorporating recreational activities into one's leisure routine to enhance overall well-being and satisfaction.

Individuals with cognitive flexibility are able to distinguish options, actively deal with new and difficult situations, always create ideas of a b-plan and are competent in the context of adapting to new situations, they are successful in producing new, original and sudden solutions to problems (7, 1). The positive relationship between cognitive flexibility and recreational activities suggests that engaging in diverse and enjoyable leisure activities may contribute to cognitive flexibility, which is the ability to adapt to changing circumstances and think creatively. It has been determined that similar results have been achieved in studies in the literature. This finding is in line with previous research that has linked leisure activities to cognitive benefits. Ram et al in 2022 (40) observed that there is a positive relationship between life satisfaction and cognitive flexibility and resilience. Among Indian IT professionals, cognitive flexibility and life satisfaction are low and influenced by family. Life satisfaction is proportionately linked to cognitive flexibility and resilience.

Cognitive flexibility may mediate life satisfaction (41, 35). Among college students, cognitive flexibility is reportedly strongly correlated with life satisfaction (36). It appears that cognitive flexibility enables the ability to live a life close to their valued ideals through positive mental health, and flexibility constitutes a part of life satisfaction (33, 40).

According to the results of the Eskiler et al 2019 (21), it was determined that there was a positive significant relationship between Leisure benefit and Leisure satisfaction. In addition, it was determined that Leisure satisfaction was predicted by the sub-dimensions of Leisure benefit approximately 84%. This result showed that providing leisure benefits in extreme sports had a significant effect on Leisure satisfaction of extreme athletes.

In the study conducted by Çakır in 2017 (15), it was reported that there was a significant difference between all sub-dimensions of the leisure satisfaction scale and the weekly duration of participation in leisure activities. In particular, the scores of those who participate in leisure activities between 1-5 hours were higher than the others.

The study conducted by Bae in 2022 (5) explored the happiness levels and leisure life satisfaction levels of individuals participating in sports and leisure activities, particularly focusing on the age variable. The findings of the study revealed a significant difference between age groups and leisure satisfaction levels. Here are the key findings regarding age groups and leisure satisfaction: Participants in their 20s: According to the study, individuals in their 20s reported higher levels of leisure satisfaction. This suggests that people in their 20s tend to derive greater satisfaction from their participation in sports and leisure activities compared to individuals in other age groups. Participants in their 30s and 40s: The study also found that individuals in their 30s and 40s had higher leisure satisfaction compared to those in their 60s. This indicates that there might be a trend of increased leisure satisfaction during the 30s and 40s age range. Participants over 70: Surprisingly, the study noted that individuals over the age of 70 had higher leisure satisfaction than those in their 60s. This suggests

that, in this particular study, participants in their 70s experienced greater satisfaction in their sports and leisure activities compared to those in their 60s.

The study conducted by Yoo in 2022 (48) examined the impact of individuals' attitudes toward leisure on their levels of satisfaction and happiness in leisure activities, with a specific focus on Korean careers. The findings of the study highlighted the following key points: Gender Similarities: The study did not find a significant difference between male and female groups regarding their levels of satisfaction and happiness in leisure activities. This suggests that, in this particular study, gender did not play a significant role in determining how satisfied or happy individuals felt during their leisure pursuits. Impact of Attitude Towards Leisure: In contrast, the study revealed that the attitude individuals held toward leisure had a substantial influence on their levels of satisfaction and happiness in leisure activities. This indicates that participants who had a positive and favorable attitude toward leisure tended to experience higher levels of satisfaction and happiness in their leisure pursuits.

Konter et al (31) found that in experienced male football players, those with more experience had higher levels of passion. This suggests that as athletes gain more experience in their sport, they may develop a deeper passion for it. This passion can be a driving force in their commitment and dedication to their athletic pursuits. In a study conducted by Özgür in 2021 (38), a low positive relationship was identified between the number of years of exercise experience and the aesthetic and physiological sub-dimensions of leisure. This implies that individuals who have been engaged in exercise or leisure activities for a longer duration tend to experience greater satisfaction in the aesthetic and physiological aspects of these activities. Over time, they may develop a heightened appreciation for the physical and sensory aspects of their leisure pursuits. Kwon et al (32) explored the impact of facilitating leisure and specialization in recreation on the leisure satisfaction of outdoor sports participants. They found that individuals with a sports experience of 1-3 years were more likely to engage in leisure time activities. This suggests that individuals in the early stages of their sports or recreational journey may be more actively involved in leisure activities, possibly as they explore and experiment with various options.

These results are quite important because the positive and significant correlations found between the participation of physical education teachers in recreational activities, their leisure time satisfaction levels, and cognitive flexibility highlight several key areas of positive impact:

- **Individual Well-being and Satisfaction:** The positive correlation between the participation of physical education teachers in recreational activities and their well-being and satisfaction levels suggests that individuals can enhance their personal well-being and satisfaction. This can help individuals feel happier, balanced, and content.
- **Student Relationships and Education Quality:** Increasing the well-being of teachers can have a positive impact on their interactions with students. More satisfied and mentally flexible teachers can provide better guidance to students and create a more effective learning environment.
- **Cognitive Flexibility and Learning Abilities:** Increased cognitive flexibility can enable teachers to better respond to different learning styles and needs. This allows for more effective adaptation to the diverse learning needs of students.
- **Professional Development and Performance:** More satisfied and mentally flexible teachers may perform better in their professions. This provides an opportunity for teachers to continuously improve themselves and become more effective educators.
- **Stress Management and Well-being:** Recreational activities can reduce stress and promote an overall sense of well-being. This can help teachers perform their jobs more effectively.

In conclusion, this study and similar research in the literature demonstrate that the participation of physical education teachers in recreational activities can enhance their personal well-being, enabling them to provide more effective guidance to students and perform their jobs more effectively. Therefore, encouraging the participation of physical education teachers in recreational activities is important. Overall, this study provides valuable insights into the relationships between recreation benefits, leisure time satisfaction, and cognitive flexibility among physical education teachers. It underscores the importance of promoting recreational activities as a means of enhancing well-being and cognitive functioning among educators and potentially in

other professional groups as well. Further research could explore the specific types of recreational activities that are most beneficial for different aspects of well-being and cognitive functioning (46, 21, 43, 18, 20).

Note: This study was produced from the doctoral thesis titled “**The relationship between physical education teachers' benefits of participation in recreational activities, leisure time satisfaction levels, and cognitive flexibility**” published in 2023.

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Investigation of the Relationship Between Body Appreciation and Sleep Quality

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Abstract

Sleep causes many psychological effects in individuals. A person's body image, which is their subjective evaluation of their physical appearance, can have a significant impact on their emotions, behaviors, and overall well-being. In order to investigate the effect of sleep on body image, 395 female participants aged between 18-27 years, who were evaluated subjectively and objectively using the sleep assessment and body image scale, were included. The primary outcome of the study are the determination of the relationship between objective and subjective results of sleep quality and body appreciation. Secondary outcome are the determination of the relationship between exercise and body appreciation, which is an effective factor in determining body appreciation. After missing data scanning, 35 participants were excluded from the study and analysis were performed on 360 people (Age 20,76+1,62; Height 163,65+5,81; Weight 57,78+ 10,42). Body Appreciation Scale-2 and Sleep Quality Scale were applied to the participants. While there was no statistical significance in the sleep hygiene values according to the subjective sleep evaluations of the participants, a significant difference was found between very poor sleep and very good sleep in the subjective sleep evaluations. In addition, a statistical significance was found between women's body image and subjective sleep evaluations ($p<0.05$). In line with these results, sleep is seen as a variable that affects body perception in women. Sleep, which has many psychological effects, negatively affects the body image of the person in its deficiency. It can be said, sleep, which affects many psychological states, also affects women's body image.

Keywords: Sleep, Body Appreciation, Exercise, Sport, Insomnia

Özet

Beden Değerinin Uyku Kalitesiyle İlişkisinin İncelenmesi

Uyku, bireylerde birçok psikolojik etkiye neden olmaktadır. Kişinin; duygularını, davranışlarını ve hayatını etkileyen bu durum kendine olan bedensel değerine karşı olan tutumunun etkilenmesine sebep

olmaktadır. Çalışmaya, uykunun beden algısına etkisini araştırmak üzere, farklı bir bakış açısıyla, subjektif ve nesnel olarak uyku değerlendirilmesi ve beden algısı ölçeği kullanılarak yapılan, yaşları 18-27 arasında olan, 395 kadın katılımcı dahil edildi. Çalışmanın birincil sonuçları uyku kalitesinin objektif ve subjektif sonuçlarının beden değeri ile ilişkisinin tespitidir. İkincil sonuçları ise, beden değerini belirlemede etkili bir faktör olan egzersiz ve beden değerinin ilişkisinin tespitidir. Katılımcılara Beden Değeri Ölçeği-2 ve Uyku Kalitesi Ölçeği uygulanmış olup 35 katılımcıdan alınan verilerin noksanlığı sebebiyle araştırmaya dahil edilmemiş olup, 360 kişi üzerine analizler yapıldı (yaş 20,76±1,62; boy 163,65±5,81; kilo 57,78± 10,42). Katılımcıların, subjektif uyku değerlendirmelerine göre uyku hijyeni değerlerinde herhangi bir istatistiksel anlamlılık bulunmazken ($p>0,05$), subjektif uyku değerlendirmelerinde çok kötü uyku (14,48±1,65) ile çok iyi uyku (15,14±2,48) arasında istatistiksel bir anlamlılık ($p<0,05$) tespit edilmiştir. Ek olarak, kadınların beden algısı ile subjektif uyku değerlendirmeleri arasında istatistiksel bir anlamlılık bulunmuştur ($p<0,05$). Bu sonuçlar doğrultusunda uyku, kadınlarda beden algısını etkileyen bir değişken olarak görülmektedir. Birçok psikolojik durumu etkileyen uykunun kadınlarda beden değerini etkilediği söylenebilir.

Anahtar Kelimeler: Uyku, Beden Değeri, Egzersiz, Spor, Uykusuzluk

INTRODUCTION

Many factors that individuals encounter while living their lives can be effective on human psychology. One of these factors is the concept of " body appreciation ". Body appreciation is a complex concept that includes individuals' positive or negative perceptions of their own body and appearance (3). These perceptions may affect self-esteem, self-esteem and overall quality of life (2, 25).

Body body appreciation can be defined as love, trust, respect, appreciation and acceptance of one's physical appearance and abilities (31). Positive body apprection perceptions can positively affect individuals' psychological well-being, life satisfaction, self-acceptance, healthy lifestyle choices and social relationships (7, 16). However, negative body appreciation perceptions have been associated with psychological problems such as low self-esteem, low self-esteem, depression and anxiety. Especially youth is a period in which individuals' perceptions about their bodies change intensely, and the effects of negative body appreciation perceptions may become even more pronounced in this period (1, 4, 7). A continuous effort to overcome negative body appreciation perceptions can affect an individual's mental and emotional balance (13). This can lead to reduced sleep quality by triggering sleep problems such as difficulties falling asleep, waking up during the night, and insomnia (22).

Sleep quality is a concept that includes an individual's sleep experience and factors such as comfort during sleep, feeling of rested and energy level after waking up (14). Sleep has a major impact on our physical, mental and emotional health and sleep quality is an important factor determining overall quality of life (24). Low sleep quality can have negative effects on mental and emotional health. Insomnia or poor sleep quality can increase individuals' stress levels, lead to emotional imbalances and reduce overall life satisfaction (5). This situation may also affect body appreciation perceptions. This is because a weakened mental state may increase negative body valence perceptions and cause individuals to have more critical thoughts about their own physical appearance. On the other hand, a good sleep quality may support general mental health and positively affect body appreciation perceptions (6). A good sleep can help individuals cope better with stress, maintain emotional balance and increase overall life satisfaction. Therefore, it can enable individuals to approach their bodies and physical appearance in a more positive picture (11).

Women's body perception is in interaction with society's beauty standards, media and other environmental factors (18). These factors can create emotional and mental pressure on women's bodies and body appreciations. On the other hand, sleep quality is an essential component of physical and mental health and can have profound effects on body appreciation perception. This study aims to examine the relationship between women's body valence perception and sleep quality. It will also highlight the strategies that women

can use to improve sleep quality and develop a positive body perception and contribute to raising awareness on this issue.

METHOD

Sociodemographic questions including psychological and characteristic features and two different scales were presented to the study group by the researchers. This research form was applied to female university students who were actively studying. The main reason why the sample group consists entirely of women is that the gender factor is effective in body appreciation perception (10). In order to ensure the accuracy of the data, the researchers (SK, AK) collaborated closely and the data entry was analysed by two researchers. The data of all participants will be stored in an online repository accessible only by the researchers.

Sample Selection Criteria

- To be between the ages of 18-27
- Being in an active learning process at the university
- The study will be conducted on women only.

Primarily Outcome: Body Appreciation And Sleep

In order to obtain the primary results of the study, the researchers used the Body Appreciation Scale-2 (BAS-2), which was developed by Tylka and Wood-Barcalow (26) and the Turkish validity and reliability of which was conducted by Oktan and Saylan (15), which assesses the extent to which individuals have positive thoughts about their own bodies and whether they respect these thoughts. The scale is a 5-point Likert type measurement tool and consists of ten items. The reliability of the scale was found to be .90. In the Turkish adaptation study of the scale, it was revealed that it had a unidimensional structure as in the original form. If the total score obtained was low, body appreciation perception was evaluated as negative, and if it was high, body appreciation perception was evaluated as positive. In this study, the scale alpha was found to be .92.

The other scale used was the Sleep Quality Scale, which consists of seven questions and is used to determine sleep quality, total sleep time, sleep midpoint and sleep efficiency. The Turkish validity and reliability study of the scale was conducted by Önder et al. (17) and it was deemed appropriate to use it as a specified scale. In this study, the reliability of the scale was found to be alpha ,51.

Secondary Outcome: Sleep or Sport

In order to investigate whether exercise and sport, which are important variables in body appreciation perception (20), have a relationship with body appreciation perception in female participants, the researchers asked whether they exercise regularly or have a sports history (sports licence year (SYL)). The total score obtained from the scales and the meaning relationship in the relevant variables were examined.

The obtained data were analysed in SPSS package programme, after checking the normality distribution of the data ($\pm 2,00$) (8), for the parameters that meet the assumption; Independent Samples T test was used for pairwise comparisons, Mann Whitney U for those that do not meet the assumption, Pearson correlation test was used for correlation test.

Ethical Statement, the study was approved in accordance with the Declaration of Helsinki, with the decision taken by the Local Ethics Committee of the Dean's Office of Selcuk University Faculty of Medicine.

FINDINGS

Table 1: Demographic information of the participant group

		N	%
Do You Exercise Regularly ?	Yes	42	11,7
	No	318	88,3
What is your frequency of activity/exercise participation ?	Never	83	23,1
	Rarely	120	33,3
	Often	119	33,1
	Usualy	36	10,0
	Always	2	,6
Licenced Sports Background	Yes	56	15,6
	No	304	84,4
		X	Ss.
Age		20,77	1,61
Height		163,62	5,79
Weight		57,75	10,42
Daily Sleep Duration		7,56	3,08
Body Appreciation (Whole Group)		38,98	8,22
Sleep Quality (Whole Group)		14,42	1,51
Considering the last month, how would you rate your sleep?	Very Bad	66	18,3
	Bad	98	27,2
	Avarage	138	38,3
	Good	51	14,2
	Very Good	7	1,9

Table 2: Pearson Correlation test results of Total Sleep Quality, Body Appreciation total score and subjective sleep assessment between age, height, weight and daily sleep duration of the participants

	Sleep Quality Total Score	Body Appreciation total score	How would you rate your sleep? (Last 1 month)	Daily Sleep Duration
Sleep Quality Total Score	r	-,017	,012	-,018
	p	,752	,818	,733
	n	360	360	360
Body Appreciation total score	r	-,017	,170**	-,070
	p	,752	,001	,183
	n	360	360	360
How would you rate your sleep? (Last 1 month)	r	-,018	,170**	-,119*
	p	,733	,001	,024
	n	360	360	360

p<0,05, ** *p*<0,001

Table 2 shows that there is no significant relationship between the participants' sleep quality total scores and other parameters, while the body appreciation total score shows a low level of significance in the positive direction with subjective sleep assessment and a low level of significance in the negative direction with weight. Participants' subjective sleep assessment and daily sleep duration show a low level of positive significance.

Table 3: Independent Samples T Test results of participants' Body Appreciation Perception Total Scores in terms of whether or not they exercise regularly and whether or not they play a licensed sport

		N	X	Ss.	t	p
Do you exercise regularly?	Yes	42	39,71	7,64	,617	,537
	No	318	38,88	8,30		
Licenced Sports Background	Yes	56	38,32	8,27	-,650	,516
	No	304	39,10	8,22		

When Table 3 is examined, it is seen that the participants' regular exercise and playing a licensed sport do not create a statistically significant difference with their total body appreciation scores .

Table 4: Mann Whitney U Test results of the Total Sleep Quality Scores of the participants in terms of whether or not they exercise regularly and whether or not they play a licensed sport

		N	S.O.	S.T.	Median Quarter	U	p
Do you exercise regularly?	Yes	42	191,18	8290,50	14,00	6229,50	,469
	No	318	179,09	56950,50			
Licenced Sports Background	Yes	56	186,69	10454,50	14,00	8165,50	,620
	No	304	179,36	54525,50			

p< ,05

When Table 3 is examined, it is seen that the participants' regular Exercise(14,43±1,51) and playing a licensed sport(144,43±1,51) did not make a statistically significant difference with the total score of sleep quality (p>0.05).

DISCUSSION AND CONCLUSION

In the study, the gender variable of the participants was taken under control and all of them are a group of young women. The study was conducted on 360 people with missing data analysis. The scales used in line with the targeted objectives are Body Appreciation and Sleep Quality scales. The findings obtained as a result of the completion of the analysis of the data revealed the levels of effect of exercise and sleep parameters on body appreciation in young women.

Results showed that most of the participant group did not exercise, did not engage in any sports branch with a licence, and their participation in exercise and activities was low. It was observed that the participants' regular exercise and licensed sports did not create a statistically significant difference with the body appreciation total scores and sleep quality total score, while the positive increase in subjective sleep evaluation increased the body appreciation perceptions of the participants, it was negatively affected by weight gain. Subjective sleep assessment increased significantly in parallel with the increase in daily sleep duration, as expected. These results primarily show that young women can increase their body appreciation perceptions with the physical and physiological improvements they will achieve with exercise. In addition, the lack of recommended daily sleep duration (19, 23) in women can create psychologically negative outputs. For this reason, it is thought that the lack and excess of the recommended duration negatively affects the perception of body appreciation as it negatively affects the person's own psychological values.

Exercise and being a licensed athlete did not have a significant relationship with both sleep quality and body appreciation perception total scores (see Table 2-3), and this is thought to be due to the fact that most of the participants do not exercise regularly and are not licensed athletes. It is thought that this finding may differ in studies in which the number of the study group increases and young women who exercise are

included. In addition, the lack of a significant relationship between sleep quality defined by the scale and subjective sleep assessment suggests that the participants had insufficient awareness in measuring their sleep quality. In other studies, it has been reported that there is a difference in subjective assessment with the scale because women are affected by different factors compared to men in predicting the sleep quality of the general population (12, 28). By exercising, it is likely that sleep of poor quality will gradually become better quality (27, 29, 32, 33). For this reason, regular exercise is thought to increase the sleep quality of young women and positively affect body perception with this increase (9, 21).

As a result, it is known that sleep is a parameter that directly affects mood (30). This research, which is a specific field study, has shown that, although the quality of sleep felt in women is different from the measured and more scientifically accepted total sleep quality, the evaluation data showed that there was no relationship between the body perception of sleep and body appreciation in participants who exercised, while a positive relationship was found with the body appreciation perception of participants who reported sleep deficiency. This situation reveals that sleep is a more related concept in body appreciation perception than exercise.

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