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Research Article

The Effect of Respiratory Muscle Exercises Applied to Smoking Athletes on Respiratory Parameters

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Abstract: The aim of the study was to determine the effect of respiratory muscle exercises on respiratory parameters of smoking athletes. Thirty athletes between the ages of 18-24 who have been doing licensed sports for at least 5 years participated in the study voluntarily. Participants were divided into 3 groups: smokers and respiratory muscle exercising group [SG, (n=10)], non-smokers and respiratory muscle exercising group [NG, (n=10)], smokers and control group without respiratory muscle exercising group [CG, (n=10)]. Respiratory parameters of all groups were determined with a spirometer. Participants in SG and NG performed respiratory muscle exercises with the triflo respiratory muscle exerciser 120 times a day for 4 weeks, 2 sets in the morning and evening every day and 30 times in each set. In the analysis of the data, two-way ANOVA test for repeated measures was applied to examine the results of different protocols (SG, NG and CG), pre-test and post-test measurements and protocol*time interaction effect. As a result of the study, FVC, FEV1, FEV1/FVC, PEF and MVV parameters of NG increased in favor of the post-test. However, no statistically significant differences were found between the groups in intergroup comparisons. However, when the percentage improvements were analyzed, it was determined that the highest improvement in all parameters was in NG.

Keywords: Respiratory muscle exercise, respiratory parameters, athlete, smoking

1. Introduction

Smoking addiction is known as a major public health problem worldwide and its prevalence is increasing. The World Health Organization has stated that smoking is linked to approximately seven million deaths each year (WHO, 2018). Smoking is directly related to nearly 20 fatal diseases, especially lung and heart diseases, but it also causes the emergence of about 50 different chronic diseases that do not result in death (Ash, 2017). Smoking causes fatal diseases not only in sedentary individuals but also in athletes, leading to shortened active sports lives and loss of physical performance. For these reasons, smoking has become an important health problem among athletes (Feinberg et al., 2015).

It has been reported that smoking in athletes can cause loss of strength due to its harmful effects on bone (Kanis et al., 2005), muscle and tendons (Kok et al., 2012), while it also causes negative effects on the respiratory system and leads to a decrease in lung volume and capacity (Clotet et al., 2004; Yıldız et al., 2024). The deterioration in lung function in smoking athletes leads to a decrease in maximal oxygen consumption (VO2max) values and a decrease in aerobic capacity (Tchissambou et al., 2004).

Lung capacity is recognized as an important indicator of the overall performance level of athletes (Schunemann et al., 2000; Verges, 2009). Increasing lung capacity increases the aerobic capacity of athletes by increasing the amount of oxygen taken into the body, which significantly affects the performance of physical activity (Olbrecht, 2000). In this

context, it is stated that respiratory muscle exercises can help improve respiratory functions by increasing respiratory capacity and strength (Aktuğ et al., 2022; Verges, 2007). Respiratory muscles are structurally and functionally classified as skeletal muscles and can respond to training like skeletal muscles when exposed to an appropriate load (Kraemer et al., 2002). Therefore, it is thought that exercises to strengthen the respiratory muscles can positively improve athletes' overall performance and movement control in physical activities (Enright, 2006).

Although respiratory muscle exercises were initially started to be used in the treatment of individuals with health problems related to the respiratory system (Beckerman et al., 2005; Weiner et al., 2004), it has recently become a method frequently used on athletes to improve athletic performance (Kilding et al., 2010; McCarthy et al., 2015; Romer et al., 2002).

As mentioned above, considering the damages caused by smoking in the respiratory system and the benefits of respiratory muscle exercises in the respiratory system, how effective respiratory muscle exercises are in mitigating the respiratory impairments caused by smoking. With this in mind, the hypothesis of the study was determined as "Smoking is a limiting factor for the positive effects of respiratory muscle exercises on the respiratory muscle".

2. Materials and Methods

2.1. Research Group

The population of the study consists of 258 students studying in the 1st education program of Niğde Ömer Halisdemir University Faculty of Sports Sciences, Department of Coaching Education. A sample of 30 people was selected from this population using purposive sampling method. The criteria sought in the purposive sampling method were that the participants should be between the ages of 18-24, be active athletes and have a license for at least 5 years. In addition, participants who smoked at least 10 cigarettes per day for the last 2 years were included in the study. Participation was completely voluntary, and participants successfully completed a four-week respiratory muscle exercise program.

Table 1. Demographic Variables of the Participants

	SG	NG	CG
Age (years)	19.30±1.33	21.00±1.33	20.70±1.25
Height (cm)	174.00±5.31	173.00±9.71	172.30±10.85
Body weight (kg)	70.40±8.83	64.40±17.26	69.20±9.21

2.2. Research Design

In this study, it was aimed to determine whether respiratory muscle exercises applied for 4 weeks were effective on respiratory functions in smokers and non-smokers, so it was conducted according to the pretest-posttest design with control experimental group from quantitative research designs. In the study, the participants were randomly divided into three groups: smokers and respiratory muscle exercising group [SG, (n=10)], non-smokers and respiratory muscle exercising group [NG, (n=10)], and smokers but not respiratory muscle exercising control group [CG, (n=10)]. Respiratory parameters of all groups were determined with a spirometer. The tests were performed twice in total, at the beginning of the study and at the end of the fourth week, and the progress of the participants was monitored.

2.3. Data Collection Tools

2.3.1. Determination of Lung Volume and Capacity

Lung volume and capacity measurements were performed twice, at the beginning of the study and at the end of the fourth week. For these measurements, the MIR (Medical International Research) Spirolab spirometer device, which complies with the American Thoracic Society measurement criteria, was used (Culver et al., 2017). The measurement was performed by placing a clip on the participant's nose after at least five minutes of rest and placing the mouthpiece of the device between the lips so that no air leakage occurred. To increase the reliability of the test, each measurement was repeated twice, and the best value was included in the study data. Forced expiratory volume in the first second (FEV1), forced vital capacity (FVC), forced expiratory ratio (FEV1/FVC%), peak expiratory flow rate (PEF) and maximum voluntary ventilation (MVV) parameters were used in the study.

2.4. Respiratory Muscle Exercises

Triflo respiratory muscle exerciser device was used for respiratory muscle exercises. There are different models of this device with single, double, triple and quadruple balls; the triple ball model was preferred in our study. The working principle of the triflo respiratory muscle exerciser is based on the movement of the balls inside with inspiration or expiration. Both expiration and inspiration exercises can be performed with the device, and in our study, an inspiration exercise was performed. Participants placed the device between their lips in such a way that no air leakage occurred and drew air through the mouthpiece. The aim was to first raise the first ball and then the other balls in sequence and to keep the balls in the air for five seconds. In our study, SG and NG performed respiratory muscle exercise with the triflo respiratory muscle exerciser 120 times a day, 2 sets in the morning and evening, 30 times in each set, every day of the week. CG did not perform respiratory muscle exercise.

2.5. Data Analysis

In this study, the assumption of normality for quantitative variables was evaluated both visually, using histograms and probability plots, and analytically through the Shapiro-Wilk test. Given that the quantitative variables exhibited a normal distribution, they were reported as mean and standard deviation. A two-way repeated measures ANOVA was conducted to examine the effects of different protocols (SG, NG, and CG), pre-test and post-test measurements, as well as the protocol*time interaction. To determine variance homogeneity, Mauchly's test of sphericity was applied, and the Greenhouse-Geisser correction was used when necessary. Partial eta squared (ηp^2) values were computed to assess effect sizes, with statistical significance established at $p < 0.05$.

2.6. Ethics Committee Permission

This study was conducted with ethical approval from the Niğde Ömer Halisdemir University Non-Interventional Clinical Research Ethics Committee. The application was submitted under protocol number 2024/110, and approval was granted with decision number 2024/120 on 12.12.2024. Before data collection, participants were thoroughly informed about the study through a detailed presentation and subsequently provided written consent. The research was carried out in accordance with the ethical guidelines of the Declaration of Helsinki.

3. Results

Table 2. Intragroup and Intergroup Comparison of Dynamic Lung Volumes and Capacities

n=30	Pre	Post	Δ	%	Two-way Repeated ANOVA		
Variable	M±SD	M±SD	TB-Tend	TB-Tend	Time	Group	Time*Group
			FVC				
SG	4.84±0.57	4.87±0.64	0.03±0.07	0.61	F = 13.62	F = 0.91	F = 1.62
NG	4.41±1.11	4.56±1.08*	0.15±0.03	3.40	p < 0.001	p < 0.415	p < 0.21
CG	4.26±0.90	4.40±0.90*	0.14±0.00	3.28	ηp2 = 0.33	ηp2 =0.06	ηp2 = 0.10
			FEV1				
SG	3.95±0.78	3.96±0.79	0.01±0.01	0.25	F = 9.81	F = 0.31	F = 5.24
NG	3.55±1.03	4.05±0.74*	0.05±0.29	14.08	p < 0.004	p < 0.73	p < 0.01
CG	3.70±0.87	3.72±0.83	0.02±0.04	0.54	ηp2 =0.26	ηp2 =0.02	ηp2 =0.28
			FEV1/FVC				
SG	81.18±11.33	82.03±9.34	0.85±1.99	1.04	F = 5.02	F = 0.63	F = 3.98
NG	80.03±9.41	89.43±5.74*	9.04±3.67	11.74	p < 0.033	p < 0.539	p < 0.030
CG	84.50±4.41	84.42±5.47	0.08±1.06	-0.09	ηp2 =0.15	ηp2 =0.04	ηp2 =0.22
			PEF				
SG	7.86±3.24	8.04±2.97	2.94±0.27	2.29	F = 18.00	F = 1.22	F = 6.90
NG	5.19±2.17	8.03±2.19*	2.84±0.02	54.72	p < 0.000	p < 0.309	p < 0.000
CG	5.95±2.39	6.81±2.13	0.86±0.26	14.45	ηp2 = 0.40	ηp2 =0.08	ηp2 = 0.33
			MVV				
SG	137.17±28.18	140.11±25.81	2,94±2,37	2.14	F = 11.38	F = 0.20	F = 1.86
NG	124.48±36.56	140.36±27.59*	15,88±8,97	12.75	p < 0.002	p < 0.817	p < 0.175
CG	126.37±28.62	135.34±30.93	8,97±2,31	7.09	ηp2 =0.29	ηp2 =0.15	ηp2 =0.12

*Δ = Change; Pre= Pre-intervention; Post= Post intervention; ηp2: Partial eta squared; * Indicates significant difference between pre-test and post-test at p< 0.05 level.*

For the FVC parameter, a statistically significant difference was identified in both the NG and CG groups (F = 13.62, p = 0.001, eta = 0.33), whereas no such difference was observed in the smoking group. Additionally, statistical comparisons between groups did not reveal any significant differences (F = 0.91, p = 0.415, eta = 0.21). There was a statistical difference in the group*time interaction (F = 1.62, p = 0.21, eta = 0.10). When percentage-based improvement levels were examined, the NG group demonstrated the most pronounced increase. For the FEV1 parameter, a statistically significant improvement was observed in the NG group (F = 9.81, p = 0.004, eta = 0.26), whereas no notable difference was identified in the other groups. Additionally, comparisons across groups did not reveal any statistically significant variations (F = 0.31, p = 0.73, eta = 0.02). There was a statistical difference in the group*time interaction. (F = 5.24, p = 0.01, eta = 0.28). When the percentage-based improvement levels were examined, the NG group exhibited the highest degree of progress. For the FEV1/FVC parameter, a statistically significant difference was observed in the NG group (F = 5.02, p = 0.033, eta = 0.15), whereas no such difference was detected in the other groups. Additionally, comparisons between groups did not yield any statistically significant results (F = 0.63, p = 0.539, eta = 0.04). There was a statistical difference in the group*time interaction. (F = 3.88, p = 0.030, eta = 0.22). When the percentage-based improvement levels were examined, the NG group exhibited the highest increase. For the PEF parameter, a statistically significant difference was observed in the NG group (F = 18.00, p = 0.000, eta = 0.40), whereas no significant change was detected in the other groups. Additionally, comparisons between groups did not yield any statistically significant differences (F = 1.22, p = 0.309, eta = 0.08). There was a statistical difference in the group*time interaction. (F = 6.90, p = 0.000, eta = 0.33). When percentage-based improvement levels were examined, the greatest increase was recorded in the NG group.

A statistically significant change was detected in the MVV parameter within the NG group (F = 11.38, p = 0.002, eta = 0.29), whereas no notable difference was identified in the other groups. Additionally, comparisons between groups did not reveal any statistically significant variations (F = 0.20, p = 0.817, eta = 0.15). Likewise, the group*time interaction did not demonstrate statistical significance (F = 1.86, p = 0.175, eta = 0.12). When examining percentage-based improvement levels, the NG group exhibited the highest degree of progress.

4. Discussion

It has been reported that cigarette smoking negatively affects lung function and reduces its functionality and this negative effect is caused by various chemical components in cigarette smoke (Baydur et al., 2001). Carbon monoxide, one of the chemical components, tends to bind to hemoglobin approximately 200 times more than O_2. For this reason, carbon monoxide binds to hemoglobin and decreases its oxygen carrying capacity and thus leads to a decrease in the oxygen concentration reaching the tissues (Dalack et al., 1993; Krupski, 1991). As a result, it negatively affects cardiopulmonary functions, weakens respiratory and lung functions and significantly affects the performance of athletes (Baydur et al., 2001; Santos, 2012). In order to minimize these problems, respiratory muscle exercises stand out as an effective solution. It has been widely documented in the literature that respiratory muscle exercises have positive effects on improving respiratory muscle strength and functions (Aktuğ et al., 2022; Kutlu, 2024; Pardy et al., 1988; Weiner et al., 1999). These exercises reduce the perception of shortness of breath that occurs as a result of decreased inspiratory muscle strength and provide a significant increase in exercise capacity, especially with its strength-enhancing effect on inspiratory muscles (Hill et al., 2010). In this context, the aim of this study was to investigate the effects of respiratory muscle exercises on respiratory function in smokers.

As a result of our study, while there was an increase in the FVC, FEV1, FEV1/FVC, PEF and MVV parameters of NG in favor of the post-test, there was no statistically significant difference between the groups. However, when the percentage improvements were analyzed, it was determined that the highest improvement in all parameters was in NG.

In a study examining the effects of respiratory muscle exercises on healthy smokers, Pişkin et al. (2023) found that device respiratory muscle training led to significant improvements in FVC, FEV1, PEF, FEV1/FVC %, and MIP parameters in both smokers and non-smokers. Similarly, Bostancı et al. (2019) conducted a study in which healthy smokers and non-smokers performed device respiratory muscle exercises daily for four weeks. Their findings indicated that smokers showed enhancements in FVC, FEV1, FEV1/FVC, MVV, SVC, and IC parameters. The use of a pressure-adjustable respiratory muscle exerciser in the studies mentioned above, whereas the use of a non-pressure-adjustable triflo device in our study may be one of the reasons for the different results in the respiratory parameters of smokers. Because in

respiratory muscle exercises performed with a pressure-adjustable device, the resistance always remains the same and this resistance is adjusted according to the person's maximal inspiratory pressure (MIP). However, since there is no pressure adjustment in the triflo, the resistance of the exercise is constantly changing, and the load of the exercise does not strain the individual. In addition, the lack of significant improvement in smokers despite respiratory muscle exercise may be due to the damaging effects of cigarette smoke on the respiratory system. Cigarette smoke causes chronic airway inflammation and structural damage at the alveolar level, which limits the improvement in exercise capacity and muscle function.

In another study, researchers investigated the impact of respiratory muscle exercises on both smokers and non-smokers. Participants engaged in these exercises twice per week over a five-week period. The findings revealed that both groups experienced an improvement in peak expiratory flow (PEF) and respiratory muscle strength (Lee et al., 2011). Kim and Lee (2012) applied balloon inflation exercises to healthy smokers and examined whether it improved lung function. Participants underwent balloon inflation exercises for 8 weeks and as a result, VC, ERV, IRV, FVC, FEV1, FEV1/FVC and PEF parameters were significantly improved. Although the balloon inflation method used in the study of Kim and Lee (2011) is not a pressure-adjustable system like the triflo device used in our study, the load created by the balloon increases as the tension of the balloon increases during respiratory muscle exercise. The use of different exercise methods and devices between the two studies may be the reason for the different results.

5. Conclusions

Within the scope of this study, it was found that respiratory muscle exercises with a device applied for 4 weeks significantly improved respiratory muscle strength and respiratory function, especially in non-smokers. This finding supports that respiratory muscle exercises performed with the device is an effective method to increase pulmonary capacity in healthy individuals. The positive effects of respiratory muscle exercises with the device on the respiratory system appear to be consistent with similar studies previously reported in the literature.

On the other hand, it was determined that the same exercise protocol applied to smokers provided limited improvement, but this improvement did not create a statistically significant difference. First of all, the fact that the triflo type respiratory exercise device used in the study was not pressure sensitive and could not adjust the individual load threshold may have provided inadequate stimulus, especially in individuals with more damaged respiratory systems. The constant low resistance of the device may not have optimized the muscle activation required for improvement.

In addition, structural and functional impairments in the airways of smokers may have limited the effect of the exercises. Factors such as airway inflammation and damage to alveolar structures caused by chronic exposure to cigarette smoke may have reduced the response to exercise in these individuals. Therefore, a four-week short-term exercise program is considered to be insufficient to achieve significant pulmonary function improvement in smokers.

In order to obtain healthier and comparable data in future studies, it is recommended that respiratory muscle exercises be applied to smokers be applied for a longer period of time (8-12 weeks). In addition, the use of more technologically advanced and resistance-adjustable respiratory exercise devices instead of the triflo respiratory muscle exerciser may be more effective in terms of muscle activation and adaptation. It is thought that optimizing parameters such as exercise frequency, duration and intensity will contribute to achieving more comprehensive results in different groups of individuals.

In conclusion, although it has been clearly demonstrated that respiratory muscle exercises have positive effects especially in nonsmokers, it is clear that more long-term, individualized and resistance-controlled exercise protocols are needed to increase the effectiveness of this method in smokers. Further studies in this context will provide important contributions in terms of both clinical applications and preventive health strategies.

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Informed Consent Statement: Before the measurements, the participants were given a detailed information presentation about the study and signed an informed consent form.

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Research Article

Rural Kindergarten Sports Resource Supply Dilemmas and Solutions Under Rural Revitalization

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Abstract: Under China's rural revitalization strategy, the equitable allocation of physical education Sports resources in rural kindergartens faces structural barriers that hinder children's holistic development and exacerbate educational inequality. This qualitative study combined literature review and field research. Using purposive sampling, 12 rural public kindergartens in Chongqing, Sichuan, and Guizhou were selected. Data were collected through semi-structured interviews, observations, and policy analysis involving 33 participants, including principals, teachers, administrators, and parents. Three key issues emerged: (1) Urban–rural and regional disparities lead to inadequate venues, outdated equipment, and fragmented policies; (2) Shortages of qualified PE teachers and training limit motor skill development; (3) Financial constraints, poor interdepartmental coordination, and hardware-focused evaluations weaken institutional support. Solutions include: (1) Establishing tiered financial mechanisms, dynamic monitoring, and cross-regional sharing; (2) Building a county–township–village teacher training system and digital support tools; (3) Fostering community-enterprise partnerships and localized educational ecosystems. A collaborative, culturally integrated framework is essential to ensure sustainability, equity, and high-quality rural preschool education.

Keywords: Rural revitalization; rural kindergartens; sports resources; supply dilemmas; solutions.

1. Introduction

In the context of the comprehensive implementation of the rural revitalization strategy, rural preschool education, as an integral part of the rural public service system, has gradually become a key area for enhancing rural human capital and promoting educational equity. Among these efforts, the allocation and application of sports resources in rural kindergartens has increasingly attracted the attention of policymakers and educational researchers. Physical activities are not only a fundamental guarantee for children's physical growth but also serve as vital carriers for their cognitive development, emotional expression, and social adaptability. They play an irreplaceable role in promoting children's overall development. Particularly in rural areas of China, due to unique family structures such as "left-behind children" and "grandparent-headed households," sports education assumes a special function in compensating for deficiencies in parent-child relationships and alleviating children's psychological loneliness (Zhang, 2022).

However, despite the continuous introduction of national policies aimed at optimizing the allocation of educational resources in rural preschool settings—such as the "14th Five-Year Plan for Preschool Education Development", which explicitly calls for "optimizing resource allocation and supporting the development of rural kindergartens" (Lin et al., 2025)—the allocation of sports resources in rural preschool education still faces structural shortages, regional imbalances, and low integration efficiency during implementation (Zhang, 2020). At present, many rural kindergartens suffer from limited space, inadequate equipment, and a shortage of qualified teachers, making it difficult to

systematically carry out physical activities, which in turn severely hinders the physical and mental development of rural children (Zhang & Gao, 2025) Moreover, influenced by traditional educational values that prioritize academics over physical education, sports education is often marginalized and has yet to establish an integrated curriculum framework that aligns with other developmental domains (Wang et al., 2023). The persistence of these issues further widens the quality gap between urban and rural education, undermining efforts toward educational equity and social justice.

In existing domestic and international research, although studies on rural education, preschool education, and child development are abundant, systematic investigations focusing specifically on the allocation of sports resources in rural kindergartens remain scarce. Particularly in areas such as the integration of resource allocation with local culture, educational equity, and the construction of social identity, current literature lacks in-depth discussion and theoretical development (Li & Xu, 2024; Shang, 2023; Yang, 2024). The absence of research in this area results in a lack of theoretical support and practical guidance for the implementation of policies and practices in rural preschool sports education, impeding the achievement of connotative development in rural education.

If this research gap can be effectively addressed and sports resources in rural kindergartens can be scientifically allocated, it will not only improve rural children's physical fitness and mental health but also enhance their social adaptability and cultural identity. This, in turn, can contribute to narrowing the urban-rural education gap and promoting the sustainable revitalization of rural societies (Hu, 2024; Ma, 2023; Zhang, 2022). Furthermore, as highly collective social practices, physical activities play a positive role in stimulating intra-community interactions, fostering collaboration between families and kindergartens, and advancing rural governance (Xiao, 2003). By incorporating local games, traditional sports, and folk stories into physical education curricula, sports can serve as a vital bridge between rural culture and modern education, helping children develop a stronger sense of cultural belonging and identity (Shang, 2023; Zhang et al., 2025). The causes of the current problems are multifaceted. First, there is a pronounced regional disparity in the distribution of educational resources, with rural areas generally lagging behind urban areas in terms of financial investment, teacher allocation, and facility construction (Zhang, 2020). Second, outdated educational philosophies still prevail, with a continued bias toward academic achievement at the expense of physical education (Zhang & Gao, 2025). Third, there is a lack of localized thinking in curriculum design, which has resulted in the failure to effectively integrate rural cultural elements into kindergarten sports teaching, leading to the near extinction of many folk sports with educational value (Zhang et al., 2025). Additionally, the absence of systematic policy guidance and professional support mechanisms has placed rural kindergartens in a difficult position when implementing sports education (Lu, 2025).

Based on the above context and issues, this paper aims to explore how to improve the quality of physical education in rural kindergartens through scientific and rational resource allocation and thus promote the high-quality development of rural preschool education. The study will focus on the following questions: What are the main issues in the current allocation of sports resources in rural kindergartens? What are the underlying causes of these issues, and how do they affect children's development? How can a feasible model for sports resource allocation—one that aligns with rural realities and integrates local culture—be constructed? By combining theoretical analysis with field research, this paper seeks to provide a theoretical foundation and practical pathway for optimizing the allocation of preschool sports education resources in rural areas, contributing to the realization of educational equity and the revitalization of rural culture.

2. Materials and Methods

2.1. Research Group

This study was conducted in central and western China, encompassing three provinces (Chongqing, Sichuan, and Guizhou), with six representative county-level districts and twelve rural public kindergartens selected as research subjects. Data were collected through semi-structured interviews, on-site observations, and policy document analysis, involving 33 participants including kindergarten principals, teachers, educational administrators, and parent representatives. Key factors were identified via thematic analysis to provide theoretical and empirical foundations for policy formulation and practical optimization.

2.2. Research Design

This study employs qualitative research methods, combining literature analysis and field investigations to examine the supply of physical education resources in rural kindergartens under the rural revitalization framework. Utilizing purposeful sampling (Suri, 2011), the research focuses on central and western China, encompassing rural public kindergartens across three provinces (Chongqing, Sichuan, and Guizhou) that represent diverse economic development levels, geographical environments, and educational resource distributions. These kindergartens, located in administrative villages or townships, primarily serve local rural children and exhibit basic infrastructure with relatively under-resourced configurations, reflecting regionally representative conditions.

2.3. Data Collection

This study involved the development of a semi-structured interview guide through a comprehensive review of relevant literature and consultations with domain experts. A pilot test (n=2) was conducted, after which the guide was refined based on feedback and finalized (Table 1).

Table 1. Interview Outline

Theme	Content
I. Basic Information	1. Could you briefly describe your kindergarten's basic information?
	2. What is your position, and how long have you worked there?
II. Current Status of Sports Resource Provision	1. Are sports venues and equipment adequate? Which are the most lacking?
	2. How are sports activities organized? Where do course materials and equipment come
	3. How often do children participate in sports activities? Are they interested and
III. Teachers and Training	1. Are there full - or part - time PE teachers? What's their educational background?
	2. Have teachers received systematic PE teaching training? What's the content and
	3. What challenges or lack of support do teachers face in practical teaching?
IV. Policies and Funding	1. Are there local policies supporting sports education? Has your kindergarten
	2. Have you encountered difficulties in sports - fund application or usage? What are the
	3. Is there poor coordination between departments or uneven resource distribution
V. Parent and Community Involvement	1. How concerned are parents about sports education? Are they willing to participate in
	2. What potential do communities, businesses, or other organizations have in supporting
	3. How can local resources be better mobilized to create a collaborative sport- education
VI. Needs and Suggestions	1. What's the core issue in kindergarten sports education that needs resolving?
	2. What support from the government or relevant departments do you hope for?
	3. Where can localization innovation improve the quality and sustainability of sports

The questionnaire underwent expert validity testing, with the results as follows:

Table 2. Expert Validity Testing Results

Evaluation Content	Very	Quite	Basically	Not Very	Unsuitable
Evaluation of the interview outline	2	2	1	-	-
Evaluation of the interview outline	3	1	1	-	-
Overall evaluation of the interview	1	3	1	-	-

Formal interviews were administered face-to-face in one-on-one settings. Prior to each session, researchers explicitly explained the study's purpose, methodology, and rationale for audio recording, while ensuring strict confidentiality of personal information to safeguard participant privacy. Interviews typically lasted 30-45 minutes. Upon completion, participants received a token of appreciation valued at 35 CNY (approximately 5 USD). We transcribed audio recordings

verbatim, anonymized the transcripts, and provided them to participants for verification and confirmation of content accuracy prior to analysis.

2.4. Data Analysis

For the qualitative analysis, the interview texts will be coded using NVivo software to identify key themes and patterns. Following the coding process, a thematic analysis will be conducted to group similar viewpoints and experiences under common categories. To ensure the reliability and consistency of the findings, participants' responses will be cross-checked. Additionally, two researchers (GDZ and GCL) independently coded a sample of the interviews to enhance analytical trustworthiness. Any discrepancies between the researchers were resolved through discussion until a consensus was reached.

2.4. Ethics Committee Permission

Ethical clearance was obtained from the Institutional Review Board of southwest University (Approval Code: SWU - PE - 20241013). All participants received detailed information sheets and provided written informed consent. Confidentiality and anonymity were assured throughout the study. Personal identifiers were removed from transcripts, and all data were stored securely in password - protected files accessible only to the research team.

3. Results

3.1. Study Participants

In this study, a total of 33 participants were involved, drawn from 12 public rural kindergartens across Chongqing, Sichuan, and Guizhou provinces. The participants included principals, frontline kindergarten teachers, local education administrators, and parents actively engaged in school affairs. Females made up the majority at 75.8%, while males accounted for 24.2%, reflecting the common gender distribution in China's early childhood education sector. The average age of participants was 34.2 years (SD = 8.6).

Regarding occupational roles, the sample included 15 kindergarten teachers (45.5%), 6 principals (18.2%), 5 local education administrators (15.2%), and 7 parents (21.2%). A majority of participants were married (63.6%). On average, participants had 9.7 years of work experience in rural education (SD = 6.3).

Table 3. Basic Information of Participants

Variable	Category	Mean (SD)	Percentage (*N*)
Gender	Male		24.2% (8)
	Female		75.8% (25)
Age		34.2 (8.6)	
Educational status	Associate degree		39.4% (13)
	Bachelor's Degree		45.5% (15)
	Postgraduate Degree		15.1% (5)
Occupational Role	Kindergarten Teacher		45.5% (15)
	Principal		18.2% (6)
	Education Administrator		15.2% (5)
	Parent		21.2% (7)
Marital status	Unmarried		51.5% (17)
	Married		36.3% (12)
	Divorce		12.1%（4）
Years of Work Experience		9.7 (6.3)	

SD = Standard Deviation

3.2. Qualitative Research Findings

Sub-theme 1: Resource Allocation Imbalance and Significant Regional Disparities

Under the current rural preschool education development landscape, there is severe imbalance in the distribution of sports resources in rural kindergartens, with significant regional disparities (Ma, 2023). Overall, preschool resource allocation still follows a "center - priority, edge - lagging" pattern. Urban - rural, regional, and even intra - county preschool resource allocation shows marked differences (Mao, 2025). Township central kindergartens are relatively well - equipped in terms of venues, facilities, and equipment. In contrast, teaching sites in remote rural areas often have poor conditions, with many regions lacking sufficient basic sports venues. This restricts children's physical and psychological development.

> *"Our kindergarten is the central one in the township, so our conditions are relatively good. The playground was renovated just last year, with anti-slip rubber flooring, so it's safer for the children to run and play. We're also fairly well-equipped with sports equipment—slides, basketball hoops, balance beams—so physical activities can be carried out regularly."*
>
> *"It's very different in our teaching site. We only have an empty dirt lot, and when it rains, outdoor classes become impossible. As for equipment, we have a few skipping ropes and some worn-out balls. If the kids want to play on slides or climbing frames, they have to wait for a visit to the central kindergarten. We know how important physical activity is, but we're really limited by what we have."*
>
> *"My child attends the village kindergarten, and most of the time they stay indoors because there's not enough space or equipment for outdoor play. Sometimes I worry—other kids are exposed to more activities, and I wonder if ours are falling behind."*
>
> *"There's definitely a 'center-priority, periphery-lagging' issue. When budgets are allocated or projects implemented, central kindergartens are prioritized. Village-level sites, due to difficult terrain and low enrollment, often get marginalized. We hope to improve this, but funding is limited, and transportation costs for equipment are high."*

The causes of these disparities are multifaceted, including financial imbalances and varying regional economic development levels (Jin, 2025). Economically better-off regions can continuously upgrade sports facilities and introduce advanced sports concepts and equipment. In contrast, economically underdeveloped areas, due to funding shortages, have outdated sports facilities that cannot be repaired or replaced for extended periods. Public sports resources are the important basis and condition for urban and rural residents to participate in sports activities, learn sports culture and enhance physical quality，this not only limits rich teaching content but also leads to differences in children's physical fitness (Liu, 2022). Over the long term, these gaps accumulate and widen, affecting educational equity. Different policy implementation levels also exacerbate resource allocation imbalances. Although the national government has introduced policies to support preschool education in underdeveloped regions, implementation issues persist. These include insufficient funding, resource tilts toward "demonstration kindergartens," and ordinary village - level kindergartens being marginalized (Gao & Huo, 2025).

Sub-theme 2: Teacher Competency Deficiencies and Lack of Professional Support

Teacher shortages are a key factor affecting rural kindergarten sports development (Ye & Li, 2024). The root cause lies in the long-standing lack of teacher professionalism and support mechanisms. In rural areas, there are few teachers with a sports background, and most have not undergone systematic training. They rely primarily on personal experience. In terms of educational background, despite all participants met the minimum qualification required for kindergarten teachers in China (i.e., associate degree or above). Specifically, 39.4% held an associate degree, 45.5% had a bachelor's degree, and only 15.1% possessed a postgraduate degree. This distribution highlights the overall low level of professional development in rural areas, particularly in terms of sports-related training. This non - specialized teaching approach simplifies sports activities into recreational games. Due to the absence of specialized training, children often lack scientifically informed instruction during key developmental windows. As a result, they may miss critical opportunities for structured motor skill development, which can impact their long-term physical competence and confidence (Chen, 2024). Moreover, due to the "multiple - role" situation, teachers, burdened with heavy workloads, find it hard to focus on the design and implementation of sports teaching. Consequently, sports activities become a

mere formality, failing to achieve the teaching depth and quality advocated by the "National Curriculum Standards (Li & Wang, 2004)." Although nationwide initiatives for teacher capacity building have been emphasized, specialized training in preschool physical education remains scarce. According to the National Curriculum Standards for Kindergarten Education, physical education should promote children's comprehensive motor development through structured, age-appropriate, and culturally relevant activities. However, the current training system fails to adequately equip rural teachers with the practical strategies and content knowledge necessary to meet these standards (Ministry of Education of the People's Republic of China, 2002).

> *"Frankly speaking, very few. Training opportunities here are inherently scarce, particularly those focused on physical education - they're practically nonexistent. Most of the time, we rely on self-directed exploration, occasionally consulting online videos or reference materials. We genuinely want to deliver quality physical education classes, but there's simply no structured guidance on effective teaching methodologies."*

> *"The greatest challenge lies in not knowing how to scientifically structure physical activities. For instance, I lack expertise in age-specific motor skill development-what exercises are appropriate for each developmental stage and how to properly implement them. There's constant anxiety that incorrect approaches might inadvertently cause injuries. Additionally, the overwhelming burden of teaching multiple core subjects leaves minimal time for dedicated physical education curriculum design. In practice, this often forces us to resort to hastily organized simple games as makeshift solutions."*

Much of the training content is theoretical, lacking practical guidance and failing to meet frontline educational needs. In sports teaching, teachers face challenges in creatively integrating local cultural elements into sports curricula and lack effective pathways and confidence. This results in the waste of local educational resources. Additionally, the lack of a professional support system leaves rural teachers in an "island" state. There is a lack of stable cooperation between universities, teaching and research institutions, and rural kindergartens. External guidance is often short - term and superficial, failing to create lasting professional impacts (Zhang, 2024).

Sub-theme 3: Weak Institutional Safeguards and Difficult Policy Implementation

The sustainable supply of sports resources in rural kindergartens is significantly constrained by weak institutional safeguards and policy implementation difficulties (Niu et al., 2024). Although the national government emphasizes strengthening public service supply in rural preschool education, there is a substantial gap between policy texts and implementation processes. In particular, financial support is often inadequate due to local funding constraints. Projects are delayed, and the construction of planned sports venues and facilities is postponed, making it hard for resources to truly materialize.

> *"The policy directives from higher authorities are well-intentioned, but persistent fiscal constraints at the county level severely impede implementation. While the central allocation for sports equipment has been approved, delays in securing mandatory local matching funds have resulted in stalled facility construction and underutilized equipment accumulating dust in storage."*

Provincial - level financial subsidies are provided through special funds. However, at the grassroots level, tight budgets make it difficult to cover local financial responsibilities. This creates a structural conflict between system design and implementation capabilities.

During implementation, several issues cannot be overlooked. Rural preschool education policies are scattered across different departments, lacking effective coordination and integration (Yang et al., 2024).

> *"The fragmented administrative responsibilities create systemic barriers: sports facility management falls under the Education Bureau, playground construction requires approvals from the Housing and Urban-Rural Development Bureau, and equipment procurement must comply with government purchasing protocols. With compartmentalized departmental mandates, kindergartens fundamentally lack the institutional capacity to navigate these bureaucratic divides."*

This leads to inconsistent standards and overlapping responsibilities, which in turn affect resource integration and utilization. Poor communication between departments results in under- utilized sports facilities, wasting limited public

resources. Furthermore, policy evaluation mechanisms have a "soft constraint" nature—namely, they exist in form but lack enforceability, as evaluation outcomes are rarely linked to concrete administrative actions or accountability measures. Consequently, relevant indicators carry little weight in performance assessments, reducing the driving force for policy advancement and implementation.

More importantly, the lack of effective supervision and evaluation mechanisms makes it hard to truly reflect the benefits of investments. In many regions, the evaluation of sports resources is limited to the amount of equipment and coverage, with little attention to curriculum quality and children's developmental outcomes. This "emphasis on quantity over quality" phenomenon leads to "visible but unattainable" situations, where some equipment is left idle or misused.

> *"Inspection protocols prioritize superficial compliance checks for equipment availability—meeting minimum inventory thresholds suffices for approval. However, systemic neglect persists regarding critical evaluations of utilization methods, children's engagement levels, or educational outcomes. Compounding this, overly complex equipment coupled with inadequate pedagogical training results in underutilized resources as teachers lack operational proficiency."*

Additionally, the absence of effective grassroots feedback mechanisms makes it difficult for local governments to receive flexible policy adjustments and support when facing specific regional and cultural contexts. This results in a significant gap between resource allocation and actual needs.

4. Discussion

4.1. Strengthening Policy Support Systems to Promote Resource Precision Allocation

During the field investigation, the complex terrain of Chongqing, Guizhou and Sichuan was found. Inconvenient logistics make sports equipment purchase and repair more expensive, further straining scarce resources. It is evident that the imbalance in sports resource allocation in rural kindergartens is not only a "hardware" issue but also reflects deeper contradictions in the education management system's coordination of regional development and resource equity (Cui, 2017). To promote balanced development in rural kindergarten sports education, institutional changes are necessary to ensure resources reach the neediest areas and provide equal development opportunities for every child. To address rural preschool education resource supply challenges, a complete policy system of "targeted policymaking - dynamic monitoring - effectiveness evaluation" needs to be established (Yao, 2025). This system, which includes three main components, is designed to ensure resources are allocated precisely where they are needed. Targeted policymaking involves creating policies based on specific needs and conditions. Dynamic monitoring allows for ongoing tracking of resource distribution and usage. Effectiveness evaluation assesses the impact of these policies and makes adjustments as necessary. This will ensure precise, differentiated, and dynamic resource allocation. The current "one - size - fits - all" education fund - allocation model fails to reflect actual differences among regions in economic foundations, child age structures, and developmental needs (He & Jia, 2023).

It is essential to build a tiered financial safeguard system based on regional economic development levels and child population characteristics. Strengthen the targeting and flexibility of fiscal transfer payments. In particular, increase the central government's financial support for nationally designated rural revitalization of key counties and other underdeveloped regions, in order to alleviate their funding pressures and enhance their supply capabilities. Meanwhile, improve the policy system's enforcement through legal and institutional means. Incorporate kindergarten sports resource allocation standards into relevant laws and regulations and refine them into quantifiable and actionable indicators. This will ensure the policy's enforceability and measurability. Based on this, further improve the fund - allocation mechanism and explore including local sports curriculum development in financial support. Establish special funds to encourage local exploration of sports resources and enrich curriculum content, thereby improving resources - utilization economic and cultural value.

At the implementation level, establishing a dynamic monitoring system is crucial. Use information platforms to track key aspects such as fund flows, facility usage, and curriculum implementation in real time. Build a problem - warning and tiered - supervision mechanism. Provide targeted support to areas with insufficient resources or outdated facilities to avoid the "over - emphasis on construction, neglect of management" issue. Incorporate policy - implementation effectiveness into performance evaluation systems. Focus on results to shift policies from "input - oriented" to "output -

oriented," improving overall resource - allocation efficiency. In the long term, enhance collaboration between regions to establish cross - regional technology - support and resource - sharing networks. Promote optimal resource flow and structural rebalancing through technology transfer, teacher assistance, and curriculum sharing. This regional cooperation model can alleviate resource - allocation imbalances and promote policy systems toward openness, coordination, and efficiency, laying a solid institutional foundation for achieving educational equity.

4.2. Strengthening Teacher Capacity Building to Improve Educational Implementation Efficiency

Enhancing rural kindergarten teachers' sports education capabilities is vital for improving educational quality and addressing practical dilemmas (Gu, 2023). Currently, rural kindergarten teacher - team construction suffers from a weak teaching staff and teaching content disconnected from local realities. It is imperative to establish a systematic and sustainable training system. On this basis, build a three-tier interactive platform of "county guidance - township backbone - village practice." Combine expert guidance with practical experience to improve teachers' comprehensive abilities in designing and organizing sports activities. Integrate professional tools and curricula into the continuing education system. Fully utilize local culture and resources to develop local - characteristic educational resources and promote innovation based on actual conditions rather than relying solely on materials.

On a deeper level, some educational managers lack preschool education expertise and fail to recognize the importance of sports education. Teachers struggle to accurately evaluate children's physical development and create personalized activity plans. Sometimes, inappropriate methods can even cause sports-related injuries. The "teach - while - test" situation not only constrains educational quality improvement but also increases teachers' work pressure. To break this dilemma, a fundamental reconstruction of the rural sports education teacher support system is needed. Digital empowerment opens up new avenues for teacher growth. Based on the National Smart Education Platform, establish an integrated "online - offline" teaching system. This will free rural teachers from time and space constraints and provide ongoing professional support. Collaborate with local governments and kindergartens to offer comprehensive support for teachers in theory and practice. This enhances their ability to handle complex teaching scenarios.

Additionally, establishing a robust incentive and evaluation system is essential. Introducing sports education achievements into title evaluation and performance assessment can effectively boost teachers' enthusiasm and creativity. Creating regional collaborative communities provides a platform for teacher exchange and learning. Promoting an educational philosophy of "respecting sports" and "innovation advocacy" and building an educational ecosystem of "moral leadership" and "people - orientedness" not only recognizes teachers' value but also supports the revival of rural education.

4.3. Building a Diverse Participation Mechanism to Promote Social Collaboration and Investment

It is imperative to shift from the traditional notion of "government - centered" approaches and establish a diversified social participation system led by the government. This aims to address the single - sourced and insufficient investment in sports resources for rural kindergartens. Through policy incentives, institutional design, and platform construction, cooperation among enterprises, communities, and social organizations can be promoted to foster new resource - co - construction and sharing models. Corporate involvement, particularly in equipment donation and venue construction, shows great potential. In some regions, companies have utilized local resources to design sports equipment suitable for young children. This not only saves costs but also enhances safety and fun. Such local resource transformation reduces financial burdens and boosts local teaching - material value - addition. Communities, being the most familiar environments for children, should play a more significant role. Building on "home - school - community" collaboration, integrate idle spaces and human resources to promote the construction of sports activity spaces and curricula led by villagers. Examples include sports grounds created by parents, volunteers, and village committees, blending natural and cultural features where children can run and explore. Advancing the integration of digital technologies and resources enables cross - regional collaboration. Information platforms can achieve precise supply - demand matching and enhance social - resource utilization efficiency, reducing redundant and ineffective donations. Innovatively, digital platforms can also be used to spread local sports culture, attract public attention, and channel more social resources into education. Institutionally, it is necessary to establish a scientific rural grassroots governance and rural education evaluation system. On this basis, construct a set of incentive and evaluation mechanisms. Praising and giving feedback to kindergarten teachers can enhance children's enthusiasm for sports activities and secure more support. Only by

forming a widely participatory and collaboratively governed ecosystem can rural kindergarten sports in China develop in a high - quality and sustainable direction.

5. Conclusions

Under the rural revitalization strategy, enhancing sports resource supply in rural kindergartens is key to narrowing the urban - rural education - development gap. However, rural sports resource supply faces structural contradictions, such as urban - rural resource - allocation imbalances. Economically underdeveloped regions often have inadequate venues and outdated facilities. At the teacher's level, the lack of full-time sports teachers and training systems lead to unscientific preschool sports teaching guidance. Institutionally, weak financial safeguards, poor departmental collaboration, and "hardware - focused" evaluation indicators limit resource - supply optimization.

To resolve these dilemmas, efforts are needed in policy, teacher development, and social collaboration. In terms of policy, build a tiered and classified financial safeguard system, strengthen dynamic monitoring, and promote regional collaboration. For teacher development, rely on county - township - village - three - level training mechanisms. This can enhance teachers' professionalism and curriculum - development capabilities by integrating digital empowerment and incentive mechanisms. In terms of social collaboration, guide enterprises, communities, and social organizations to participate in co - construction. Use technological approaches to integrate resources and create a local - characterized education ecosystem. Future research should further explore integrating local culture with sports curricula. It should also focus on the needs of vulnerable groups like left- behind children and promote resource - supply precision, inclusiveness, and sustainability. This will lay a solid foundation for rural children's healthy growth and cultural heritage.

Limitation

The research is limited by time and resources. Only a limited number of rural kindergartens are selected as research objects. The research results may not fully reflect the overall situation of rural kindergarten sports resource supply. In the future research, more rural kindergartens will be included in the research scope to further improve the representativeness and generalizability of the research results.

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Research Article

A Bibliometric Analysis using VOSviewer of Publications on Horticultural Therapeutic Recreation

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Abstract: The aim of this research is to reveal the scope of the studies published within the scope of Web of Science (WoS) regarding the concept of horticultural therapeutics and the variables used. In this study, bibliometric analysis, one of the quantitative analysis methods, was used to examine the literature on the concept of horticultural through articles published in academic journals indexed in the WoS database and general research trends were determined. Accordingly, the data obtained from the WoS database were analyzed through 1.6.19 VOSviewer. In the study, 673 results were reached in the search made from 1981 to 2024 by selecting "all fields" in WoS with the keywords ("horticultural therapy" OR "horticultural activity" OR "horticulture therapy" OR "therapeutic horticulture" OR "horticulture therapeutic recreation"). However, since the exclusion criteria were determined in the study, only articles and review articles and 458 data in the SCI-Expanded, SSCI, ESCI, and A&HCI indexes were analyzed. In the data analysis, analyses were conducted to determine the number of citations received and works produced by authors, journals, countries, organizations, and the number of most frequently used words. The most frequently used keywords in publications related to the concept of horticultural therapy were horticultural therapy with 149 repetitions, gardening with 50 repetitions, mental health with 30 repetitions, therapeutic horticulture with 28 repetitions, and well-being with 22 repetitions. It is seen that horticultural therapy is the subject of "stress", "anxiety", "depression" and "psychological well-being" keywords.

Keywords: Horticultural, recreation, therapeutic recreation, bibliometrics.

1. Introduction

Horticultural therapeutic recreation is an accessible recreation method that allows individuals to easily adapt to various healthy lifestyle activities by providing various benefits (physical, cognitive, social, emotional, etc.) and for entertainment purposes (Wichrowski et al., 2005). In particular, it includes being intertwined with the soil, garden and nature in order to support the physical and mental well-being of disabled or disadvantaged individuals, their interest and participation in activities (Söderback et al., 2004). Horticultural therapeutic applications ensure that the muscles are active during the physical rehabilitation process and improve balance, coordination, and strength (Verra et al., 2012). In horticultural therapy, physical activities such as moving, planting, watering, and harvesting plants are effective in strengthening muscle groups and revitalising muscles (Karaelmas, 1998). Thus, as a result of the inter-action between the natural environment and the individual, horticultural therapy is one of the most important treatments that provide stress-relieving effects such as peace, trust and calmness on the individual and make positive contributions to physical and mental health. For this reason, in recent years, research on horticultural therapy, which utilises the physical, mental and spiritual benefits of nature on human health and is one of them, has been increasing rapidly (Chan et al., 2017).

It is stated that horticultural therapeutic practices increase social participation (Blake & Mitchell, 2016; Yao & Chen, 2017), improve memory and thinking skills (Blake & Mitchell, 2016), reduce depression (Connell et al., 2007), and improve physical and mental well-being in patients with chronic musculoskeletal pain and in cardiac rehabilitation services (Ng et al., 2018; Verra et al., 2012; Wichrowski et al., 2005). It is stated that horticultural therapy has positive effects on many different disease groups; relieving pain (musculoskeletal pain), improving motor skills, providing emotional comfort, reducing anxiety and depression levels, reducing loneliness by increasing social interaction with peers in elderly individuals and increasing quality of life (Lee et al., 2013; Verra et al., 2012). The technique of producing and transporting plants has provided improvement in hand and finger movement coordination and control in patients with traumatic brain injury and paralysis (Uslu & Shakouri, 2012). In summary, horticultural therapy contributes to the development of biomotor characteristics such as flexibility, balance, coordination, strength, emotional characteristics such as good mood, self-esteem, self-confidence, cognitive characteristics including memory such as recognizing and memorizing plant species, and social characteristics such as making friends or communication (Lantz, 2006; Szofran et al., 2004; Taft, 2004).

When the concept of horticultural therapeutics, which has a significant effect on the cognitive, affective and psychomotor developmental characteristics of individuals, is examined, it is thought that this study will contribute to the literature in the field by determining the citation levels obtained as a result of the relationships between keywords, publications, authors, journals, countries and institutions and by eliminating the lack of studies that will guide future research on the concept of horticultural therapeutic recreation.

Bibliometric studies are considered one of the most popular research methods of recent times. Recently, bibliometric studies have been used to evaluate scientific research through quantitative studies of published studies globally. It can be said that bibliometric analyses are related to the examination and quantitative analysis of certain features of published studies or documents such as "author, subject, cited publication information, cited sources" using statistical methods (Yılmaz, 2021). Bibliometric analysis provides as useful for objectively analysing and mapping large-scale data. Accordingly, qualified bibliometric studies may lay the groundwork for solid foundations by revealing original and meaningful results in a field. With this method, scientists (1) provide a one-stop overview, (2) reveal gaps in the literature, (3) develop new ideas for future studies, and (4) reveal the map of targeted contributions to the field (Donthu et al., 2021). Bibliometric analysis is a research approach used to reveal the global evolution of academic studies published in Scopus or WoS databases and the trends of published studies (Alsharif et al., 2020). This study aims to reveal the processes and relationships of the articles published in the WoS database regarding the concept of horticultural therapeutics from the past to the present. Therefore, it is thought that examining the studies conducted within the scope of the literature on the concept of horticultural therapeutics will provide insight into how much it has been addressed in the discipline of sports (e.g. physical education and sports, recreation for the disabled or recreation for the disabled) and provide a perspective for new studies to be conducted in these areas.

2. Materials and Methods

2.1. Research Model

In this study, bibliometric analysis, one of the quantitative analysis methods, was used to examine the literature on the concept of horticultural through articles published in academic journals indexed in the WoS database and general research trends were determined. In this research, bibliometric analysis method, which has been a trend in recent years, was used. Bibliometric analysis is a research approach used to identify worldwide research trends in a particular field through the data of academic studies in Scopus or WoS databases (Alsharif et al., 2020). The data obtained in the study were analyzed using the 1.6.19 VOSviewer analysis program. This program is a program developed free of charge by Van Eck & Waltman (2010) that facilitates researchers in processing bibliometric analyses and creating maps. WoS database was used in the current study. WoS database generally publishes quality studies by journals that have proven themselves in their fields and have high impact factors in their own networks. Therefore, the preference of this database is seen as an important factor in terms of the quality, reliability and ethics of the published studies (Dirik et al., 2023).

On 10.02.2025, 673 results were obtained in the search made from 1981 to 2024 by selecting “all fields” in WoS with the keywords (“horticultural therapy” OR “horticultural activity” OR “horticulture therapy” OR “therapeutic horticulture” OR “horticulture therapeutic recreation”). As a result of the research, 372 articles, 160 Proceeding Paper, 73 Review

Article, 52 Meeting Abstracts, 8 Early Access, 7 Book Chapters, 5 Book Reviews, 4 Editorial Material, 3 Letters, 3 Notes, 2 Retracted Publications, 1 News Item and 1 Retraction were obtained. Within the scope of WoS categories, 377 Science Citation Index Expanded (SCI-Expanded), 275 Social Sciences Citation Index (SSCI), 166 Conference Proceedings Citation Index – Science (CPCI-S), 79 Conference Proceedings Citation Index – Social Science & Humanities (CPCI-SSH), 70 Emerging Sources Citation Index (ESCI), 6 Book Citation Index – Social Sciences & Humanities (BKCI-SSH), 5 Arts & Humanities Citation Index (A&HCI) and 4 Book Citation Index – Science (BKCI-S).

However, since in the study included articles and review articles as well as Scı-Expanded, SSCI, ESCI and A&HCI indexes, the analysis process was continued with 428 data. As a result of this analysis, 356 articles and 72 review articles were included in the study. In terms of disciplines, it was seen that the majority of the studies were conducted in the fields of Horticulture (89), Public Environmental Occupational Health (77), Environmental Sciences (67), Rehabilitation (26), Environmental Studies (25), Gerontology (25), Integrative Complementary Medicine (24), Nursing (24), Geriatrics Gerontology (21), Psychiatry (15), Medicine General Internal (14) Psychology Multidisciplinary (14), Social Sciences Biomedical (2), Sociology (2) and Sport Sciences (2). Of these studies, 313 are in the SCI-Expanded, 237 SSCI, 66 ESCI and 3 A&HCI WoS categories. The obtained data was examined through author-citation-journal-country-institution and keyword analysis. The contents indexed in WoS were taken as the database as the criterion.

2.2. Ethics Committee Permission

Ethics Committee Permission is required for all kinds of research conducted with qualitative or quantitative approaches that require data collection from participants using survey, interview, focus group study, observation, experiment, interview techniques, use of humans and animals (including materials/data) for experimental or other scientific purposes, clinical research on humans, research on animals, retrospective studies in accordance with the law on the protection of personal data. Since only WoS data were processed in this study, ethics committee permission was not required.

3. Results

3.1. Co-Authorship of Authors

While analyzing the co-authorship analysis of the authors, in order to determine the authors who are most connected and collaborate with each other, a network map was created for those who meet the condition of creating the criterion of at least 1 publication and 1 citation. According to the created network map, the first 5 authors with the most publications are as follows, respectively: Park, Sin-Ae (n: 53 publications, total link strength: 147), Son, Ki-Cheol (n: 23 publications, total link strength: 90), Lee, A. Young (20 publications, total link strength: 58), Kim, Seon-Ok (12 publications, total link strength: 28) Waliczek, Tina Marie (9 publications, total link strength: 28).

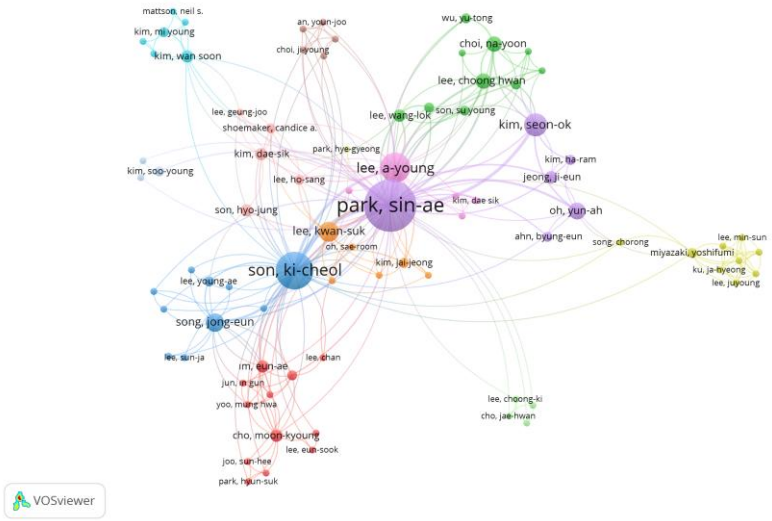

Figure 1. Co-author analysis

3.2. *Citation of Authors*

In this section, in order to reveal the citation networks of the authors, an analysis was conducted based on the criteria of at least 1 publication and 1 citation for the authors. As a result of the analysis, it was determined that 999 units of the authors were connected to each other. This link was grouped under 23 clusters, had 19246 links, and the total link strength was determined as 23883. In this case, it was determined that the first 5 most cited authors were Park, Sin-Ae (n: 816 citations, total link strength: 1829), Hartig, Terry (n: 455 citations, total link strength: 405), Son, Ki-Cheol (n: 447 citations, total link strength: 1048), Kirkevold, Marit (n: 281 citations, total link strength: 455) and Grahn, Patrik (n: 265 citations, total link strength: 167).

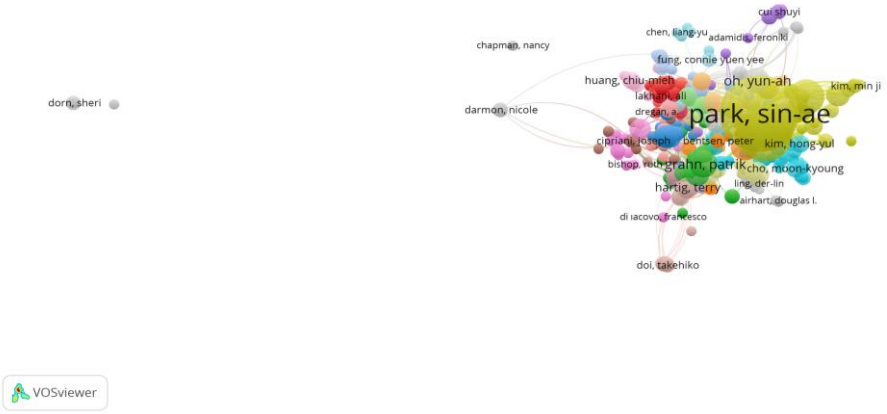

Figure 2. Author citation analysis

3.3. *Citation of Countries*

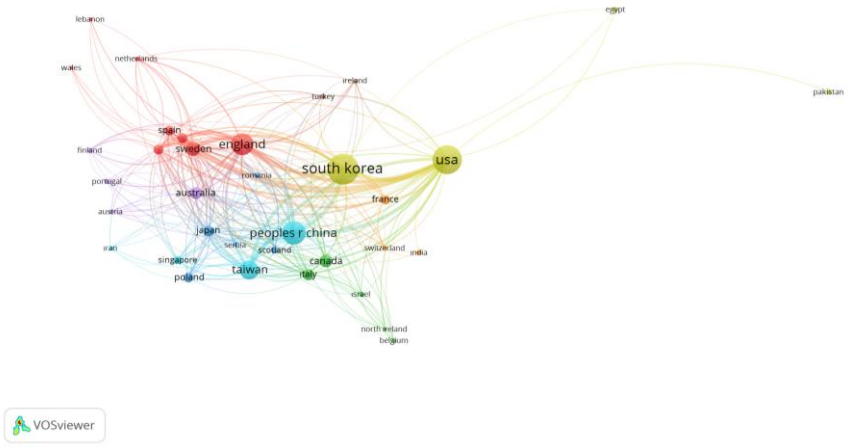

Figure 3. Citation of countries links

In this section, it was aimed to create a network map for the citations received by the published study based on the countries where the authors are located. In order to create this network map, it was determined that there were 43 observation units that were in relation to each other and fulfilled the condition of at least 1 work being published and 1 citation being received by a country. 8 clusters, 261 connections and 1421 total link strength were obtained under these 43 observation units. According to this connection, the countries with the most citations were USA (n: 1876 citations, total link strength: 436), England (1349 citations, total link strength: 305), Switzerland (n: 1303 citations, total link strength: 202), South Korea (n: 1030 citations, total link strength: 1829). In terms of the number of works, the order is as follows: South Korea (88 publications), America (78 publications), People's Republic of China (52 publications), England (45 publications), Taiwan (33 publications) and Switzerland (19 publications).

3.4. Citation and Publications of Organizations

In this section, it was aimed to create a citation network map as a result of the cooperation of organizations. In the formation of this network map, the condition that at least 1 work should be published by an institution and 1 citation should be provided is taken as basis. Within the scope of this condition, it was determined that there were 561 observation units with an inter-organizational citation network. It was observed that these units formed a total of 20 clusters, had 5924 connections and the total link strength was 7777. Accordingly, it was seen that the organizations with the highest publications were Konkuk University (n: 60, total link strength: 757), Swedish University of Agricultural Sciences (n: 12, total link strength: 234), Natl Taiwan University (n: 9, total link strength: 82). It was found that the address institutions of the publications with the most citations were Konkuk University (844 citations), Swedish University agr sci (687 citations), Uppsala University (564 citations) and Norwegian University life sci (467 citations).

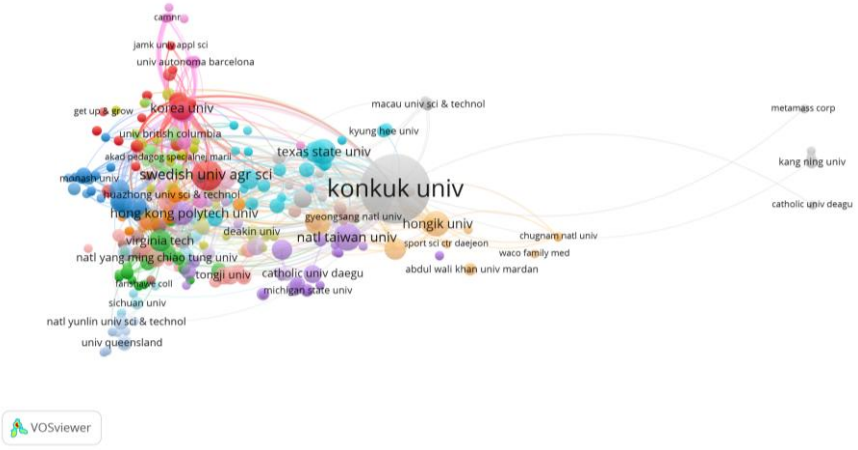

Figure 4. Bibliometric networks of number of organizations publication

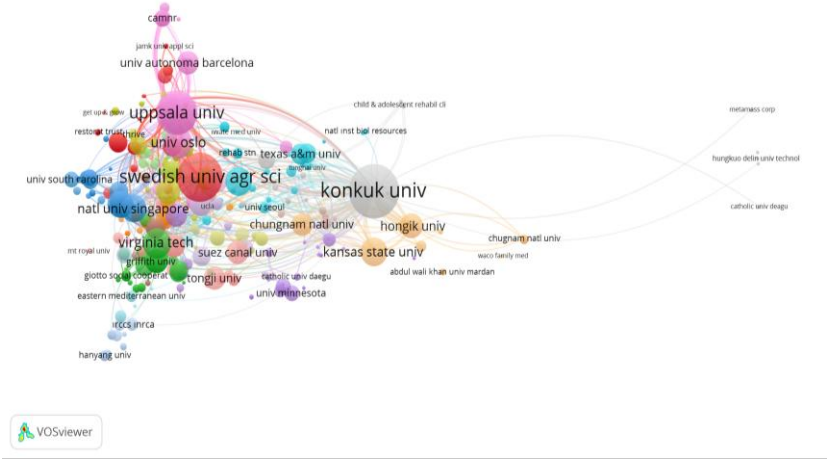

Figure 5. Organization Citation Count Bibliometric Networks

3.5. Co-occurence of All Keywords

In determining the keywords of the published studies related to the concept of horticultural therapeutics, an analysis was conducted on 105 observation units with a relationship between them based on the criterion of at least 3 occurrences. These units have a total of 10 clusters, 571 connections and 999 total link strengths. The most frequently used words in this network relationship are horticultural therapy with 149 repetitions, gardening with 50 repetitions, mental health with 30 repetitions, therapeutic horticulture with 28 repetitions, and well-being with 22 repetitions. The

strongest concepts in terms of the total link strength of these expressions are "horticultural therapy, gardening and mental health".

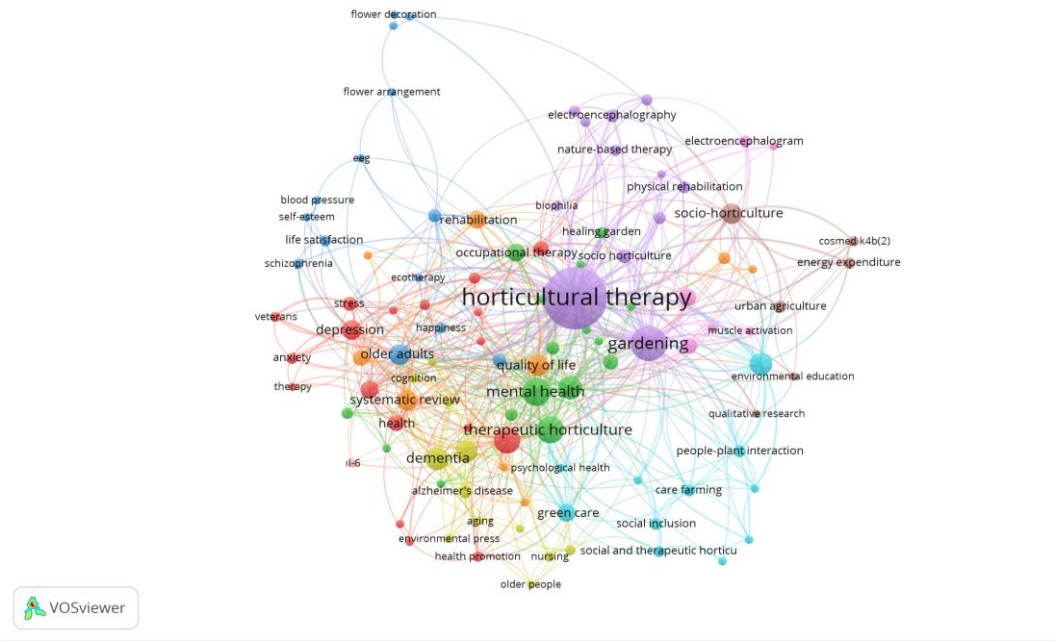

Figure 5. Most frequently used keyword links

3.6. Bibliografic coupling of documents

Bibliographic matching refers to the citation of a common work by two unrelated sources. The criterion for determining this situation was that the source had at least 1 citation. Based on this criterion, 340 units of works that were related to each other were identified. It was observed that these units were grouped into 8 clusters, had 15294 connections, and had a total link strength of 30768. The publications with the highest bibliographic matches were Bringslimark (2009) with 240 citations, Annerstedt (2011) with 210 citations, Coventry (2021) and Clatworthy (2013) with 168 citations. The works with the highest total link strength were Howarth (2020, total link strength: 778), Odeh (2017, total link strength: 711), and Summers (2018, total link strength: 700).

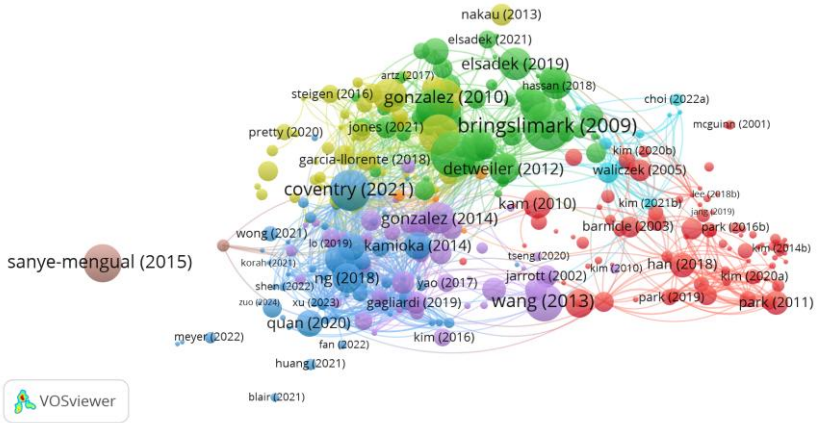

Figure 6. Bibliographic matching links of documents

3.7. *Co-citaiton of co-authors*

The aim of the co-citation section is to determine two different sources cited in a publication. In order to determine this, the number of citations was selected as at least 10 and it was seen that 202 units were formed. Accordingly, it was determined that this unit was grouped under 5 clusters, had 11023 connections and had a total connection strength of

45601. Therefore, the most common authors were listed as follows: Park, SA (281), Ulrich, RS (158), Kaplan, R (107), Gonzalez, MT (97), and Kaplan, S (93).

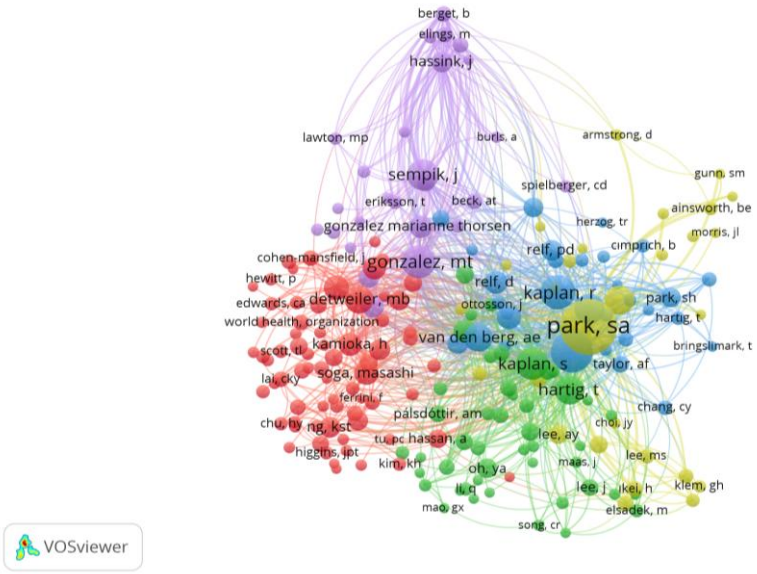

Figure 7. Links between co-cited authors

3.8. Bibliometric analysis of cited journals

In this section, it is aimed to determine the current publication and citation numbers of journals. In this case, at least 2 publications and 2 citation criteria were created. As a result of this criterion, 50 journals were analyzed.

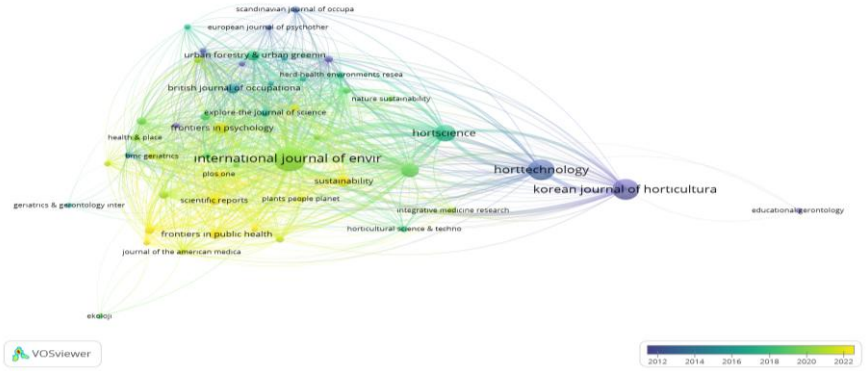

Figure 8. Links to publications produced by journals

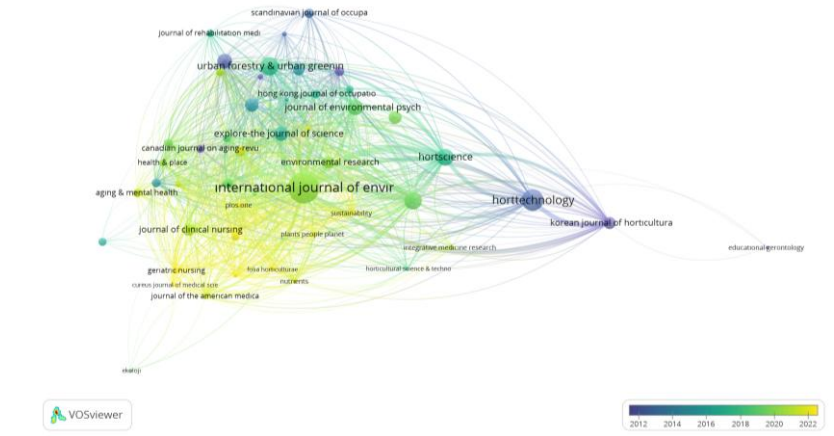

Figure 9. Link between the number of citations produced by journals

Accordingly, the first 6 journals that produce the most publications are listed as follows: "International Journal of Environmental Research and Public Health" (n: 41 publications, total link strength: 5760), "Horttechnology" (n: 29 publications, total link strength: 1352), "Korean Journal of Horticultural Science Technology" (n: 29 publications, total link strength: 1091), "Hortscience" (n: 18 publications, total link strength: 2181), "Complementary Therapies In Medicine" (n: 13 publications, total link strength: 1782) and "Frontiers in Psychology" (n: 8 publications, total link strength: 1487).

As a result of the analysis, the first 6 journals with the most citations were determined as follows, respectively: "International Journal of Environmental Research and Public Health" (n: 1000 citations, total link strength: 5760), "Horttechnology" (n: 491 citations, total link strength: 1352), "Urban Forestry & Urban Greening" (n: 343 citations, total link strength: 1085), "Complementary Therapies in Medicine" (n: 329 citations, total link strength: 1782), "Hortscience" (n: 303 citations, total link strength: 2181), and "Journal of Environmental Psychology" (n: 250 citations, total link strength: 665).

4. Discussion

It was tried to reveal the whole perspective of the studies on the concept of horticultural therapeutic recreation. As a result of the analyses on the concept of horticultural therapeutic recreation, it is seen that the most used keyword is "horticultural therapy" as expected. The other most used keywords in the research are "gardening", "mental health", "therapeutic horticulture", and "well-being". In general, it is recognized that horticultural therapy contributes to the subject of stress, anxiety, depression, and psychological well-being keywords. It can be said that whether horticultural therapeutic recreation reduces stress, anxiety and depression and whether it increases psychological well-being has become a subject of curiosity and has been researched.

Another result of our bibliometric study is that the researcher with the highest number of publications and citations is Sin-Ae Park. The researcher works in the institution of "Konkuk University", which is a foundation university located in the capital of South Korea and study in the fields of Agricultural, Environmental Sciences & Ecology Public, Environmental & Occupational Health, Integrative & Complementary Medicine, and Science & Technology. In total, the researcher has 84 publications in the WoS database and 71 of these publications are articles, 2 reviews, 7 abstracts, 2 editorial materials and 2 proceeding papers. It is seen that 53 of these studies are in the field of Horticulture WoS Category. In addition, the study has a WoS H-index of 19 and a total of 1,043 WoS citations. The second author Ki-Cheol Son, like Sin Ae Park, works at Konkuk University, South Korea, and studies in the fields of Agriculture Public, Environmental & Occupational Health, Integrative & Complementary Medicine, Environmental Sciences & Ecology, and Geriatrics & Gerontology. In total, the researcher has 43 publications in the WoS database and 29 of these publications are articles, 1 review, 7 meeting abstracts, 1 editorial material, and 5 proceeding papers. It is seen that 38 of these studies are in the field of Horticulture WoS Category. The researcher has an H-index of 14 and a total of 639 WoS citations. The third author Lee, A. Young, like the other two authors, works at the institution "Konkuk University". The researcher studies in the fields of Agricultural, Environmental Sciences & Ecology Public, Environmental & Occupational Health Integrative, Complementary Medicine, and Ophthalmology. The researcher has a WoS H-Index of 11 and a total of 315 citations.

As a result of the analyses, the publication with the highest number of citations was published in the journal "Complementary Therapies in Medicine" in 2018 with the title "Reduced stress and improved physical functional ability in elderly with mental health problems following a horticultural therapy program" by Park, Sin-Ae. This publication study was conducted together with Ah-Reum Han and Byung-Eun Ahn. In the study, it was aimed to determine whether the horticultural therapeutic 10-session programmed activities had an effect on twenty-eight elderly Korean individuals with mental health problems. In the study, saliva samples of elderly individuals with mental health problems who participated in horticultural therapeutic program activities were examined at the end of the program. As a result of the examination, it was determined that individuals participating in horticultural therapeutic program activities had a decrease in cortisol levels, a decrease in stress levels, and a significant improvement in physical functional abilities (Han et al., 2018). The second most cited study is "Nature and Health" by Hartig et al. (2014) and published in the Annual Review of Public Health. In the study, the links between nature and health, including physical activity, social harmony and stress reduction of positive resources such as air in nature, were investigated in order to

minimize the negative effects of lifestyle changes caused by urbanization on humans, and it was stated that spending time in nature has many benefits on health (Hartig et al., 2014). The third most cited study is "Determining exercise intensities of gardening tasks as a physical activity using metabolic equivalents in older adults", conducted by Son, K.C. with Park and Lee, and published in the journal "HortScience". This study, published in 2011, aimed to determine the effect of exercise intensities on the metabolic health of 20 Korean individuals over the age of 65 while performing 15 garden tasks. The study found that low and moderate intensity horticultural therapeutic activities were effective on the metabolic health of elderly individuals (Park et al., 2011). It is noteworthy that all three first authors are from the same institution, "Konkuk University" in Seoul, the capital of South Korea. In the fourth place is the study titled "Therapeutic horticulture in clinical depression: A prospective study of active components", published in the "Journal of Advanced Nursing" by Gonzalez et al. (2010). The study aimed to investigate the effects of a 12-week horticultural therapeutic program on the severity of depression, perceived attention status and rumination of individuals with clinical depression. It was determined that the applied horticultural therapeutic applications reduced the severity of depression and improved the perceived attention capacity of individuals with clinical depression. It was also stated that the decrease in the severity of depression continued for up to 3 months after the completion of the 12-week horticultural therapeutic program (Gonzalez et al., 2010). The last author with high citations is Patrik Grahn's study titled "The relation between perceived sensory dimensions of urban green space and stress restoration", conducted with Ulrika K. Stigsdotter and published in the journal "Landscape and urban planning". This study, conducted in 2011, investigated whether there was a relation between perceived sensory dimensions of urban green spaces and stress restoration. According to this study, it was determined that sensory perception of natural environments has positive effects on human health. It was stated that it positively affects the mental and psychological well-being of stressed individuals in particular (Grahn & Stigsdotter, 2010).

According to another result of our study, the country citation bibliometric analysis, it was seen that the country with the most citations was the United States. The United States is followed by the United Kingdom, Switzerland, and South Korea. It is seen that South Korea, despite producing more publications than the United States and other countries, is the last in terms of country citations. However, it can be said that the publication years of the United States are much older than other countries, and that this is a product of other countries feeding off of the United States in this regard. It was seen that other countries have more recent publications.

The organization with the most publications is "Konkuk University", where a private university founded in South Korea in 1931. The institution ranked second is "Swedish University of Agricultural Sciences", where founded in Sweden in 1977. The university was founded in 1977 by merging three separate colleges for veterinary medicine, forestry, and agriculture, as well as some smaller units into a single organization in order to increase efficiency through resource sharing between departments. The institution ranked third is "University of Queensland", where founded in Australia in 1909. The institution ranked fourth is "National Taiwan University", where founded in Taiwan in 1928. National Taiwan University is a university located in Taipei, where the capital of Taiwan. It was founded in 1928 and is considered one of the most prestigious universities in the country and one of the best universities in the world.

When the results of bibliometric analysis for inter-organisational citations were analysed, it was seen that Konkuk University was in the first rank and Swedish University of Agricultural Sciences was in the second rank as in the institution with the highest number of publications. However, the third institution with the highest number of citations is Uppsala University. Uppsala University is a research university located in Uppsala, Sweden. The university, where founded in 1477, is the oldest university in Sweden. The university gained importance during the rise of Sweden as a great power in the late 16th century. The institution with the most citations in fourth place was Norwegian University of Life Sciences. The Norwegian University of Life Sciences was founded in 1859 as the Higher Agricultural College (Den høiere Landbrugsskole). Then in 1897 the institution was transformed into the Norwegian Agricultural College (Norges Landbrugshøiskole, later Norges Landbrukshøiskole, Norges Landbrukshøyskole and Norges Landbrukshøgskole, abbreviated NLH). It acquired the status of a university-level college (vitenskapelig høgskole). In 2005 it acquired university status and was renamed the Norwegian University of Life Sciences (Universitet for miljø- og biovitenskap; UMB) (URL).

It is seen that the journal named "International Journal of Environmental Research and Public Health" has the most publications and citations. It is seen that the journal is indexed in the "SSCI" category in the Q 1 class and the publisher

of the journal is “MDPI”. It is seen that the journal started its publication life in 2004 and publishes articles monthly. The second-ranked journal, “Horttechnology”, is indexed in the Q2 class within the scope of “SCI-E” and publishes 6 issues per year. It was determined that the journal was founded in 1991 and the publisher of the journal is the “American Society for Horticultural Science”. It is seen that the journal “Korean Journal of Horticultural Science Technology”, which is in the third-ranked, was founded in 1998 and is indexed within the scope of Q3 “SCI-E”. It was determined that the publisher of the journal is “Korean Society of Horticultural Science” and the journal publishes once every two months. The journal “Hortsicence”, which is ranked fourth, was founded in 1966 and is indexed in the "SCI-E" category in the Q2 class. The publisher of the journal is the “American Society for Horticultural Science”, and the journal publishes 4 issues per year. The journal “Complementary Therapies in Medicine”, which is ranked fifth, was founded in 1986 under the name “Complementary Medical Research” and continued its publication life under its current name “Complementary Therapies in Medicine” in 1993. It is seen that the journal is indexed in the Q2 class within the scope of “SCI-E” and the publisher of the journal is “Hurchill Livingstone”. While the journal was published three times a year by Routledge in its initial phase, it is currently published eight times a year by Elsevier. It is seen that the journal "Frontiers in Psychology", which is ranked sixth, was founded in 2007 and is indexed in the Q2 class within the scope of "SSCI". It was determined that the publisher of the journal is "Frontiers Media Sa".

It is seen that the journal “Urban Forestry & Urban Greening”, which is ranked 3rd in the citation ranking, was founded in 2006. It has been determined that the journal is included in the Q1 class within the scope of “SSCI and SCI-E” index. The publisher of the journal is “Elsevier GMBH” and publishes 1 publication per month. This journal deals with topics related to urban design and greening. It is seen that the “Journal of Environmental Psychology” journal, which is ranked 6th in the citation ranking, started its publication life in 1938 and the journal publishes 10 issues per year. It was determined that the journal is indexed in the Q4 class within the scope of the “SCI-E” category and the publisher of the journal is the “National Environmental Health Association”. It is seen that the journal covers themes related to environmental health.

Based on the above findings, it can be seen that horticultural therapeutic applications are mostly addressed by disciplines such as life sciences, urban and environment, and complementary medical sciences. Since the horticultural garden is more related to the concepts of forest, plant, soil, etc., it has been observed that more research has been carried out by disciplines such as life sciences, urban and environment, complementary medical sciences. It can be said that the examination of the concept of horticultural therapeutic recreation emphasises the psychological well-being, social solidarity, quality of life, health improvements in the physical and mental rehabilitation process of horticultural activities. Accordingly, although it is determined that the concept of horticultural therapeutics is related to physical activity and therapy practices in the rehabilitation and socialisation of disadvantaged or disabled individuals in leisure time, it is seen that the concept has been addressed at a very limited level with only two research studies within the scope of sports sciences discipline. For example, one of these is the study titled “Nature-assisted rehabilitation for reactions to severe stress and/or depression in a rehabilitation garden: long-term follow-up including comparisons with a matched population-based reference cohort” published by Wahrborg et al. (2014) in the Journal of rehabilitation medicine. The study aimed to determine the effect of a nature-assisted rehabilitation program on 118 individuals with severe stress or mild to moderate depression, and as a result, various benefits were obtained in terms of the health outcomes of the individuals. The second and last study addressed within the sports discipline is the study titled “A randomized controlled trial of nature-based post-stroke fatigue rehabilitation” published by Pálsdóttir et al. (2015) in the “International Journal of Stroke”. In this study, the effects of a nature-based therapeutic program on the quality of life, depression, stress, and anxiety of elderly individuals were investigated, and it was determined that positive results were observed.

5. Conclusions

As a result, academic studies on the concept of horticultural therapeutics within the scope of recreation in outdoor disabilities within the sports discipline can be expanded and contribute to the field. Especially recreation in disabled people or physical education and sports fields in disabled people are considered to be among the important functions of rehabilitation and socialization of disadvantaged individuals. Horticultural therapy, through light or moderate physical activities such as planting and watering, can enhance the physical fitness parameters of individuals with

disabilities or those from disadvantaged groups (such as muscle strength, flexibility, coordination, etc.); support the development of their psychological aspects (such as reducing stress and burnout, enhancing psychological well-being); and simultaneously support the development of their social skills (such as communication, teamwork, leadership, group dynamics, sharing, and peer support).Therefore, it is thought that the consideration of horticultural therapeutic applications within the scope of recreation in disabled people will bring a new dimension to therapeutic applications for disabled or disadvantaged individuals.

This bibliometric research review reveals the direction in which the studies conducted on the concept of horticultural therapeutics by journals, authors, publishers, countries and institutions have evolved and the number of researchers conducting research on this subject. We believe that it will guide researchers who want to conduct research on this subject.

Limitations

This current study has some limitations. One of the important limitations of this study is that our research data was obtained only from the reliable, prestigious and widely used WoS database and that data from other databases were not consulted. Therefore, we assume that studies not indexed in the WoS database or published in journals with different indexes may not have been included in the scope of the review. For future research, studies on the concept of horticultural therapeutics can be examined through the Scopus and PubMed databases.

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Research Article

Investigation of Self-Efficacy Levels of Different Sports Branch Referees

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Abstract: This study aimed to examine the self-efficacy levels of referees from different sports branches. The study sample consisted of 309 referees who were actively working in İzmir during the 2021–2022 season and were selected through a simple random sampling method. Data were collected using a "Personal Information Form" and the "Referee Self-Efficacy Scale." The personal information form gathered demographic details such as gender, age, sport discipline, and refereeing experience. The "Referee Self-Efficacy Scale" is a 5-point Likert-type instrument comprising 18 items and five sub-dimensions. As the data were found to be normally distributed, independent samples t-tests were conducted to analyze the variables of gender, sport discipline, and refereeing experience, while one-way analysis of variance (ANOVA) was used to examine the age and education level variables. As a result, it was found that male refer-ees had higher scores in the game knowledge sub-dimension in terms of the gender variable. In terms of age, the 18–24 and 25–34 age groups scored higher than the 35–44 age group in the physical competence and game knowledge sub-dimensions. Additionally, the 25–34 age group scored higher than the 35–44 age group in the decision-making and communication sub-dimension and higher than the 18–24 age group in the pressure sub-dimension. Although no significant differences were observed across sports branches, self-efficacy scores were generally high. Regarding refereeing experience, referees with more years of experience scored higher in the pressure sub-dimension compared to those with fewer years of experience.

Keywords: Different sport branch, referee, self- efficacy.

1. Introduction

In contemporary sports, the fundamental components shaping the nature of the field are typically grouped into three primary categories: athletes, spectators, and referees. Every single factor mentioned here is undeniably essential, playing a crucial role in the overall outcome (Arı & Erdem, 2022). Referees must successfully perform multiple tasks under pressure to ensure accurate decision-making and avoid errors during competitions (Giel & Breuer, 2020). Referees must successfully perform multiple tasks under pressure to ensure accurate decision-making and avoid errors during competitions. Referees must evaluate actions under challenging conditions. They must make quick and clear decisions, manage the game efficiently, be open to communication, focus on multiple issues at the same time, maintain order, and resolve disputes effectively (Karaçam & Pulur, 2016; Orhan et al., 2022).

Referees are required to demonstrate a high level of physical competence to effectively follow the game and ensure its seamless progression. In addition to physical attributes, psychological preparation is essential for making accurate decisions under pressure. The ability to manage psychological factors such as self-efficacy, anxiety, fear, and stress significantly influences their performance (Sarıdede, 2018). Given the limited duration of competition, referees need to

maintain intense focus and exhibit unwavering attention to detail. Successful refereeing depends on both inherent qualities—such as strong instincts, fairness, mental resilience, confidence, and determination—and acquired competencies, including attentiveness, vigilance, and the ability to make swift yet decisive judgments, which are developed through experience (Diotaiuti et al., 2020).

Self-efficacy, along with other factors, affects the types of challenges people are willing to face and the level of goals they set. Individuals who possess high self-efficacy in a particular domain tend to select more challenging and assertive goals. The impact of self-efficacy on goal setting extends beyond the initial goal setting process, as it also fosters persistence in achieving these goals. Consequently, individuals who possess a strong sense of self-sufficiency maintain stronger goals (Luszczynska et al., 2005; Eskiyecek et al., 2019). Referee self-efficacy describes referees' self-efficacy belief that they can effectively fulfill their duties and responsibilities. This concept is crucial in referees' decision-making processes, their ability to perform under pressure, and their ability to manage the flow of the game (Guillén & Feltz, 2011). Bandura (1997) describes referee self-efficacy as the belief in one's capability to perform officiating tasks successfully and achieve expected results in sports. A strong sense of self-efficacy enables referees to officiate effectively while boosting confidence and positive emotions (Nazarudin et al., 2009). Research in the field highlights that referees with a strong sense of self-efficacy are more likely to make precise decisions, perform more effectively, earn greater recognition from coaches, managers, and other officials, and experience reduced stress levels compared to those with lower self-efficacy (Guillén & Feltz, 2011; Karaçam & Pulur, 2017; Myers et al., 2012). It is emphasized that experience is the most significant factor influencing referee performance (Spencer, 2015).

In this context, the aim of this study is to analyze the self-efficacy levels of referees in different sports branches in terms of various variables. Considering that the studies in literature mostly focus on the self-efficacy levels of referees in a single sport branch, the fact that this study focuses on referees working in different sports branches highlights the importance of the research.

2. Materials and Methods

2.1. Research Group

The population of the study consists of referees in various branches actively working in Izmir province in the 2021-2022 season. Within the scope of the study conducted by simple random sampling method, participants randomly selected from the research population were reached. The sample of the study is composed of 104 female and 205 male referees, with a total of 309 participants.

2.2. Research Design

This study employed a quantitative research design utilizing the descriptive survey method. The survey method is defined as an approach that explains a past or current situation as it exists (Büyüköztürk, 2018). In the descriptive research process, the stages of determining the research problem and objectives, defining the variables, selecting the sample, collecting data, and analyzing the data are carried out systematically. In this study, an attempt was made to reveal whether the self-efficacy levels of different sports branch referees show differences according to the variables of gender, age, previous playing status in the branch of the referee, sport branch and years of being a referee.

2.3. Data Collection

The data collection tool used in the study comprises two stages. In the first stage, a Personal Information Form was prepared by the researchers to identify the demographic characteristics of the participants. The responses related to the variables of gender, age, refereeing branch, and years of refereeing experience were collected through this form. In the second phase of data collection, participants were administered the Referee Self-Efficacy Scale (REFS), originally developed by Karacam and Pulur (2017). The scale includes 18 items formatted on a five-point Likert scale. It is composed of five distinct subscales: physical fitness (5 items), game knowledge (3 items), decision-making (3 items), pressure (3 items) and communication (4 items). The scale does not contain any reverse-scored items. The internal consistency (Cronbach's alpha) values reported for the subscales were .88 for physical fitness, .71 for game knowledge, .85 for decision-making, .88 for pressure, .81 for communication, and .90 for the overall scale.

2.4. Data Analysis

The data were analysed using SPSS 29.0 statistical package program. Normality was assessed using skewness and kurtosis values, with thresholds set at ±3, as suggested by Karagöz (2021). Descriptive statistics, independent samples t-tests, and one-way ANOVA were performed with a significance level set at 0.05.

Table 1. Descriptive statistics related to the research

Sub Dimensions	x	Kurtosis	Skewness	Cronbach Alpha
Physical Fitness	20.05	-.147	-.397	.951
Game Knowledge	12.66	-.355	.321	.942
Decision-Making	12.35	-.554	.475	.905
Pressure	12.39	-.083	-.462	.925
Communication	16.61	-.191	-.508	.923

x; mean

2.6. Ethics Committee Permission

Ethics committee permission was taken from Dokuz Eylül University Non-Interventional Research Ethics Committee with the decision dated 25.05.2022 and protocol number 2022/19-10. Before data collection, participants were thoroughly informed about the study through a detailed presentation and subsequently provided written consent. The research was carried out in accordance with the ethical guidelines of the Declaration of Helsinki.

3. Results

Table 2. T Test Results According to Gender Variable

Sub Dimensions	Gender	N	x	Sd	t	p
Physical Fitness	Women	104	19.73	3.34	1.137	.256
	Men	205	20.20	3.52		
Game Knowledge	Women	104	12.29	1.79	2.659	.008*
	Men	205	12.84	1.70		
Decision-Making	Women	104	12.13	1.84	1.552	.122
	Men	205	12.47	1.84		
Pressure	Women	104	12.20	1.92	1.179	.239
	Men	205	12.48	1.96		
Communication	Women	104	16.57	2.24	.211	.833
	Men	205	16.63	2.53		

x; mean, Sd; standard deviation, p; significance

Table 2 shows the t-test results for gender variable. When self-efficacy scores were examined, the difference in favor of males in the game knowledge sub-dimension was found to be significant ($p<0.05$). No significant difference was found in other sub-dimensions ($p>0.05$).

Table 3. ANOVA Results of Self-Efficacy Scares According to Age

Sub Dimensions	Age	N	x	Sd	t	p
Physical Fitness	18-24 Age (a)	89	20.70	3.02	7.304	0.001 a-c b-c
	25-34 Age (b)	106	20.58	2.99		
	35-44 Age (c)	69	18.43	4.23		
	45 Age and over (d)	45	19.96	3.35		
Game Knowledge	18-24 Age (a)	89	12.79	1.53	5.353	0.001 a-c b-c
	25-34 Age (b)	106	12.96	1.71		
	35-44 Age (c)	69	11.94	1.95		
	45 Age and over (d)	45	12.78	1.70		

Table 3. (Continue)

Sub Dimensions	Age	N	x	Sd	t	p
Decision-Making	18-24 Age (a)	89	12.27	1.68	3.977	0.008 b-c
	25-34 Age (b)	106	12.68	1.68		
	35-44 Age (c)	69	11.77	2.09		
	45 Age and over (d)	45	12.64	1.92		
Pressure	18-24 Age (a)	89	12.07	1.72	3.318	0.020 b-a
	25-34 Age (b)	106	12.83	1.93		
	35-44 Age (c)	69	12.07	2.05		
	45 Age and over (d)	45	12.44	2.09		
Communication	18-24 Age (a)	89	16.57	2.39	6.357	0.001 b-c
	25-34 Age (b)	106	17.22	2.14		
	35-44 Age (c)	69	15.62	2.66		
	45 Age and over (d)	45	16.76	2.39		

x; mean, Sd; standard deviation, p; significance

The table shows the ANOVA results according to age. When self-efficacy scores were analyzed, a significant difference was found in all sub-dimensions ($p<0.05$). Groups with differences are shown with letters.

Table 4. ANOVA Results of Self-Efficacy Scores According to Referee Branches

Sub Dimensions	Sports Branch	N	x	Sd	t	p
Physical Fitness	Football	37	20.22	3.56	0.856	0.464
	Basketball	164	19.76	3.57		
	Volleyball	69	20.38	2.75		
	Other	39	20.51	4.04		
	Total	309	20.05	3.47		
Game Knowledge	Football	37	12.62	2.33	0.163	0.921
	Basketball	164	12.71	1.59		
	Volleyball	69	12.54	1.68		
	Other	39	12.69	1.95		
	Total	309	12.66	1.75		
Decision-Making	Football	37	12.43	2.24	0.948	0.418
	Basketball	164	12.34	1.76		
	Volleyball	69	12.13	1.69		
	Other	39	12.74	2.01		
	Total	309	12.35	1.84		
Pressure	Football	37	12.51	2.45	0.447	0.720
	Basketball	164	12.29	1.82		
	Volleyball	69	12.38	1.84		
	Other	39	12.67	2.16		
	Total	309	12.39	1.95		
Communication	Football	37	16.65	3.05	1.259	0.289
	Basketball	164	16.54	2.33		
	Volleyball	69	16.38	2.21		
	Other	39	17.28	2.57		
	Total	309	16.61	2.43		

x; mean, Sd; standard deviation, p; significance

Table 4 shows the ANOVA results according to the branches of the referees. When self-efficacy scores were examined, no significant difference was found in the sub-dimensions ($p<0.05$).

Table 5. ANOVA results according to refereeing experience

Sub Dimensions	Refereeing Experience	N	x	Sd	t	p
Physical Fitness	1-3 years (a)	84	20.13	3.31	1.746	0.176
	4-6 years (b)	93	19.51	3.81		
	7 years and over(c)	132	20.37	3.28		
Game Knowledge	1-3 years (a)	84	12.67	1.63	.137	0.872
	4-6 years (b)	93	12.58	1.70		
	7 years and over(c)	132	12.70	1.87		
Decision-Making	1-3 years (a)	84	12.01	1.64	2.851	0.059
	4-6 years (b)	93	12.29	1.82		
	7 years and over(c)	132	12.61	1.95		
Pressure	1-3 years (a)	84	12.06	1.90	3.312	0.038 c-a
	4-6 years (b)	93	12.23	1.79		
	7 years and over(c)	132	12.70	2.04		
Communication	1-3 years (a)	84	16.63	2.27	.124	0.883
	4-6 years (b)	93	16.51	2.30		
	7 years and over(c)	132	16.67	2.63		

x; mean, Sd; standard deviation, p; significance

Table 5 shows the ANOVA results according to the year of referee variable. When self-efficacy scores were analyzed, a significant difference was found in the pressure sub-dimension ($p<0.05$). No significant difference was found in other sub-dimensions ($p>0.05$). Groups with differences are indicated with letters.

4. Discussion

The findings are discussed in the light of these variables. According to the findings, male referees scored higher than female referees in game knowledge self-efficacy in terms of gender. In this study, Atıcı (2024) found that male referees had higher scores than female referees in game knowledge, decision making and pressure sub-dimensions. Sivri (2023), in his study on tennis referees, found that male referees had higher pressure self-efficacy scores than female referees. Dereceli et al. (2019) found that male soccer referees had higher game knowledge, decision-making and pressure self-efficacy scores than female referees. Karafil & Akgül (2021) found a significant difference in favor of male referees in the physical competence and decision-making sub-dimension. In the same study, no difference was found in game knowledge, pressure and communication sub-dimensions according to gender. Orhan et al. (2022) conducted a study with basketball referees and found that male referees scored higher than female referees in the physical competence sub-dimension. Koçak (2019) stated that male referees had higher scores in physical competence and decision-making sub-dimensions than female referees. Sarıdede (2018) states that male referees have higher self-efficacy than female referees in terms of decision-making, game knowledge and general referee self-efficacy. It is seen that these studies are in parallel with the results of the study. There are also studies in literature that do not support the results of the study. Karaçam & Pulur (2017) found that female referees had higher average pressure self-efficacy scores than male referees. Aygün & Murathan (2023) and Diotaiuti et al. (2017) found no significant difference in the self-efficacy scores of referees according to gender. The difference could stem from traditional gender roles and the male-dominated structure of the sports world, which may foster a greater sense of competence among male referees.

When we examined the self-efficacy scores according to the age variable in the study, it was determined that the 18-24 and 25-34 age group obtained higher scores than the 35-44 age group in the physical competence and game knowledge sub-dimension, the 25-34 age group obtained higher scores than the 35-44 age group in the decision-making and communication sub-dimension, and the 25-34 age group obtained higher scores than the 18-24 age group in the pressure sub-dimension. When the literature is examined, there are studies that support and do not support the current findings. Arı & Erdem (2022), Koçak (2019), Adıgüzel (2018) and Myers et al. (2012) found significant differences between the age and self-efficacy of referees in their studies. These studies conducted by Atıcı (2024), Sevinç et al. (2021), Sivri (2023), Dereceli et al. (2019), Adıgüzel (2018), Karaçam & Pulur (2017) and Ekmekçi et al. (2021) do not support the research results. According to the results of this study, it was concluded that the age of the referees did not affect their self-

efficacy. These findings may indicate that younger referees, especially those aged between 18 and 34 years, tend to exhibit higher levels of physical capacity and cognitive flexibility, which may positively influence their self-efficacy perceptions in the domains of physical competence and game knowledge. In addition, referees in the 25-34 age group are likely to have reached an optimal balance in terms of refereeing experience and physical competence with increasing experience, which may explain their higher self-efficacy scores in the decision-making, communication and pressure management subscales.

In addition, referees aged 35-44 years may experience age-related declines in physical endurance and adaptability to the dynamic demands of the pace of modern sport play, which may negatively affect their self-efficacy in certain domains. In addition to these physiological factors, generational differences in self-concept and sociocultural variables such as evolving referee training and development programs and changing expectations in sport organizations may also play an important role in shaping self-efficacy perceptions in different age groups.

In the study, no significant difference was found between groups in self-efficacy scores according to sports branches. When the literature is examined, there are studies that do not support the current findings. Karaçam & Pulur (2017) stated that football and basketball referees had higher scores than handball referees in self-efficacy total score. In the current study it is thought that there is no statistically significant difference between the groups because the self-efficacy scores are generally high. The lack of significant differences in self-efficacy scores across sports disciplines may be due to the overall high levels of self-efficacy observed across all referee groups, potentially limiting the detection of statistical differences. Furthermore, despite the varying technical and tactical demands of different sports, referees generally undergo standardized training and certification processes, which may lead to similar perceptions of self-efficacy regardless of their refereeing discipline.

When analyzed according to the referee year variable in the study, referees with seven or more years of experience showed significantly higher self-efficacy in the pressure sub-dimension compared to those with 1–3 years of experience. This finding aligns with previous studies (Arı & Erdem, 2022; Orhan et al., 2022) which emphasized that experience enhances confidence and decision-making under pressure. The lack of differences in other sub-dimensions may be because the study was conducted in a sample of referees from different sports.

5. Conclusions

As a result, it was found that the game knowledge sub-dimension scores of male referees were higher in gender variable. Regarding age, referees aged 18–24 and 25–34 scored higher than those aged 35–44 in the physical competence and game knowledge sub-dimensions. Additionally, the 25–34 group outperformed the 35–44 group in decision-making and communication and the 18–24 group in pressure. While there was no significant difference according to sports branches, self-efficacy scores were higher in all branches. In the pressure sub-dimension referees with more years of experience scored higher than those with fewer years of experience.

When we analyze the research findings, some suggestions can be presented. Examining the psychological, social and organizational factors underlying gender differences in self-efficacy levels may provide a more comprehensive perspective on this phenomenon. Extensive research is recommended to explore how self-efficacy develops over time with increasing age and experience. Finally, studies on the development of stress management skills to improve decision-making, communication and stress management skills, especially for younger and less experienced referees, may contribute to referee training and development processes.

Limitations

This study is limited to referees actively working in the İzmir province, which restricts the generalizability of the findings to other regions and sports contexts. Given the potential cultural, organizational, and structural differences across provinces and sports branches, future research should consider expanding the sample to include referees from diverse geographical locations and various sports disciplines. Such an expansion would allow for a more comprehensive understanding of the factors influencing self-efficacy and other related variables and help identify regional and sport-specific patterns underlying these outcomes.

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Research Article

Digital Nomads' Leisure Time and Examination of Recreation Perceptions

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Abstract: This research aims to examine the leisure and recreation perceptions of individuals who live their lives as digital nomads. In the research, 'case study' method, which is one of the qualitative research methods, was used. The research consists of 14 individuals who continue their lives as digital nomads. The voluntary consent form was approved by the individuals participating in the research. The digital nomads whose voluntary consent form was approved were asked to answer the questions in the personal information form. Participants who answered the personal information form were asked to answer the interview questions. Nvivo data analysis software was used in the data analysis of the research. As a result of the research, it was revealed that individuals who continue their lives as digital nomads are aware that they continue their lives as 'digital nomads'. It was determined that individuals who live their lives as digital nomads define themselves with concepts such as thrill-seeking, mobility, learning by doing, continuous development, desire to succeed, happiness, socialisation, entrepreneurship and time management. It has been determined that individuals who continue their lives as digital nomads take part in sportive (physical) recreation, cultural recreation and touristic (tourism) recreation activities in their occupational choices. It has been revealed that digital nomads give place to the concepts of freedom, comfort, happiness and high energy as a difference between doing their professions in a fixed lifestyle. Digital nomads are constantly travelling and can work in any environment where the internet is available by adopting an online working method during their travels. It is thought that digital nomads who both make a living and travel the world can play an important role in strengthening the unity of definition as a new profession in the sector as business data recreation.

Keywords: Digital nomad, leisure, recreation.

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1. Introduction

Survival, one of the most basic instincts of humanity, has always existed since the day humanity existed. Despite the difficult conditions of the geographies where people have lived throughout their lives and the various disasters they have faced throughout their lives, they have managed to survive in line with the opportunities they have (Acar, 2021). While trying to survive against the disasters, human beings have continued their lives as nomads in order to meet their own needs and live in a safe environment (Akgül, 2006). Nomadic societies have brought along certain mobilizations in continents. People's search for new places, increasing needs and insufficient natural resources have forced people to migrate (Tan, 2013). Throughout world history, migrations between continents have sometimes accelerated and sometimes slowed down. There has never been a period when the concept of migration has disappeared (Karakaya, 2020). Today, military forces emerging with the developing technology, the population of large countries increasing day by day and the desire to have various underground resources have brought wars. These wars have brought security problems especially in countries in the Middle East (Ertan & Ertan, 2017). This increasing insecurity in the Middle East

has forced people in that region to migrate to neighbouring countries. During these migrations, Turkey has become a stopover for mass migration (Demirhan & Aslan, 2015).

In the 18th century, the Industrial Revolution, which started in England, also brought the era of mechanization. The industrial revolution gradually started to show its effect all over the world. The age of mechanization has reduced the need for manpower and brought social changes (Şahin, 2019).

The period between 1860-1900 is called the Second Industrial Revolution. The Second Industrial Revolution is a period in which many new technologies emerged. The inventions that emerged with this technology are the harbingers of the period that will last for approximately 70 years (Atkenson & Kehoe, 2001). Today, the Third Industrial Revolution welcomes us. It is known as the progress of technology day by day, affecting the direction and form of production (Davutoğlu, 2020). In the 21st century, technology, which has become a part of our lives, has caused many changes. It shows that we have stepped into the digital age, which is the new age with the changing world (Saykılı, 2019).

The digital age, which is a new era, has an important place in the working lives of individuals. New business lines have also emerged with digitalization. One of these business lines is digital nomadism (İmamoğlu & Barutçu, 2023). Digital nomadism is people who do not have a working connection with the office; instead, they are people who freely decide where to work. Digital nomads who carry their computers with them can easily handle their work in any environment where the internet is available (Hannonen, 2020). Individuals living as digital nomads do not have time and space restrictions. They can access the files they need at any time (Makimoto, 2013).

The advancement of technology and the use of these technological products in daily life increase the popularity of individuals living as digital nomads' day by day (Nash, 2018). The increasing number of individuals living their lives as digital nomads has become a very important resource for states. Countries want to increase their capital, countries want to promote more and compete to attract digital nomads to their countries for their economic policies (Busuttil, 2021).

The increase in digitalization day by day and people who are bored with monotonous working life have created a new order in business life where they want to travel and earn money. The desire of people to make good use of their leisure time, which has become more differentiated with the coronavirus (Covid-19) pandemic, has created an opportunity for digital nomads (Yılmaz & Gürbüz, 2023).

With the industrial revolution, the decrease in the need for manpower and the shortening of working hours have led to an increase in people's free time. Leisure time is the time outside the working hours (Demir & Demir, 2006). Leisure time is also very important for the welfare of people and the functioning of society (Mullens & Glorieux, 2023). People prepare themselves for the next day by utilizing their leisure time with recreational activities to get rid of the tiredness of the day, to get away from monotonous life and to get away from stress during the day (Tütüncü et al., 2011).

Recreational activities contribute to emotional stability in people, maintaining well-being during the day, self-esteem and a sense of well-being. Recreational activities contribute positively to the physical health, mental health, mental health and spiritual health of individuals (Ibhafidon et al. 2021). People need recreational activities to support and protect physical health, to strengthen socialization, to reveal talents, to work efficiently in the field of work and to be happy in life (Yaylı, 2024).

The number of digital nomads living in various parts of the world is increasing day by day with the development of technology. Digital nomads, who can work in any environment where there is internet, have emerged as a new line of business. In this study, it is thought that it will add a different perspective and innovation to the field.

2. Materials and Methods

2.1. Research Group

The study group of the research consists of digital nomads, who are individuals who work online while maintaining a lifestyle based on travel, where the boundaries between work, leisure and travel disappear (Reichenberger, 2018). The digital nomads in the research group were reached via messages from social media platforms (Instagram, YouTube, etc.). A total of 14 participants voluntarily participated in the research. Of these participants, 14 people (11 male, 3

female) were participants. The most important issue taken into consideration while including the participants in the research is that they volunteer to participate and continue their lives as digital nomads.

2.2. Research Design

In this study, in which the leisure and recreation perceptions of digital nomads are examined, 'case study', one of the qualitative research methods, was used. Case study has a rich history dating back to well-known theorists such as Piaget, Freud and Darwin. Case study provides an in-depth understanding of the situation by using various data collection tools (interviews, observations, reflective diaries) and different perspectives (child, teacher, parent, researcher) to capture the perspectives of various participants (Mills et al, 2009). Case study can be defined as an intensive study conducted with a person or a group and aiming to generalize about more than one data. Case study can also be defined as an intensive and systematic investigation of an individual or a group in which the researcher examines data on various variables in depth (Heale & Twycross, 2017).

2.3. Data Collection

In this study, data collection consisted of 2 stages in total. The interviews were conducted over the internet and recorded. In the first stage, before starting the interviews with the participants, the participants were informed about the general and subject headings of the research. Afterwards, the interview started by asking for permission to record the interview. The 'Voluntary Consent Form', which provides general information about the research and undertakes that the data will not be processed and used for any purpose other than scientific purposes, was presented to the participants who accepted the interview, and their approval was obtained. In the second stage, the participants who participated in the study were asked to provide information about themselves and the 'Personal Information Form' questions, which included demographic information. This information form includes questions such as age, gender, marital status, education level. In the third stage, 'Interview Questions' prepared in a semi-structured manner were transferred to the participants. In general, the questions prepared to understand the examination of digital nomads' perceptions of leisure and recreation were directed to the participants.

2.4. Data Analysis

The data were analyzed using NVivo qualitative data analysis software and presented in tables, graphs and models in the findings section. The data obtained from descriptive responses and observer interviews were analyzed in NVivo 10 qualitative data analysis software.

2.5. Validity and Reliability

Validity deals with the accuracy of the results of the research or the ability to solve problems. Validity in qualitative research is to solve the problem of the researched subject as objectively as possible. The degree to which the data reflects the actual situation is important. Addressing the research problem as a whole or focusing on all the features of the phenomenon under study are important validity criteria (Baltacı, 2019). The main purpose of research in qualitative study is the researcher himself. The data obtained in the research cannot be consistent and reproducible. Even if the research is repeated by other researchers, it is not possible to obtain the same results even under similar conditions and conditions (Yağar & Dökme, 2018). Reliability means that the findings and interpretations of the research are the product of a consistent process. The process of obtaining the findings should be as clear and reproducible as possible. This issue is closely related to qualitative research (Arastaman et al. 2018).

2.6. Ethics Committee Permission

'Ethics Committee Approval' (Date: 31.01.2023, Number: E.476679) was obtained from Manisa Celal Bayar University Institute of Social Sciences Ethics Committee. Before data collection, participants were thoroughly informed about the study through a detailed presentation and subsequently provided written consent. The research was carried out in accordance with the ethical guidelines of the Declaration of Helsinki.

3. Results

In this part of the study, the personal characteristics of the participants such as age, gender, marital status, educational status, department studied, profession, years of profession, fields of occupation, areas of specialization, how many times

a year do you change destinations (destination) are presented in tables. In addition, descriptive analyses of the participants' perceptions of leisure and recreation are presented.

Table 1. Demographic information of digital nomad individuals

	Personal Feature	Number of Participants	%
Age Distribution	21 age	1	%6
	23 age	4	%27
	24 age	1	%7
	27 age	2	%13
	28 age	2	%13
	29 age	2	%13
	37 age	1	%7
	40 age	1	%7
	51 age	1	%7
Gender	Male	11	%79
	Female	3	%21
Marital Status	Single	9	%64
	Married	5	%36
Education Status	Primary School	1	%7
	High school	2	%14
	Licence	11	%79

Table 1 shows that the participants were between the ages of 21-51. Gender distribution of the participants It was determined that 3 of the participants were female and 11 of them were male. It was determined that 9 of the participants were single and 5 were married. It was determined that 1 of the participants graduated from primary school, 2 from high school, 2 from associate degree and 9 from bachelor's degree.

Table 2. Distribution of the participants according to their departments

	Personal Feature	Number of Participants	%
Study Department	Faculty of Sport Sciences	3	%25
	Computer Engineering	2	%17
	Machine Shipbuilding	1	%9
	Travel Management	1	%9
	Brand Communication	1	%8
	Industrial Engineering	1	%8
	Public Relations and Publicity	1	%8
	English Business	1	%8
	Electronics Department (Vocational High School)	1	%8
	Total	12	

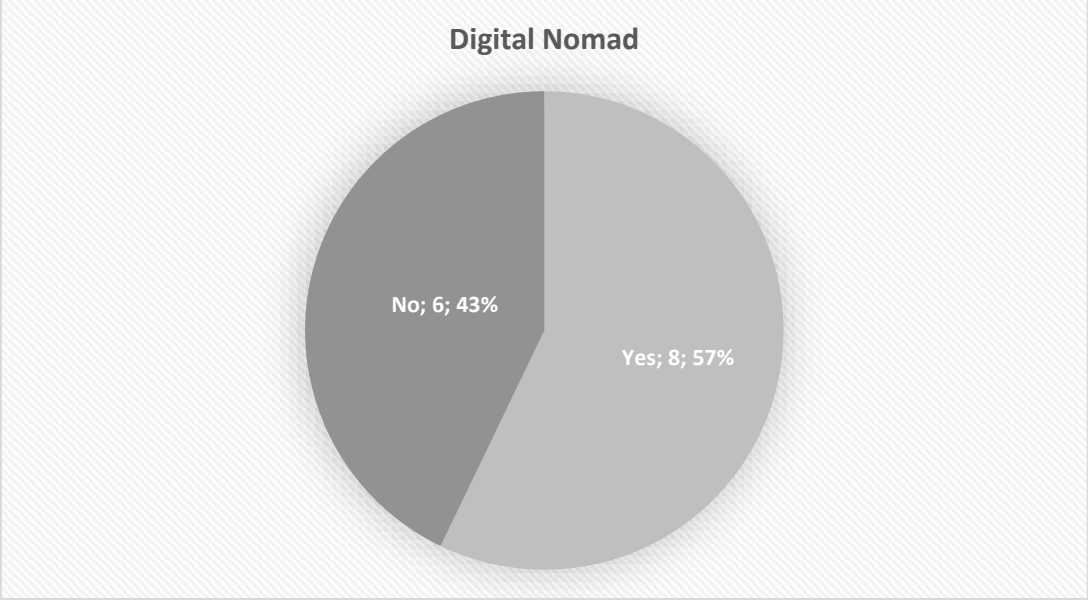
Table 2, it is determined that 3 of the participants are studying Sports Sciences, 2 are studying Computer Engineering, 1 is studying Mechanical Engineering, 1 is studying Travel Management, 1 is studying Brand Communication, 1 is studying Industrial Engineering, 1 is studying Public Relations and Publicity, 1 is studying English Business Administration, 1 is studying Vocational High School, 1 is studying primary school and 1 is studying active university education.

Table 3. Frequency of national and international destinations of the participants

Participant	National	International
K1	4	—
K2	4	—
K3	3	—
K4	10	—
K5	More than 20	20
K6	8	—
K7	15	—
K8	—	10
K9	—	10
K10	10	10
K11	30	30
K12	More than 20	12
K13	10	15
K14	10	5

Table 3, the distribution of the participants according to the number of times a year you change your destination (destination) nationally/internationally is determined.

3.1. Findings Related to Participants' Perceptions of Leisure and Recreation



Graphic 1. Digital nomad awareness

In Graph 1, it is seen that 57% of the participants are aware of 'digital nomad' and 43% are not aware of 'digital nomad'. Participants' awareness of "Digital Nomad" is presented below.

> *I don't like sitting, staying calm and staying still for a long time, so I am constantly moving. I see myself as a digital nomad (P1). It makes us adapt the work we do more and become more digital nomads (P3). I have been living as a digital nomad for 8 years (P7). I can do different jobs in different parts of the world. Digital nomadism actually respects this a little bit (P11). In terms of digital nomadism, we can actually consider video work as an area of expertise in the last period (P12).*

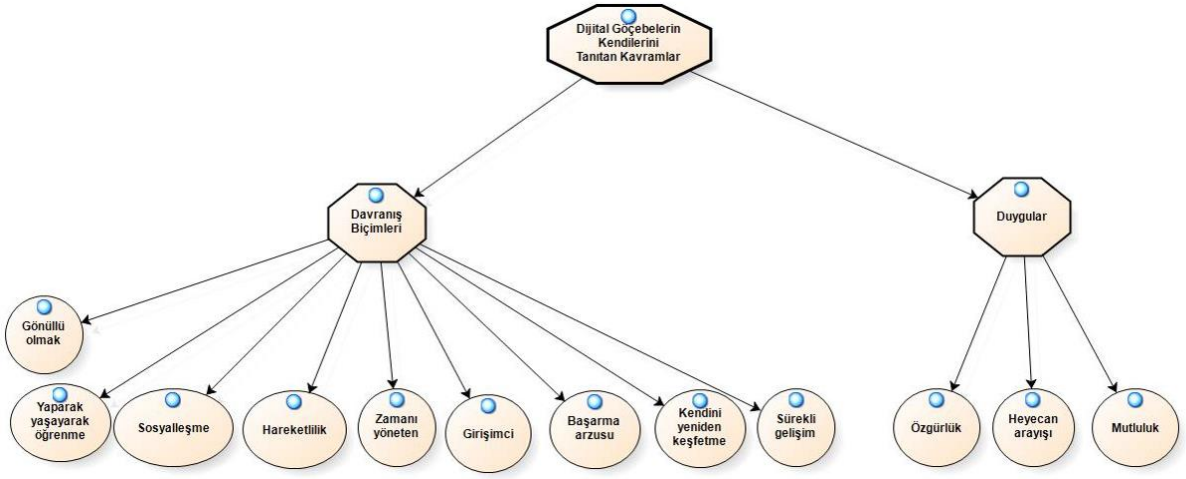


Figure 1. Concepts that recognize digital selves

The concepts that the participants introduced themselves are given in model 1. The statements of the participants about their personal characteristics are presented below.

> *Statements of the participants about the concept of happiness; I can travel alone, which is personal to me, and at the same time, while travelling, I can fulfil my hobby, earn money and provide for the house. I think he lives a happier life by doing 3-5 things together (P7). I am happy, I have a flexible way of working and we have a versatile job (P5).*
>
> *The statements of the participants about freedom; I am already happy because I feel free and I want to do these things (P2). I experience freedom by travelling and since I ride a motorbike independently, I do not have the obligation to have 4-5 people following me like a car (P7).*
>
> *Desire to succeed; if a man is successful in something, he must love it (P4).*
>
> *Time management: I look at it more as time management (P10).*

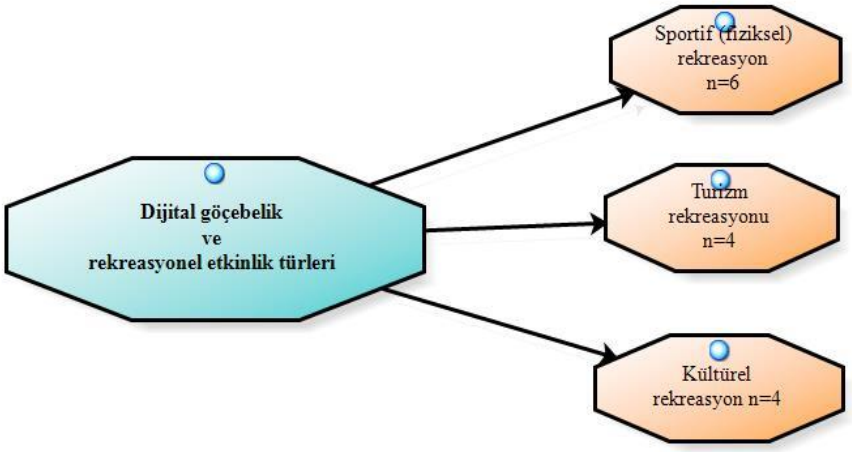


Figure 2. Participants' digital nomadism and recreational activity types

Model 2, it was determined that the concepts of sportive (physical) recreation, tourism recreation and cultural recreation were included among the digital nomad and recreational activity types. The statements of the participants about the activity types are presented below.

> *Statements of the participants about sportive (physical) recreation; I like to do sports and create opportunities for the sports I like and go to those regions and do them there (P2). We decide according to the season. The time we will do is very important for us because what we do is nature sports (P6). Statements of the participants related to tourism*

recreation; Our priority is tourism during tourism (P5). Statements of the participants related to cultural recreation; We also show it to people when we visit. People's favorite thing to see is the cultures in other countries (P8). Let's make a culture and art trip (P13).

Figure 3. 'I' as a digital nomad

Table 4. Concepts of 'I' as a Digital Nomad

Concepts of 'I' as a Digital Nomad	Free
	Mobile
	Having fun
	High Energy
	Comfortable
	I do not take orders
	Working on Myself
	I Earn More
	I Feel Like I'm Different
	Social
	Peacemaker
	Helpful
	Experiencing Life
	Happy
	Peace

The statements of the participants about the concept of freedom.

I am incredibly free, this freedom can be used in many different ways. You can be free in your social life, you can be free in your environment, freedom is all of these freedoms (P3). I can take my family and live in Van for 5 years, I can live in Balıkesir for 3 years. I can go abroad and live there. It gives me complete freedom (P7). I can do whatever I want, I am more free (P14). The statements of the participants about the concept of comfort; *We do whatever project we have in mind that day. Therefore, it has such a comfort (P4). Because I am very comfortable, I can do whatever I want, I get up at the time I want and go to bed at the time I want in the evening (P7).* The statements of the participants about the concept of happiness; *Absolutely happiness (P10). It allows us to do our work more happily (P11). It's really beautiful and happy for human beings (P12). I am more happy to live this way (P14).* The statements of the participants related to high energy*: I don't want to extinguish the energy in me, that's why I chose such a lifestyle (P2). I don't think I will ever, ever choose this fixed life to feel energized (P3).*

4. Discussion

When the information on demographic findings is evaluated in general, the digital nomadic individuals who participated in the research consist of a total of 14 individuals, 11 of whom are male and 3 of whom are female. It is seen that the ages of these individuals are between 21-51 years old.

It shows that the number of male participants in the research group is higher than the number of female participants and there is a difference between them. The main reason for this may be due to the difficulties of living as a digital nomad and the role of women in society. In the study conducted by Kılıç and Öztürk (2014), it is shown that women's workload at home is one of the obstacles to women's employment, and in the study conducted by Karatepe and Arıbaş (2017), the fact that business life is generally determined as male-dominated in society causes women to be put in the second plan in the business world and overlaps with the study.

There is variability in the age ranges of the participants. The main reason for this difference is that individuals in the research group have the opportunity to live as digital nomads at any age. The fact that individuals who are fond of traveling around the world, earning money and freedom want to live as digital nomads shows us that individuals of all ages can live as digital nomads.

When other demographic characteristics of the participants are examined, it is seen that single participants include more people than married participants. In addition, considering the educational status of the participants, it is noteworthy that the number of individuals with bachelor's degree level education is high. Individuals who continue their lives as digital nomads continue their lives in various parts of the world. It is thought that these individuals change their locations frequently and continue their lives as single because they are fond of their freedom. Considering the cost of living, digital nomads are thought to continue their lives as single. In addition, since digital nomads do not dream of a future such as having a profession and doing the same job as in past generations, they do not prefer to establish a regular family life and prefer to live as single (Öztornacı, 2024). It is thought that the fact that the education level of digital nomads is high at the undergraduate level, that each of them is intellectually productive individuals as a literate person, and that their social media shares are high as a result of technological developments facilitate both the awareness of individuals in terms of the conditions they are in and the opportunity to meet and communicate with other people who share similar views with them (Ardatürk, 2022). It is seen that the frequency of national and international destinations of the participants is different. The main reason for this is thought to be that the frequency of destinations varies as each digital nomad decides how much he/she will move every year and the advantages that countries apply for digital nomads.

It was determined that the participants' awareness of "digital nomad" (Graphic 1) was higher than those who were not aware of it. It is thought that the main reason for this situation is that the concept of digital nomadism is more prominent today. In the study conducted by Karacaoğlan and Şahin (2016), it is seen that employees with higher levels of awareness provide more job satisfaction. Individuals with high job mindfulness prefer to face their negative experiences without prejudice rather than getting stuck in them. It has been concluded that employees with high levels of mindfulness increase their job satisfaction and job performance and reduce their turnover intentions (Yalçınkaya, 2020). The results of this study are consistent with the results of the studies conducted in the literature.

In the personal characteristics of the participants (Model 1), concepts such as happiness, rediscovering oneself, freedom, thrill-seeking, entrepreneur, desire to succeed, time management, mobility, continuous development, volunteering, socialization and learning by living by living were included. Individuals who are in a suitable profession willingly do their jobs in society, progress in their profession, and live happy and productive lives (Sarıkaya & Khorshıd, 2009). Freedom has become a concept that has concerned all humanity since the early ages. It means that human beings act independently of all kinds of external influences, based on their own will (Ayaz, 2021). In the study conducted by Sarıkaya and Khorshıd (2009), it was found that young people value freedom and make career choices accordingly. It is thought that individuals who continue their lives as digital nomads value their freedom and continue their lives in this way because they do not want to work in an office environment. The results of this study are consistent with the studies conducted in the literature.

The type that is based on physical exercise or recreational application of various sports branches and constitutes a large part of recreation activities is called sportive recreation (Birol & Karaküçük, 2014). In the study conducted by Gönen et

al. (2022), it was determined that they found it important to have paths such as walking, cycling and skating in recreation areas, and that it was important to provide opportunities to practice different sports branches. Tourism recreation is the recreational activities within the tourism product that digital nomads participate in to relax, spend their free time efficiently and be happy (Duman, 2024). It is thought that the main reason for this is that digital nomads want to see historical ruins, museums showing the cultures of the countries and works of art in the region and want to develop themselves culturally.

5. Conclusions

It has been revealed that individuals who are digital nomads have perceptions of leisure and recreation. In this study, examining all these concepts together will contribute to national and international researchers in terms of digital nomads' perceptions of leisure and recreation. The concept of digital nomadism can become widespread. The number of qualified academic and social studies can be increased. By reaching a higher number of digital nomads than the number of digital nomads reached, it may be possible to make a broad generalization. In the national literature, it is seen that studies evaluating digital nomads and leisure time are not at a sufficient level. Quantitative, qualitative and experimental studies can be conducted with more participants. Since data collection was conducted through interviews in the study, the activity areas were limited to the use of semi-structured order in order to facilitate observation and to facilitate the analysis of the data obtained. Studies can be conducted in unstructured areas with more participants using different observation methods. The results obtained from this research and similar studies can contribute to different approaches and planning. Research can be conducted on the effects of digital nomadism on different generations.

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Research Article

The effect of physical education and sports teachers' healthy nutrition attitudes and physical activity habits on work performance

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Abstract: This study was conducted to examine the impact of physical education and sports teachers' attitudes toward healthy eating and physical activity habits on their professional performance. The sample of the study consisted of a total of 140 physical education and sports teachers working in schools affiliated with the Bingöl Provincial Directorate of National Education, including 29 women and 111 men. The measurement tool used to collect relevant data in the study consisted of four sections. The first section included demographic information, the second section comprised the Attitude Scale Toward Healthy Eating, the third section contained the Physical Activity Habit Questionnaire, and the fourth section included the Job Performance Scale. A correlation test was applied to determine the relationship between teachers' attitudes toward healthy eating, physical activity habits, and job performance dimensions. To identify the relationship between attitudes toward healthy eating, physical activity habits, and job performance sub-dimensions with certain demographic variables, skewness and kurtosis tests were initially examined. Based on the test results, the Mann-Whitney U test was applied for comparisons of independent paired groups, while the Kruskal-Wallis test was used for comparisons of independent multiple groups. Additionally, regression analysis was utilized to comprehensively examine the relationships between variables. The results were evaluated within a 95% confidence interval, with statistical significance set at $p<0.05$. The SPSS 22.0 software package was used for data analysis. As a result of the study, it was concluded that the job performance of physical education and sports teachers with positive attitudes toward healthy eating and regular physical activity habits could be positively influenced. This, in turn, is believed to indirectly enhance other variables such as job efficiency, job motivation, and overall work performance.

Keywords: Physical education and sports, physical activity, work performance, healthy nutrition.

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1. Introduction

Physical education and sports lessons are of great importance for education and training to raise more qualified people and to realize this purpose in the best way. In education and training, physical education and sports courses are effective in the development of many aspects of students (Selçuk, 2010). Teaching is a profession that has certain duties beyond cognitive needs. Positive attitude towards the profession is of great emotional importance. In addition to supporting their own cognitive development, it is important for teachers to develop a positive attitude towards the teaching profession and to have high academic competence (Dağ, 2022).

In order to improve the quality of life, people need to have proper nutrition and physical activity in order to feel better, fulfill their daily duties and responsibilities, enjoy their work and protect themselves against the negative conditions of

life (Özkatar Kaya et al., 2018). Adequate and balanced nutrition is essential to achieve and maintain optimum health. This includes establishing and maintaining eating habits by taking the nutrients the body needs in the right amounts. Nutrition is important in terms of improving the quality of life as well as protecting against diseases and supporting the healthy aging process (Baysal, 2018). The basis of nutritional goals in active individuals is adequate nutrient intake to optimize sports performance, fitness or health (Özdoğan & Özçelik 2011).

Physical activity is defined as activities that strain muscles and joints, consume energy, increase heart and respiratory rate, and cause various degrees of fatigue in daily life (Rowland & Freedson 1994; Savcı et al., 2006). It is recommended that individuals who live a sedentary life should engage in regular physical activity in order to be more active in their daily lives (Özkatar Kaya et al., 2018). Job performance is defined as how successfully a job is performed according to certain conditions or how successfully an employee completes the task assigned to him/her within a certain period of time (Bayram, 2006). Recently, one of the most important problems in organizations is to determine the extent to which employees fulfill their duties or what their job performance is. This has caused the concept of performance to gain importance rapidly in organizations (Çalık, 2003). Individual and group performance shows how successfully the goals and standards set by the organization are achieved. Organizational performance, on the other hand, refers to the total performance of the system in general. First of all, it is important for organizations to increase individual performance. Because the effectiveness of an organization can only be as high as the performance of its personnel (Geylan et al., 2018). In the light of this information, our study aimed to examine the effect of physical education and sports teachers' attitudes towards healthy nutrition and physical activity habits on their job performance on scientific basis.

2. Materials and Methods

2.1. Research Group

The study group consisted of physical education and sports teachers working in schools in the center and districts of Bingöl Provincial Directorate of National Education and participating voluntarily.

2.2. Research Design

This research is a field survey. Questionnaire technique was used to collect data in the field survey.

2.3. Data Collection

The questionnaire used to collect the relevant data in the study consisted of four sections. The first part consisted of demographic information, the second part consisted of "Attitude Scale on Healthy Eating", the third part consisted of "Physical Activity Habit Questionnaire" and the fourth part consisted of "Job Performance Scale". Table 1 shows the demographic information of the participants in the study.

Attitude Scale on Healthy Eating: In order to measure the level of attitude towards healthy nutrition, the "Attitude Scale on Healthy Nutrition" form developed by Tekkurşun Demir & Cicioğlu (2019) was used. The scale used for the purpose of our research has 4 sub-dimensions: knowledge about nutrition, feelings towards nutrition, positive nutrition and poor nutrition. There are 21 items in total in the scale designed for the purpose of our research. Of these; items 1 through 5 measure knowledge about nutrition, items 6 through 11 measure feelings towards nutrition, items 12 through 16 measure positive nutrition and items 17 through 21 measure poor nutrition. The scale is a 5-point Likert scale, and the options of the positive statements are listed as "Strongly Agree", "Agree", "Undecided", "Slightly Agree", "Strongly Disagree" and scored as 5, 4, 3, 2, 1.

Physical Activity Habit Questionnaire: The Physical Activity Habit Questionnaire developed by Baecke et al. (1982) was used to measure physical activity habits. Three sub-dimensions of the questionnaire used for the purpose of our study, namely work, sports and leisure time, were used. There are 23 items in total in the scale used for the purpose of our research. Of these, items 1 through 9 are related to work; items 10 through 19 are related to sports; and items 20 through 23 are related to leisure time.

Job Performance Scale: In order to measure the job performance levels of the participants, Sigler & Pearson (2000)'s 4 statements taken from Kirkman & Rosen (1999) were taken from research conducted by Çöl (2008). The scale used for

the purpose of our research is one-dimensional. The scale is a 5-point Likert scale, and the options of the positive statements are listed as "Strongly Agree", "Agree", "Undecided", "Slightly Agree", "Strongly Disagree" and scored as 5, 4, 3, 2, 1.

Table 1. Distribution of physical education and sports teachers participating in the study according to demographic variables.

Demographic Variables		N	%
Gender	Male	111	79.3
	Female	29	20.7
Age	24-28	20	14.3
	29-33	42	30.0
	34-38	46	32.9
	39-43	17	12.1
	44 and over	15	10.7
Marital Status	Single	87	62.1
	Married	53	37.9
Length of service in the profession?	1-5	38	27.1
	6-10	51	36.4
	11-15	35	25.0
	16-20	6	4.3
	21 and over	10	7.1
Location of the school you work at?	Center	96	68.6
	District	44	31.4
Is there a sports facility at your school?	Yes	55	39.3
	No	85	60.7
Total		140	%100

2.4. Data Analysis

The data collected through the attitude towards healthy eating, physical activity habit questionnaire and work performance scales were analyzed using the statistical package program SPSS.22 and the results were interpreted. Descriptive statistics including arithmetic mean, standard deviation, frequency and percentage distributions were presented to provide insight into demographic information and other group questions. Correlation (Spearman) test was applied to determine the relationship between the attitudes towards healthy nutrition, physical activity habits and job performance dimensions of the PES teachers. In order to determine the relationship between attitudes towards healthy eating, physical activity habits and job performance sub-dimensions and certain demographic variables, Skewness and Kurtosis tests were firstly used, and then Mann Whitney-U test was used to compare independent paired groups and Kruskal Wallis test was used to compare independent multiple groups according to the test results. If there was a difference between independent multiple variables, Mann Whitney-U test was used to determine which group or groups this difference originated from. In addition, regression analysis was used to test the relationships between variables in a holistic manner. The results were evaluated at 95% confidence interval and significance was evaluated at $p<0.05$ level.

2.5. Ethics Committee Permission

For the ethical compliance of the study, ethics committee permission was obtained from Bingöl University Institute of Health Sciences Ethics Committee with "20.03.2023 dated, 23/06 numbered, Decision: 02". Before data collection,

participants were thoroughly informed about the study through a detailed presentation and subsequently provided written consent. The research was carried out in accordance with the ethical guidelines of the Declaration of Helsinki.

3. Results

Table 2. Comparison of healthy nutrition, physical activity habits and job performance of physical education and sports teachers according to gender variable

	Sub-dimensions	Gender	N	$\bar{x}$	sd	U	P
Attitude Toward Healthy Eating Scale Sub-dimensions	Information About Nutrition	Male	111	21.73	3.473	1141.500	.013*
		Female	29	19.48	4.947		
	Feeling Towards Nutrition	Male	111	16.72	4.197	1226.000	.048*
		Female	29	18.37	3.110		
	Positive Nutrition	Male	111	17.09	4.218	1233.000	.052
		Female	29	15.51	3.225		
	Poor Nutrition	Male	111	11.72	4.542	1224.000	.047*
		Female	29	13.31	3.475		
Physical Activity Habit Questionnaire Sub-dimensions	Job Related	Male	111	28.72	2.988	1434.500	.364
		Female	29	28.34	2.364		
	Sports Related	Male	111	28.73	5.830	1313.500	.127
		Female	29	27.34	5.333		
	Related to Free Time	Male	111	12.03	2.589	1562.000	.805
		Female	29	12.13	2.183		
Attitudes towards Healthy Nutrition General Total		Male	111	67.29	7.813	1465.000	.457
		Female	29	66.68	8.220		
Physical Activity Habits General Total		Male	111	69.49	9.474	1353.500	.188
		Female	29	67.82	7.161		
Job Performance General Total		Male	111	4.10	.756	1337.000	.151
		Female	29	3.83	.954		
Total			140				

**; p<0.05, $\bar{x}$; mean, sd; standard deviation*

When Table 2 is examined, according to the gender variable of the teachers participating in the study, there was a statistically significant difference between the groups in the scores of knowledge about nutrition, feelings towards nutrition and poor nutrition, while there was no statistically significant difference between the groups in the total score of physical activity habits and its sub-dimensions and total averages of work performance.

When Table 3 is examined, according to the age variable of the teachers participating in the study, there was a statistically significant difference between the groups in the total scores of attitude towards healthy nutrition, positive nutrition, emotion towards nutrition and attitude towards healthy nutrition, while there was no statistically significant difference between the groups in the total score of physical activity habit and its sub-dimensions and total averages of work performance.

Table 3. Age-Related Variations in Nutrition, Activity, and Work Performance

	Sub-dimensions	Age	N	$\bar{x}$	Ss	Sd	x^2	P	Mann Whitney-
Attitude Toward Healthy Eating Scale Sub-dimensions	Information About Nutrition	24-28[a]	20	20.65	4.693	4	3.970	.410	
		29-33[b]	42	20.95	3.975				
		34-38[c]	46	21.39	3.186				
		39-43[d]	17	22.76	2.359				
		44 and Over[e]	15	20.93	5.762				
	Feeling Towards Nutrition	24-28[a]	20	17.95	4.501	4	22.082	.000***	a-e
		29-33[b]	42	18.88	3.171				b-e
		34-38[c]	46	16.50	3.488				b-c
		39-43[d]	17	15.70	4.209				
		44 and Over [e]	15	14.13	4.733				
	Positive Nutrition	24-28[a]	20	16.00	4.667	4	11.001	.027*	a-e
		29-33[b]	42	16.33	3.842				c-e
		34-38[c]	46	16.32	4.027				b-e
		39-43[d]	17	17.23	3.509				
		44 and Over [e]	15	19.86	3.622				
	Poor Nutrition	24-28[a]	20	13.05	4.850	4	4.990	.288	
		29-33[b]	42	12.85	4.164				
		34-38[c]	46	11.26	3.963				
		39-43[d]	17	11.35	3.516				
		44 and Over [e]	15	11.73	6.076				
Physical Activity Habit Questionnaire Sub-dimensions	Job Related	24-28[a]	20	28.10	2.425	4	2.209	.697	
		29-33[b]	42	29.02	2.771				
		34-38[c]	46	28.58	2.848				
		39-43[d]	17	28.00	2.622				
		44 and Over [e]	15	29.20	3.931				
	Sports Related	24-28[a]	20	29.60	6.532	4	3.541	.472	
		29-33[b]	42	27.66	5.908				
		34-38[c]	46	28.86	5.119				
		39-43[d]	17	27.35	5.522				
		44 and Over [e]	15	29.06	6.463				
	Related to Free Time	24-28[a]	20	11.60	2.436	4	3.898	.420	
		29-33[b]	42	12.40	2.499				
		34-38[c]	46	12.08	2.355				
		39-43[d]	17	11.23	2.194				
		44 and Over [e]	15	12.53	3.292				
Attitudes towards Healthy Nutrition General Total		24-28[a]	20	67.65	10.256	4	10.922	.026*	
		29-33[b]	42	69.02	7.906				
		34-38[c]	46	65.47	6.043				
		39-43[d]	17	67.05	5.868				
		44 and Over [e]	15	66.66	10.607				
Physical Activity Habits General Total		24-28[a]	20	69.30	9.979	4	3.515	.476	
		29-33[b]	42	69.09	8.756				
		34-38[c]	46	69.54	8.518				
		39-43[d]	17	66.58	7.834				
		44 and Over [e]	15	70.80	11.742				
Job Performance General Total		24-28[a]	20	3.92	.862	4	4.973	.290	
		29-33[b]	42	4.07	.685				
		34-38[c]	46	4.21	.706				
		39-43[d]	17	3.79	.848				
		44 and Over [e]	15	3.91	1.186				
Total			140						

**; p<0.05, $\bar{x}$; mean, sd; standard deviation*

Table 4. Work Experience and Health Behaviors in PE Teachers

	Sub-dimensions	Term of Office	N	$\bar{x}$	Ss	Sd	x^2	P
Attitude Toward Healthy Eating Scale Sub-dimensions	Information About Nutrition	1-5	38	21.39	4.030	4	2.321	.677
		6-10	51	20.94	3.916			
		11-15	35	21.85	2.365			
		16-20	6	18.66	8.164			
		21 and over	10	22.00	4.396			
	Feeling Towards Nutrition	1-5	38	17.39	4.142	4	7.326	.120
		6-10	51	17.86	3.944			
		11-15	35	16.40	4.103			
		16-20	6	15.16	3.970			
		21 and over	10	15.30	3.368			
	Positive Nutrition	1-5	38	16.68	4.899	4	3.264	.515
		6-10	51	16.23	3.712			
		11-15	35	16.88	3.529			
		16-20	6	18.50	4.764			
		21 and over	10	18.40	3.835			
	Poor Nutrition	1-5	38	11.89	4.700	4	5.844	.211
		6-10	51	12.98	4.221			
		11-15	35	11.22	4.109			
		16-20	6	13.16	6.145			
		21 and over	10	10.20	3.047			
Physical Activity Habit Questionnaire Sub-dimensions	Job Related	1-5	38	28.92	2.603	4	.607	.962
		6-10	51	28.60	2.836			
		11-15	35	28.48	3.003			
		16-20	6	28.50	2.810			
		21 and over	10	28.40	3.921			
	Sports Related	1-5	38	29.36	5.658	4	1.426	.840
		6-10	51	28.15	6.188			
		11-15	35	28.08	5.248			
		16-20	6	29.16	2.786			
		21 and over	10	27.30	7.056			
	Related to Free Time	1-5	38	11.94	2.426	4	2.543	.637
		6-10	51	12.35	2.423			
		11-15	35	11.71	2.573			
		16-20	6	13.16	2.639			
		21 and over	10	11.50	2.990			
Attitudes towards Healthy Nutrition General Total		1-5	38	67.36	9.476	4	3.722	.445
		6-10	51	68.01	6.718			
		11-15	35	66.37	7.772			
		16-20	6	65.50	9.669			
		21 and over	10	65.90	6.838			
Physical Activity Habits General Total		1-5	38	70.23	8.322	4	1.518	.823
		6-10	51	69.11	9.702			
		11-15	35	68.28	8.634			
		16-20	6	70.83	6.112			
		21 and over	10	67.20	11.811			
Job Performance General Total		1-5	38	4.06	.806	4	2.965	.564
		6-10	51	4.21	.631			
		11-15	35	4.00	.727			
		16-20	6	3.37	1.594			
		21 and over	10	3.72	1.063			
Total			140					

When Table 4 is examined, no statistically significant difference was found between the groups in the total score and sub-dimensions of attitudes towards healthy nutrition, total score and sub-dimensions of physical activity habits and total averages of work performance according to the length of service in the profession variable of the teachers participating in the study.

Table 5. Comparison of healthy nutrition, physical activity habits and job performance of physical education and sports teachers according to marital status variable

	Sub-dimensions	Marital Status	N	$\bar{x}$	SD	U	P
Attitude Toward Healthy Eating Scale Sub-dimensions	Information About Nutrition	Single	87	21.49	3.566	2218.000	.699
		Married	53	20.90	4.438		
	Feeling Towards Nutrition	Single	87	16.78	4.210	2033.500	.241
		Married	53	17.54	3.739		
	Positive Nutrition	Single	87	17.64	3.800	1566.500	.001**
		Married	53	15.33	4.136		
	Poor Nutrition	Single	87	11.27	4.333	1632.500	.004**
		Married	53	13.33	4.183		
Physical Activity Habit Questionnaire Sub-dimensions	Job Related	Single	87	28.60	3.100	2214.500	.693
		Married	53	28.69	2.461		
	Sports Related	Single	87	27.78	5.554	1892.500	.075
		Married	53	29.54	5.924		
	Related to Free Time	Single	87	11.94	2.479	2060.000	.287
		Married	53	12.24	2.556		
Attitudes towards Healthy Nutrition General Total		Single	87	67.19	6.907	1997.500	.185
		Married	53	67.13	9.315		
Physical Activity Habits General Total		Single	87	68.33	9.187	2001.000	.190
		Married	53	70.49	8.727		
Job Performance General Total		Single	87	4.06	.779	2197.500	.635
		Married	53	4.02	.852		
Total			140				

**; p<0.05, $\bar{x}$; mean, sd; standard deviation*

When Table 5 is examined, according to the marital status variable of the teachers participating in the study, there was a statistically significant difference between the groups in the positive nutrition and malnutrition scores from the sub-dimensions of attitudes towards healthy nutrition, while there was no statistically significant difference between the groups in the total score of physical activity habits and its sub-dimensions and total averages of work performance.

Table 6. Comparison of physical education and sports teachers' healthy nutrition, physical activity habits and job performance according to the location of the school where you work

	Sub-dimensions	School Location	N	$\bar{x}$	SD	U	P
Attitude Toward Healthy Eating Scale Sub-dimensions	Information About Nutrition	Center	96	21.66	3.298	1890.000	306
		District	44	20.40	4.938		
	Feeling Towards Nutrition	Center	96	17.16	3.640	2041.000	.749
		District	44	16.86	4.844		
	Positive Nutrition	Center	96	17.08	4.007	1833.500	.210
		District	44	16.09	4.180		
	Poor Nutrition	Center	96	12.07	4.314	2105.000	.975
		District	44	12.02	4.567		

**; p<0.05, $\bar{x}$; mean, sd; standard deviation*

Table 6. (Continue)

	Sub-dimensions	School Location	N	$\bar{x}$	SD	U	P
Physical Activity Habit Questionnaire Sub-dimensions	Job Related	Center	96	28.59	2.878	2093.500	.933
		District	44	28.75	2.870		
	Sports Related	Center	96	28.22	5.830	1938.000	.434
		District	44	28.93	5.575		
	Related to Free Time	Center	96	11.96	2.515	1918.500	.381
		District	44	12.25	2.497		
Attitudes towards Healthy Nutrition General Total		Center	96	67.98	7.153	1880.000	.297
		District	44	65.38	9.086		
Physical Activity Habits General Total		Center	96	68.79	9.201	1930.000	.414
		District	44	69.93	8.748		
Job Performance General Total		Center	96	4.10	.677	2001.500	.612
		District	44	3.91	1.027		
Total			140				

**; p<0.05, $\bar{x}$; mean, sd; standard deviation*

When Table 6 is examined, no statistically significant difference was found between the groups in the total score and sub-dimensions of attitude towards healthy nutrition, total score and sub-dimensions of physical activity habits and total averages of work performance according to the location of the school where the teachers participated in the study.

Table 7. Comparison of physical education and sports teachers' healthy nutrition, physical activity habits and job performance according to the variable "Is there a sports facility in the school where you work?"

	Sub-dimensions	Is there a sports facility in the school where you work?	N	$\bar{x}$	SD	U	P
Attitude Toward Healthy Eating Scale Sub-dimensions	Information About Nutrition	Yes	55	21.58	3.603	2230.000	.637
		No	85	21.07	4.110		
	Feeling Towards Nutrition	Yes	55	16.89	4.314	2269.000	.769
		No	85	17.18	3.877		
	Positive Nutrition	Yes	55	18.00	4.136	1717.000	.008**
		No	85	15.97	3.851		
	Poor Nutrition	Yes	55	11.96	4.654	2228.000	.639
		No	85	12.11	4.218		
Physical Activity Habit Questionnaire Sub-dimensions	Job Related	Yes	55	28.72	3.045	2333.500	.986
		No	85	28.58	2.761		
	Sports Related	Yes	55	28.63	5.926	2268.500	.768
		No	85	28.32	5.649		
	Related to Free Time	Yes	55	12.49	2.508	2054.500	.223
		No	85	11.77	2.475		
Attitudes towards Healthy Nutrition General Total		Yes	55	68.43	7.771	1982.000	.129
		No	85	66.35	7.875		
Physical Activity Habits General Total		Yes	55	69.85	9.546	2218.500	.611
		No	85	68.69	8.734		
Job Performance General Total		Yes	55	4.14	.690	2150.000	.413
		No	85	3.98	.869		
Total			140				

**; p<0.05, $\bar{x}$; mean, sd; standard deviation*

When Table 7 is examined, it is seen that there is a statistically significant difference between the groups only in positive nutrition scores among the sub-dimensions of attitudes towards healthy nutrition according to the variable 'Is there a sports facility in the school where you work?', and there is no statistically significant difference between the groups in the total mean scores of physical activity habits and sub-dimensions and total mean scores of work performance.

Table 8. Correlation analysis between physical education and sports teachers' attitudes towards healthy nutrition, physical activity habits and job performance levels.

		Job	Sports	Related to Free	Physical Activity Habits	Job
Information About Nutrition	r	.318	.158	.058	.206	.382
	p	.000***	.063	.498	.015*	.000***
	n	140	140	140	140	140
Feeling Towards Nutrition	r	-.048	-.031	-.021	-.060	.012
	p	.570	.719	.801	.480	.885
	n	140	140	140	140	140
Positive Nutrition	r	.260	.164	.105	.199	.235
	p	.002**	.053	.215	.018*	.005**
	n	140	140	140	140	140
Poor Nutrition	r	-.017	.236	.158	.172	-.179
	p	.841	.005**	.062	.042*	.035*
	n	140	140	140	140	140
Attitudes towards Healthy Nutrition General Total	r	.196	.277	.178	.259	.192
	p	.020*	.001***	.036*	.002**	.023*
	n	140	140	140	140	140

p<0.05, p<0.01**, p<0.001****

When Table 8 is analyzed, a statistically positive and significant relationship was found between the variables of knowledge about nutrition, which is one of the sub-dimensions of attitude towards healthy eating, and work-related (r=.31), total score of physical activity habit (r=.20) and work performance (r=.38), which are sub-dimensions of physical activity habit. A statistically positive and significant relationship was found between the positive nutrition dimension, which is one of the sub-dimensions of attitude towards healthy nutrition, and the variables related to work (r=.26), total score of physical activity habit (r=.19) and work performance (r=.23), which are sub-dimensions of physical activity habit. There was a statistically positive significant relationship between the malnutrition dimension, one of the sub-dimensions of attitudes towards healthy eating, and the variables related to sports (r=.23) and total score of physical activity habit (r=.17) among the sub-dimensions of physical activity habit, while a statistically negative significant relationship was found between work performance (r=-.17). A statistically positive and significant relationship was found between the total scores of attitude towards healthy nutrition and the variables of work-related (r=.19), sports-related (r=.27) and leisure-time-related (r=.27), physical activity habit total score (r=.25) and work performance (r=.19). A statistically positive and significant relationship was found between the total scores of work performance and the variables of work-related (r=.31), sports-related (r=.26), and leisure-time-related (r=.18) physical activity habits sub-dimensions and the total score of physical activity habits (r=.30).

Table 9. Regression analysis between physical education and sport teachers' attitudes towards healthy nutrition and job performance levels.

		Variables	Beta (ß)	S. Hata	*T*	*F*	*P*	R^2
Independent Variables	Attitudes Towards	ATHN»JP	.290	.008	3,561	12,678	.001***	.08
Dependent Variables	Job Performance							

*p<0.001****

When Table 9 is analyzed, when the results of the regression analysis conducted to determine the effect of teachers' attitudes towards healthy nutrition and job performance levels on each other are examined, it is determined that teachers' attitudes towards healthy nutrition affect their job performance at a low but positive level (R2=.08).

Table 10. Regression analysis between physical activity habits and job performance levels of physical education and sport teachers.

		Variables	Beta (ß)	S. Hata	*T*	*F*	*P*	R^2
Independent Variables	Physical Activity Habits	PAH»JP	.249	.007	3,016	9,095	.003**	.06
Dependent Variables	Job Performance							

p<0.01

When Table 10 is analysed, when the results of the regression analysis conducted to determine the effect of teachers' physical activity habits and job performance levels on each other are examined, it is found that teachers' physical activity habits affect their job performance at a low but positive level (R2=.06).

4. Discussion

This study was conducted to examine the effect of attitudes towards healthy nutrition and physical activity habits of physical education and sports teachers working in schools in the centre and districts of Bingöl Provincial Directorate of National Education on their job performance.

In the study (Table 2), when the sub-dimensions of the attitude towards healthy nutrition according to the gender variable of the physical education and sports teachers participating in the study were analysed, statistically significant differences were found between the groups among the scores of knowledge about nutrition, feelings towards nutrition and malnutrition, while no statistically significant differences were found between the groups among the total score of physical activity habit and its sub-dimensions and total averages of work performance. According to these findings, it was determined that male teachers had more knowledge about nutrition compared to female teachers, and female teachers enjoyed consuming ready-made and packaged products and unhealthy foods more and were happier. Regarding poor nutrition attitudes, it was concluded that female teachers had poor nutrition attitudes more than male teachers. It can be said that physical education and sports teachers' physical activity habits and work performance levels are similar in terms of gender variable. When the studies on healthy eating attitude according to gender variable in the literature are examined; Sargın & Güleşce (2022) concluded that male teachers had better nutritional knowledge in their study in which they examined teachers' attitudes towards healthy nutrition. Karataş (2021), Gündoğdu (2009) and Vançelik et al. (2007) concluded that the level of nutrition knowledge of female teachers was higher than male teachers. In addition, it is found that gender does not have a significant difference in the level of teachers' nutrition knowledge (Couture et al., 2015; Çongar & Özdemir 2004; Dursun, 2020; Özkan, 2021). When the studies on physical activity habits according to gender variable in the literature are examined; Santiago et al., (2012), Durukan et al., (2016), Tekkanat (2008) reported that the physical activity levels of physical education and sports teachers did not make a difference according to gender. In his study, Demir (2019) found that especially male teachers engaged in more (vigorous) physical activity than females, while Arabacı & Çankaya (2007), Tüzün (2021) and Özdöl et al. (2014) found that there were differences in the physical activity levels of physical education and sports teachers according to gender variable and that males had a higher physical activity level than females. When the studies on job performance according to gender variable in the literature are examined; there are studies in which there is no difference in the job performance levels of physical education and sports teachers according to gender variable (Şekertağ 2021; Arslan 2022; Büyükgöze & Özdemir 2017; Deniz & Demirdağ 2020; Eşsiz 2023).

According to the research findings (Table 3), when we examined the sub-dimensions of attitudes towards healthy eating according to the age variable of the physical education and sports teachers participating in the study, statistically significant differences were found between the groups in the total scores of positive nutrition, emotion towards nutrition and attitude towards healthy eating, while no statistically significant differences were found between the groups in the total score of physical activity habit and its sub-dimensions and in the total averages of work performance. According to these findings, it was concluded that positive nutrition attitude increased as the age level increased in the positive nutrition dimension, and the emotional state felt when consuming unhealthy products in the emotional

dimension towards nutrition tended to increase as the age level decreased. It can be said that physical education and sports teachers' physical activity habits and work performance levels are similar to each other in terms of age variable. When the studies on healthy nutrition according to age variable in the literature are examined, there are studies with similar or different results to our research. In the study of Dursun (2020), when the findings of the analysis of the nutritional knowledge level of physical education and sports teachers according to age distribution are examined, the mean rank of those aged 26-30 is 63.70, the mean rank of those aged 31-35 is 78.05, the mean rank of those aged 36-40 is 85.78, and the mean rank of those aged 41 and over is 76.50 and P<0.043. According to these results, the relationship between these variables is statistically significant. Karataş (2021) examined the healthy nutrition levels of individuals working in the field of sports according to their ages, and found a statistically significant difference in the malnutrition dimension under the healthy nutrition scale, and it was stated that this difference was due to the difference between the groups aged 18-22 years and 33-37 years. In addition, no statistically significant difference was found in the dimensions of knowledge about nutrition, feelings towards nutrition, positive nutrition and healthy eating general score. According to Gündoğdu (2009), it was observed that older teachers had higher average scores compared to younger teachers. In the study conducted by Sabbag (2003), it was stated that teachers between the ages of 30-39 had a good awareness of balanced nutrition. Sargın & Güleşce (2022) examined the attitudes of teachers working in Van province towards healthy nutrition and concluded that attitudes towards healthy nutrition increased with increasing age. Özkan (2021) reported that there was no significant difference between the scores of physical education and sports teachers from the eating attitude test according to age variable. When the studies on physical activity habits according to age variable in the literature are examined; Durukan et al. (2016), in a study in which physical activity levels of physical education and sports teachers were examined according to age variable, it was concluded that physical activity levels increased with increasing age, but this increase was not statistically significant. When Karataş (2021) examined the motivation levels of participation in physical activity according to the age of employees in the field of sports, no statistically significant difference was found according to the age variable. Arabacı & Çankaya (2007) stated that there was a positive relationship between physical activity and age in their study on physical education and sports teachers. They found that older people had higher physical activity levels than younger people. In a study conducted by Demir (2019), it was determined that age is an effective factor on physical activity level. A decrease in physical activity level is observed with increasing age. When the studies on job performance according to age variable in the literature are examined, Arslan (2022) reported that there was no statistically significant difference in the job performance levels of physical education and sports teachers according to age variable. In Erol (2022) study, it was determined that the mean job performance scores of amputee football referees did not differ significantly according to the age variable. In Eşsiz (2023) study, it was reported that the job performance levels of teachers did not show a significant difference according to age variable. In a study conducted by Karaçam & Adıgüzel (2019), a positive significant relationship was found between age and performance with basketball referees and it was stated that the performance of referees increased with the increase in their age. Koca & Yıldız (2018) stated that the job performance of football referees increased with increasing age and years of refereeing. It was stated that this situation can be explained by experience and it was emphasised that as the experience of the referees increases, their job performance also increases.

In the study (Table 5), according to the marital status variable of physical education and sports teachers, there was a statistically significant difference between the groups in the positive nutrition and malnutrition scores from the sub-dimensions of attitudes towards healthy nutrition, while there was no statistically significant difference between the groups in the total score of physical activity habits and its sub-dimensions and total averages of work performance. Accordingly, it can be said that single teachers have higher levels of positive nutrition attitudes than married teachers and married teachers have worse nutrition attitudes than single teachers. When the studies on healthy nutrition according to marital status variable are examined in the literature, there are studies with similar or different results to our research. Dursun (2020) and Özkan (2021) did not find a statistically significant difference in the healthy eating levels of physical education and sports teachers in terms of marital status variable. Karataş (2021) found that there was a statistically significant difference in the malnutrition dimension in his study in which the healthy nutrition levels of individuals working in the field of sports were examined according to the marital status variable. When the rank averages were taken into consideration, it was seen that the level of malnutrition of married people was higher, and it was stated that there was no significant difference in the general level of healthy eating and other sub-dimensions. Gündoğdu (2009) found that married people had higher mean scores than single people and concluded that the level

of knowledge of married people about nutrition was higher than single people. When the studies on physical activity habits according to marital status variable in the literature are examined; In the study conducted with the participation of physical education and sports teachers to examine physical activity levels, it was reported that marital status did not cause a statistical difference in physical activity levels (Durukan et al., 2016; Demir 2019). Karataş (2021) stated that there was no significant difference in the general score and sub-dimensions of participation in physical activity according to the marital status of sports employees. Arabacı & Çankaya (2007) found that physical education and sports teachers who were married had higher physical activity levels than those who were single. In his study, Tüzün (2021) found that the marital status variable caused a significant difference in physical activity levels. It was found that married participants had lower physical activity levels than single participants. When the studies on job performance according to marital status variable in the literature are examined, Şekertağ (2021) concluded that the job performance levels of physical education and sports teachers did not differ according to marital status variable and it was stated that the job performance levels of married and single teachers were similar. In his study, Eşsiz (2023) stated that the job performance levels of teachers did not show a significant difference according to the marital status variable. In a similar study, there was no significant difference between marital status and job performance (Koç et al., 2009). However, in other studies conducted for teachers, it was concluded that there were significant differences between marital status and job performance (Gede & Lawason 2011; Oselumese et al., 2016). Erol (2022), on the other hand, found that the mean job performance scores of amputee football referees did not differ significantly according to the marital status variable.

In the study (Table 4), no statistically significant difference was found between groups in terms of the total score and sub-dimensions of attitudes toward healthy eating, the total score and sub-dimensions of physical activity habits, and the overall job performance averages based on the length of service variable of physical education and sports teachers. Accordingly, it can be said that the length of service variable does not have an effect on the attitudes of physical education and sports teachers toward healthy eating, their physical activity habits, or their job performance. When examining studies in the literature on healthy eating based on the length of service variable, there are studies that have found similar or different results compared to our research. In their studies, Dursun (2020) and Özkan (2021) did not find a significant difference in the attitudes of physical education and sports teachers toward healthy eating based on their length of service. Similarly, in the study conducted by Corley et al. (1990) on university coaches' nutritional knowledge and dietary practices, no significant difference was found between nutritional knowledge and coaching experience duration. Gündoğdu (2009) and Eşsiz (2023) reported that teachers' job performance levels did not show a significant difference based on their professional working years. In the study conducted by Hacıbeyoğlu Ataünal (1976) with teachers, it was concluded that those with 21-30 years of professional experience provided the highest number of correct answers and that knowledge levels increased in parallel with professional experience. In the study by Smith-Rockwell et al. (2001), which evaluated the nutritional knowledge, opinions, and practices of university coaches and trainers, it was found that participants with 15 or more years of experience gave significantly more correct answers compared to coaches who had worked fewer years. When examining studies in the literature on physical activity habits based on the length of service variable, Durukan et al. (2016) found that as the working years of physical education and sports teachers increased, their physical activity levels also increased; however, this increase was not statistically significant. In a study conducted with the participation of physical education and sports teachers to examine physical activity and occupational burnout levels, it was reported that years of service did not create a significant difference in physical activity levels (Demir, 2019). In his study, Tüzün (2021) determined that there was a significant difference in the MET values of physical education and sports teachers according to years of seniority categories. According to this, teachers with more than 20 years of professional experience had higher MET values compared to teachers with 6-10 years and 11-15 years of seniority. When examining studies in the literature on job performance based on the length of service variable, Arslan (2022) did not find a statistically significant difference in the job performance levels of physical education and sports teachers according to their years of service. In their study, Büyükgöze & Özdemir (2017) stated that there was no differentiation in teachers' job performance based on their years of professional experience. In his research, Erol (2022) found that the average job performance scores of amputee football referees did not significantly differ according to the length of service variable. In their study, Deniz & Demirdağ (2020) reported that as professional working years increased, teacher performance decreased.

In the study (Table 6), no statistically significant difference was found between groups in terms of the total score and sub-dimensions of attitudes toward healthy eating, the total score and sub-dimensions of physical activity habits, and

the overall job performance averages based on the school location variable of physical education and sports teachers. Accordingly, it can be said that the school location variable does not have an effect on the attitudes of physical education and sports teachers toward healthy eating, their physical activity habits, or their job performance. When examining studies in the literature, no research has been found that evaluates teachers' attitudes toward healthy eating and job performance levels based on the school location variable. The results of our research will serve as a reference for future studies. Durukan et al. (2016) found a statistically significant difference when examining the physical activity levels of physical education and sports teachers based on the school location variable. It has been reported that this difference arises because teachers working in central areas have higher physical activity levels compared to those working in districts.

In the study (Table 7), a statistically significant difference was found between groups only in the positive nutrition scores, which is one of the sub-dimensions of attitudes toward healthy eating, based on the presence of a sports facility in the school where physical education and sports teachers work. However, no statistically significant difference was found between groups in terms of the total score and sub-dimensions of physical activity habits or the overall job performance averages. Based on these results, it was concluded that teachers working in schools with sports facilities have higher levels of positive nutrition attitudes. In the literature, it is mentioned that engaging in physical activity in public institutions can have a positive impact on job performance and that providing time and facilities for sports in public organizations could be beneficial for employees to exhibit higher job performance (Dere, 2022). When examining studies in the literature, no research has been found that evaluates teachers' attitudes toward healthy eating and job performance levels based on the presence of a sports facility in their school.

In the study (Table 8), correlation analyses were conducted to determine the effect of physical education and sports teachers' attitudes toward healthy eating and physical activity habits on job performance. The results showed a statistically significant positive correlation between the nutrition knowledge sub-dimension of attitudes toward healthy eating and the work-related sub-dimension of physical activity habits ($r = .31$), the total physical activity habit score ($r = .20$), and job performance ($r = .38$). A statistically significant positive correlation was also found between the positive nutrition sub-dimension of attitudes toward healthy eating and the work-related sub-dimension of physical activity habits ($r = .26$), the total physical activity habit score ($r = .19$), and job performance ($r = .23$). Additionally, a statistically significant positive correlation was observed between the poor nutrition sub-dimension of attitudes toward healthy eating and the sports-related sub-dimension of physical activity habits ($r = .23$) as well as the total physical activity habit score ($r = .17$). However, a statistically significant negative correlation was found between the poor nutrition sub-dimension and job performance ($r = - .17$). A statistically significant positive correlation was also found between the total scores of attitudes toward healthy eating and the work-related ($r = .19$), sports-related ($r = .27$), and leisure-related ($r = .27$) sub-dimensions of physical activity habits, as well as the total physical activity habit score ($r = .25$) and job performance ($r = .19$). Finally, a statistically significant positive correlation was observed between the total job performance scores and the work-related ($r = .31$), sports-related ($r = .26$), and leisure-related ($r = .18$) sub-dimensions of physical activity habits, as well as the total physical activity habit score ($r = .30$).

In the study (Table 9), regression analysis was conducted to determine the effect of physical education and sports teachers' attitudes toward healthy eating on their job performance levels. The results showed that teachers' attitudes toward healthy eating positively influenced their job performance ($R^2 = .08$) ($p < 0.001$). When examining the literature, another factor that is considered to have a direct or indirect impact on individuals' ability to engage in physical activity is their nutritional habits. It is evaluated that individuals' nutritional habits may have a significant effect on their physical activity levels and, consequently, on their job satisfaction and job performance levels (Dere, 2022).

In the study (Table 10), regression analysis was conducted to determine the effect of physical activity habits on job performance levels among physical education and sports teachers. The results indicated that teachers' physical activity habits positively influenced their job performance ($R^2 = .06$) ($p < 0.003$). When examining the literature, Kusan (2019) investigated the impact of physical activity levels on job performance among physical education and sports teachers working in public schools in Samsun. The study found that 50.98% of the participating teachers had a high level of physical activity, while 49.02% had a low level. It was also determined that there was a statistically significant difference in job performance median scores based on participants' physical activity levels, years of seniority, and fields of expertise. Accordingly, individuals with a high level of physical activity had significantly higher job performance

scores. Additionally, those with 6-10 years of seniority had significantly higher job performance median scores compared to those with 0-5 years of seniority. Furthermore, graduates from coaching programs had significantly lower job performance median scores compared to graduates from teaching and management programs. It has been reported that engaging in physical activity contributes to individuals' job performance (Can et al., 2014; Dere, 2022). Similarly, Dindar (2018) found in his study on sports employees that participation in sports activities positively affected quality of life and job performance, while non-participation had a negative impact. In the literature, no study has been found that simultaneously examines attitudes toward healthy eating, physical activity habits, and job performance. Additionally, no research has been identified that specifically associates attitudes toward healthy eating, physical activity habits, and job performance with physical education and sports teachers as a study group.

5. Conclusions

It has been concluded that positive attitudes of physical education and sports teachers toward healthy eating and physical activity habits can positively affect their job performance. This, in turn, may indirectly enhance other factors such as job efficiency, job motivation, and similar variables.

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Declaration of Data Availability: The data are publicly available.

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Research Article

Experiences And Challenges Faced by Students with Special Needs in Faculties of Sport Sciences

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Abstract: The aim of the present study is to investigate the experiences of students with special needs enrolled in faculties of sport sciences, to identify the challenges they encounter, and to offer potential solutions. This study employed a qualitative research design, specifically utilizing the phenomenological approach. n this study, the criterion sampling method—one of the purposive sampling techniques—was employed to identify participants. Research consists of 8 individuals with special needs. In order to collect data for the study, a semi-structured interview form consisting of five questions was administered to the participants. The data were analyzed using the content analysis method. The themes of "Impact of the Educational Experience in the FSS on Life", "Course Experiences and Pedagogical Barriers of Individuals with Special Needs", "Social and Academic Interactions of Individuals with Special Needs in the Faculty of Sport Sciences", "Challenges Encountered and Coping Strategies", "Suggestions for Improving University Life for Individuals with Special Needs" were determined. The findings suggest that while individuals with special needs studying in faculties of sport sciences gain a sense of achievement and perseverance, they face significant physical and systemic challenges, particularly in transportation, accessibility, classroom conditions, and learning materials.

Keywords: Disability, sports, special needs, university.

1. Introduction

Despite all the differences they may have, every individual strives to hold on to life. The competencies and limitations that may influence the entire course of their development play a significant role in shaping their lives—this is equally true for individuals with special needs (İlhan & Esentürk, 2014). The term individuals with special needs refers to those who undergo developmental stages that differ from individuals with typical development. These needs may arise due to various factors occurring before birth, during birth, or after birth (İlhan & Yarımkaya, 2022). Nevertheless, every individual bears the responsibility to contribute to society in their own unique way and to enhance their personal qualities. In this regard, society is also obliged to support and foster the development and transformation of individuals.

In our country, individuals with special needs frequently face various challenges in numerous areas such as education, socialization, employment, and accessibility (Sevinç & Çay, 2017). These individuals often experience significant difficulties in adapting to social life, forming social relationships, meeting their basic needs, managing daily routines, using transportation, operating vehicles, participating in sports activities, and engaging in educational processes (Artar & Karabacakoğlu, 2003). In this context, education encompasses all parameters that aim to elevate individuals to a more qualified and mature state, thereby giving their lives greater meaning. It serves as a guide for individuals to make sense of themselves and their environment, to become integrated into society, to adapt to the innovations of the modern era,

and to establish healthy communication (Gün, 2015). From this perspective, education functions as a means for individuals with special needs to develop themselves and enhance their overall competencies.

Universities are institutions entrusted with the mission of supporting individuals' development and progress. They encompass both typically developing individuals and those with special needs, playing a pivotal role in shaping their future. However, unfortunately, students with special needs may encounter significant challenges within educational processes, particularly in social, environmental, and emotional dimensions. Nevertheless, the educational journey of individuals with special needs is even more vital compared to their typically developing peers. The inclusion of these individuals in educational settings is essential for minimizing the negative effects stemming from their limitations, recognizing and developing their abilities, and enhancing their level of knowledge. In fact, the number of studies focusing on individuals with special needs has been steadily increasing (Daşkesen et al., 2024; Fakazlı et al., 2021; Kozak et al., 2019; Uzunçayır et al., 2023; Yarayan et al., 2023). Furthermore, such educational environments contribute to social integration by fostering individuals' perception of inclusion in society, which in turn promotes a sense of life acceptance and enhances overall well-being (Sevinç & Çay, 2017). Therefore, one of the most critical conditions for enabling individuals with special needs to participate in society is ensuring full accessibility to educational institutions in every aspect. These environments should be designed in a way that allows individuals with special needs to feel safe and comfortable, both physically and psychologically (Hacıhasanoğlu, 2003).

Of course, the process is not limited to spatial accessibility alone. Ensuring equal opportunities in education, allowing every individual to experience the learning process fairly and equitably, addressing the specific needs of individuals with special needs without neglect by society (Zhang et al., 2020), and preventing negative attitudes such as exclusion, pity, or stigmatization are also critical components. In this context, it has been observed that the fundamental needs and challenges faced by students with special needs enrolled in universities are often similar. These students frequently encounter difficulties related to planning, curriculum, accessibility, transportation, social environments, and the attitudes and approaches of society throughout their university education (Mengi, 2014). A few common examples include the lack of appropriate ramps for individuals using wheelchairs, the inaccessibility of toilets and showers, the absence of instructional materials designed specifically for their needs, the failure to adapt campus facilities to accommodate individuals with disabilities, the non-ergonomic design of sports equipment, uneven or damaged sidewalks, and the insufficiency of elevators (Lape et al., 2018; Urbański et al., 2021).

Particularly in faculties of sport sciences—where facilities are generally more numerous compared to other faculties—students with special needs face various challenges. These include insufficient guidance within faculty buildings and sports facilities, lack of instructional materials adapted for students with special needs, difficulty accessing faculty offices and classrooms, poor road conditions, inadequate desk space in classrooms for writing, desks that are not accessible for wheelchairs, difficulties in reaching sports halls, the absence of braille signage, and limited access to essential facilities such as cafeterias, changing rooms, and dining halls. Moreover, the lack of designated staff to assist students with special needs further complicates their experience (Aydın, 2012; Burcu, 2002; Esatbeyoğlu, 2014; Martin, 2011; Yılmaz et al., 2021). In addition to these physical barriers, unfortunately, students with special needs may also face exclusion, marginalization, and a lack of peer support. All these parameters can leave lasting negative impressions on these students, potentially reducing their quality of life and leading to avoidance behaviors in the long term (Çınar, 2010; Gurgis et al., 2022; Kang et al., 2007; Sevinç & Çay, 2017; Wilson, 2010). Nonetheless, universities are among the most effective environments not only for academic development but also for enabling individuals with special needs to socialize and integrate into society. Therefore, it is crucial to examine the current issues they face and to propose viable solutions. Based on this perspective, the aim of the present study is to investigate the experiences of students with special needs enrolled in faculties of sport sciences, to identify the challenges they encounter, and to offer potential solutions.

2. Materials and Methods

2.1. Research Group

This study employed a qualitative research design, specifically utilizing the phenomenological approach. The phenomenological design is a qualitative research method used to explore the shared meanings of individuals'

experiences related to a particular phenomenon—how they understand, perceive, judge, and feel about it. This approach aims to comprehend and uncover social reality by examining individuals' lived experiences (Creswell, 2014).

2.2. Research Design

This study employed a quantitative research design utilizing the descriptive survey method. The survey method is defined as an approach that explains a past or current situation as it exists (Büyüköztürk, 2018). In the descriptive research process, the stages of determining the research problem and objectives, defining the variables, selecting the sample, collecting data, and analyzing the data are carried out systematically. In this study, an attempt was made to reveal whether the self-efficacy levels of different sports branch referees show differences according to the variables of gender, age, previous playing status in the branch of the referee, sport branch and years of being a referee.

Table 1. Demographic Information of the Participants

No	Participant Cosw	Gender	Type of Disability	Age	Duration of Disability (Years)	Sport Discipline	Department
1	Ö1	Male	Physical and visual	20	8	Bocce	Coaching
2	Ö2	Male	Physical	22	Since birth	Amputee Football	Coaching
3	Ö3	Male	Physical	22	Since birth	Amputee Football	Physical Education and Sport
4	Ö4	Male	Visual	24	19	Goalball,	Recreation
5	Ö5	Female	Hearing	20	17	Taekwondo	Coaching
6	Ö6	Male	Physical	19	Since birth	Amputee Football	Coaching
7	Ö7	Female	Visual	21	21	Taekwondo	Sports Management
8	Ö8	Female	Hearing	21	21	Karate	Physical Education and Sport

2.3. Data Collection

In order to collect data for the study, a semi-structured interview form consisting of five questions was administered to the participants. The interview questions were developed based on a review of the relevant literature. The draft version of the form was then reviewed by an assessment and evaluation specialist, a special education expert, and an academician. Based on their feedback, necessary revisions were made.

To enhance the validity of the interview form, a pilot study was conducted with three students with special needs. Following the pilot interviews, questions that were not clearly understood were revised, and the form was finalized after obtaining additional expert opinions. The questions included in the semi-structured interview form are presented below:

- How does studying at the Faculty of Sport Sciences make you feel?
- What are your experiences regarding theoretical and practical courses? What kinds of challenges do you encounter?
- What are your thoughts on your social and academic communication within the faculty?
- What kinds of difficulties do you face in your faculty? What coping strategies do you use?
- What are your opinions and suggestions for improving your educational experience?

The data were collected through face-to-face interviews. A semi-structured interview form developed by the researchers was used to facilitate data collection. Prior to the interviews, participants were informed about the purpose of the study. Interviews were conducted at dates and times convenient for the participants who agreed to take part in the study. With their consent, the interviews were audio-recorded after necessary explanations were provided. All interviews took place in safe, private settings where participants could feel comfortable and where no third parties were present.

2.4. Data Analysis

The data were analyzed using the content analysis method. Content analysis involves organizing and interpreting similar data under certain concepts and themes, presenting the results in a way that is clear and understandable to readers (Yıldırım & Şimşek, 2013). This method was chosen because it allows for the establishment of conceptual connections between the collected data and the research objectives (Büyüköztürk, 2013).

In this study, content analysis was carried out in the following stages: coding the data, identifying themes, organizing codes and themes, describing the findings, and interpreting them (Yıldırım & Şimşek, 2006). First, the audio recordings obtained from the interviews were transcribed. Participants were coded as Ö1, Ö2, Ö3, Ö4, Ö5, Ö6, Ö7, and Ö8. The resulting data were analyzed and presented in tables based on identified themes and codes. The findings were interpreted and supported with direct quotations from the participants. To ensure the reliability of the research, the formula proposed by Miles and Huberman (1994) was used: Reliability = Agreement / (Agreement + Disagreement) × 100 As a result, the reliability of the analysis was calculated as 82%.

2.5. Ethics Committee Permission

Ethical approval for this study was obtained from the Ethics Committee of Social and Human Sciences at Bartın University with the protocol number 2025-SBB-0062, dated January 29, 2025. Participation in the study was based on voluntary consent, and all ethical principles and guidelines were strictly followed throughout the research process. Before data collection, participants were thoroughly informed about the study through a detailed presentation and subsequently provided written consent. The research was carried out in accordance with the ethical guidelines of the Declaration of Helsinki.

3. Results

In this section of the study, the findings obtained from the analysis of the views of individuals with special needs (ISNs) regarding their educational experiences in the Faculty of Sport Sciences (FSS) are presented and interpreted under relevant themes.

Table 2. Feelings and Perceptions of Individuals with Special Needs Regarding Their Educational Experience in the Faculty of Sport Sciences

Theme	Sub-theme	Code	Participant(s)
Impact of the educational process in FSS on life	Personal development	Life satisfaction	Ö3 Ö5 Ö6 Ö7 Ö8
		Spirit of perseverance	Ö1 Ö2 Ö6 Ö7
		Personal transformation	Ö1 Ö2
		Healthy lifestyle	Ö2
		Socialization	Ö1
	Professional development and attitude	Sense of professional belonging	Ö3 Ö5
		Learning motivation	Ö8
		Contribution to subject knowledge	Ö3
	Negative experiences	Difficulty and stress	Ö4

As shown in Table 2, the theme titled "Impact of the Educational Experience in the FSS on Life" was derived from the views of individuals with special needs (ISNs), along with three related sub-themes: personal development, professional development and attitude, and negative experiences. Within the personal development sub-theme, participants expressed that studying in the Faculty of Sport Sciences (FSS) contributed to their life satisfaction, fostered a spirit of perseverance, supported personal transformation, promoted a healthy lifestyle, and enhanced opportunities for socialization and forming social circles. Under the sub-theme of professional development and attitude, participants shared that pursuing education in the FSS helped them develop a sense of professional belonging, increased their learning motivation, and despite their disabilities, participating in practical courses contributed positively to their subject knowledge. Regarding the negative experiences sub-theme, only one participant reported experiencing stress and difficulty during their educational process in the FSS. Some noteworthy statements from ISNs regarding this theme are as follows:

"I am making an effort for myself, and I have a goal. Right now, I think I'm progressing well toward that goal."
— Ö6 (Life Satisfaction)
"Studying at the FSS makes me feel like I can hear everything. I push my mental limits by overcoming barriers. This empowers me. I don't just see—I feel."
— Ö7 (Spirit of Perseverance)
"By engaging in sports at the FSS, I am broadening my perspective."
— Ö2 (Personal Transformation)

"Because I have a physical disability, doing sports helps me significantly improve my health."
— Ö2 (Healthy Lifestyle)
"Also, since I haven't given up on life despite my disability, doing sports helps me shift my outlook."
— Ö2 (Spirit of Perseverance)
"Studying in the Faculty of Sport Sciences changed everything in my life—socially and in terms of my environment. I've become more social."
— Ö1 (Socialization / Personal Transformation)
"It was a department I liked. It was a discipline I loved. I love sports. That's why I chose to study physical education teaching."
— Ö3 (Sense of Professional Belonging)
"Being in the FSS is very exciting. What I learn in classes contributes a lot to me. Developing in this field is very enjoyable."
— Ö8 (Learning Motivation)
"In practical courses, they had me perform all of the exercises. I'm happy about that because I'm going to be teaching this sport, and if I hadn't done it myself, I wouldn't be able to demonstrate it to children."
— Ö3 (Contribution to Subject Knowledge)
"Normally, it's good, but due to limited facilities, there are times I feel tense and stressed."
— Ö4 (Difficulty and Stress)

Table 3. Experiences of Individuals with Special Needs in Course Processes and the Pedagogical Barriers They Encounter in the Faculty of Sport Sciences

Theme	Sub-theme	Code	Participant(s)
Experiences and pedagogical barriers in course processes	Practical course experiences	Difficulty in active participation	Ö1 Ö2 Ö4 Ö5 Ö6 Ö7 Ö8
		Need for support or assistance	Ö4 Ö5 Ö7 Ö8
	Theoretical course experiences	Communication problems	Ö2 Ö3 Ö5
		Perception of courses as rote learning	Ö3
	Educational exclusion	Lack of inclusive teaching	Ö2 Ö4 Ö5 Ö7
		Intensity of the course schedule	Ö1
		Non-inclusive assessment and evaluation	Ö1

As shown in Table 3, the theme *"Course Experiences and Pedagogical Barriers of Individuals with Special Needs"* was identified based on participants' views. This theme includes three related sub-themes: *practical course experiences*, *theoretical course experiences*, and *educational exclusion*. Within the *practical course experiences* sub-theme, participants reported difficulties in actively participating in practical courses and expressed a need for additional support and assistance during these sessions. In the *theoretical course experiences* sub-theme, some participants stated that, similar to practical courses, they experienced barriers to active participation in theoretical courses due to their disabilities. Additionally, issues related to communication, either stemming from their disability or from a lack of awareness on the part of instructors, were also highlighted. The final sub-theme under this category, *educational exclusion*, includes codes related to a lack of inclusive teaching practices by faculty members, challenges posed by course schedules that do not consider the needs of students with disabilities, and non-inclusive assessment and evaluation methods. Some of the notable statements by individuals with special needs regarding this theme are as follows:

"I struggle physically—some practical exercises are difficult for me to perform."
— Ö1 (Difficulty in Active Participation)
"I have a hearing impairment, and during practical courses like athletics, I find it difficult to follow when I am far from the instructor or classmates."
— Ö5 (Difficulty in Active Participation)
"Although I have low vision, I still struggle in practical classes. But there are also students who are completely blind. There should be an additional teacher or student assigned to support us."
— Ö4 (Difficulty in Active Participation / Need for Support or Assistance)
"Teachers should provide more explanations and offer more help to students."
— Ö8 (Need for Support or Assistance)
"When my hearing is at its lowest, I can't understand well. And with some instructors, it becomes impossible. I usually try to sit in the front rows, and my right ear has zero hearing. I can only hear from the left, so I position myself so that the entire class is to my right side."

— Ö5 (Communication Problems)
"I've never liked theoretical courses that rely solely on rote memorization."
— Ö3 (Perception of Courses as Rote Learning)
"I really wish instructors understood the capacities of students with disabilities."
— Ö2 (Lack of Inclusive Teaching)
"In communication with instructors, I'm often faced with questions like how to access visual materials or how to make course content more accessible."
— Ö7 (Lack of Inclusive Teaching)
"There are too many overlapping courses. Going directly from one class to another is difficult. There's no break; when courses are scheduled back-to-back, it becomes overwhelming."
— Ö1 (Intensity of the Course Schedule)
"Let me put it this way—I have 51% visual impairment. During exams, I have the font size increased and request about 15 extra minutes so I can fully comprehend the questions."
— Ö1 (Non-Inclusive Assessment and Evaluation)

Table 4. Thoughts and Experiences of Individuals with Special Needs Resulting from Their Interactions with Others in the Faculty of Sport Sciences

Theme	Sub-theme	Code	Participant(s)
Social and Academic Interactions of Individuals with Special Needs in the Faculty of Sport Sciences	Academic Staff Approach and Competence	Positive Interaction	Ö1 Ö6 Ö7 Ö8
		Supportive Approach	Ö8
		Being Sensitive	Ö5
	Attitudes of Academic Staff and Communication Problems	Experiencing Communication Problems	Ö3 Ö5
		Lack of Inclusivity	Ö2 Ö4
		Indifference	Ö2 Ö4
		Lack of Awareness	Ö5
	Peer Interaction and Support	Positive Interaction	Ö3 Ö7 Ö8
		Support and Helpfulness	Ö4 Ö7 Ö8
		Shared Vision Through Common Experience	Ö1 Ö7
		Sport Discipline	Ö4
		Respect	Ö4
	Negative Peer Attitudes	Lack of Awareness	Ö2 Ö5
		Cognitive Dissonance	Ö2

As shown in Table 4, based on the views of individuals with special needs, the theme titled "Social and Academic Interactions of Individuals with Special Needs in the Faculty of Sport Sciences" was identified. This theme includes two sub-themes related to academic staff—academic staff approach and competence and attitudes of academic staff and communication problems—as well as two sub-themes related to peers: peer interaction and support and negative peer attitudes. In the sub-theme of academic staff approach and competence, participants reported that academic staff generally established positive interactions with them, exhibited supportive behaviors, and acted sensitively in response to their disabilities. On the other hand, in the sub-theme attitudes of academic staff and communication problems, participants noted that they experienced communication difficulties with instructors, that instructors lacked an inclusive pedagogical approach, and were often indifferent to students' disabilities. It was also noted that many instructors were unaware of the presence of students with disabilities in their classes beforehand, which led to a general lack of awareness among the faculty members. Within the peer interaction and support sub-theme, participants stated that they experienced positive interactions with their peers throughout their undergraduate education. They often received support and help from peers, made collaborative plans with them, and shared a common vision. One participant also noted that peers within the faculty had a strong sense of sports discipline and mutual respect, which helped foster reciprocal respect in social interactions.

In the negative peer attitudes sub-theme, similar to the findings related to academic staff, participants mentioned that their peers were often unaware of their disabilities beforehand, which they perceived as a drawback. Additionally, it was reported that while people generally expect non-disabled individuals to succeed, they were criticized for achieving success despite their disabilities. This situation was identified in the study findings as an example of cognitive dissonance. Some of the notable statements by individuals with special needs regarding this theme are as follows:

"I never have any issues with the faculty members at school. When I do, I send them an email. If I can't send an email, I go to their office when I'm on campus and explain my excuse in person."
— Ö1 (Positive Interaction)
"Instructors often ask questions about how to make the lessons more accessible. I have good communication with them, and it's easy to get their support."
— Ö8 (Supportive Approach)
"I wasn't able to establish communication with the instructor."
— Ö3 (Experiencing Communication Problems)
"I told my instructor that I couldn't hear and that I pretended to understand and continued. The instructor asked why I pretended. I said I didn't want to keep asking because I was hesitant. But after the instructor showed sensitivity, I no longer hesitate—I ask questions, and they respond with understanding."
— Ö5 (Initial Lack of Awareness → Being Sensitive After Realization)
"Some instructors treat students with disabilities just like students without disabilities."
— Ö4 (Lack of Inclusivity)
"They have to practice at least some degree of positive discrimination because we have a special condition. They are educators, not guards or watchmen—they must help us."
— Ö2 (Indifference)
"I have never experienced any bullying from my peers due to my disability."
— Ö3 (Positive Interaction)
"These experiences strengthen our communication and allow us to work more harmoniously toward a shared goal."
— Ö7 (Shared Vision Through Common Experience)
"My peers are very helpful. Thanks to them, I can understand the lessons much better."
— Ö8 (Support and Helpfulness)
"Since they are athletes themselves, my peers are usually respectful and disciplined. I respect them too. I've never had any issues at school."
— Ö4 (Sport Discipline / Respect)
"In the beginning, my classmates didn't know me or my disability. I always leaned to the left due to my condition, and they thought I was ignoring them when they called out to me. They even said they found me annoying at first. Later, when we talked about it, they realized it wasn't intentional—it was because I couldn't hear them. That's when things changed."
— Ö5 (Lack of Awareness)
"I play amputee football, so some of my teammates have no leg, and I have no hand—but we never give up and we play for the national team. But my peers without disabilities give up easily because they're lazy or unmotivated. It really upsets me. It should actually be the opposite—I'm a person with a disability, so I should be the one to give up easily. I already carry the psychological weight of starting 1–0 behind in life. It's frustrating to see my peers give up when I keep pushing forward."
— Ö2 (Cognitive Dissonance)

Table 5. Challenges Faced by Individuals with Special Needs and Their Coping Strategies

Theme	Sub-theme	Code	Theme
Challenges Encountered and Coping Strategies	Accessible Campus	On- and Off-Campus Transportation	Ö1 Ö4 Ö6 Ö8
		Lack of Braille Signage	Ö4 Ö7
		Accessible Communication for Individuals with Hearing Impairments	Ö5 Ö8
		Issues with Tactile Ground Surface Indicators	Ö4
		Lack of Audio Guidance and Signage	Ö7
		Elevator Accessibility Problems	Ö6
		Slippery Surfaces	Ö4
	Coping with Challenges	Motivational Support from Social Environment	Ö1 Ö2 Ö3 Ö7 Ö8
		Self-Efficacy Skills	Ö2 Ö3 Ö5 Ö6 Ö7
		Support from Academic Staff and Peers	Ö2 Ö5 Ö8
		Experience	Ö6
		Navigating Bureaucratic Procedures	Ö4

As shown in Table 5, the theme titled "Challenges Encountered and Coping Strategies" was developed based on the views of individuals with special needs. Two sub-themes were identified under this theme: accessible campus and coping with challenges.

Within the accessible campus sub-theme, participants reported several accessibility-related difficulties. These included the unavailability of suitable transportation or shuttle services for individuals with disabilities, inadequate on-campus mobility infrastructure, lack of tactile paving (e.g., yellow embossed walking paths for the visually impaired), insufficient Braille signage, limited accessible communication tools for individuals with hearing impairments, absence of audio guidance and clear visual signage, malfunctioning elevators designed for accessibility, and slippery floor surfaces.

In the coping with challenges sub-theme, participants stated that they overcame these difficulties with the help of motivational support from their social environment, their own self-efficacy skills, and support from academic staff and peers. Moreover, they emphasized that the experiences gained while facing such challenges also played a significant role in developing coping mechanisms. Another coping strategy frequently mentioned was the use of bureaucratic procedures, such as filing formal petitions or complaints, to address problems and advocate for solutions. Some of the notable statements from individuals with special needs regarding this theme are presented below:

"My main problem is that the school is far from my home. When classes start at 8:30 or 9:00 in the morning, I struggle to get there on time since I rely on the bus. While this is a valid excuse for me, it's not always considered acceptable by instructors, which causes difficulties."
— Ö1 (On- and Off-Campus Transportation)
"Some instructors have their nameplates above the door, instead of at eye level. This makes it difficult for me to see. There should be tactile writing (not necessarily Braille), but because it's missing, students who are completely blind can't find out where the instructor's office is."
— Ö4 (Lack of Braille Signage)
"Some of our instructors speak very softly—so softly that even my classmates say they have trouble hearing them. When my hearing is at its lowest, I just can't understand. I usually try to sit in the front. My right ear has zero hearing, so I position myself so the entire class is on my left side where I can hear better."
— Ö5 (Accessible Communication for Individuals with Hearing Impairments)
"There are yellow tactile guide paths for the visually impaired, but many of them are either missing or incorrectly installed."
— Ö4 (Issues with Tactile Ground Surface Indicators)
"The biggest physical challenge at school is that some campus routes are complex, and some areas are not accessible for people with disabilities. It's especially difficult to navigate because the auditory and visual signs and directions aren't helpful to me."
— Ö7 (Lack of Audio Guidance and Signage)
"Once the elevators were out of service—that was my only major issue at the time."
— Ö6 (Elevator Accessibility Problems)
"Some of the pathways inside the campus are slippery or cut off before reaching the destination, which is a problem for visually impaired individuals."
— Ö4 (Slippery Surfaces)
"I ask people around me. I get support from my social environment."
— Ö3 (Motivational Support from Social Environment)
"I always try to stay motivated and see obstacles as opportunities. I try to treat every situation as a learning experience."
— Ö7 (Self-Efficacy Skills)
"To cope with difficulties, I seek help from both instructors and friends."
— Ö8 (Support from Academic Staff and Peers)
"First I go through the difficulty, and then I try to face it and turn it into something manageable."
— Ö6 (Experience-Based Learning)
"If necessary, I inform the rector, the dean, or the department head through formal petitions. I also ask for support from instructors I feel comfortable with."
— Ö4 (Navigating Bureaucratic Procedures)

As shown in Table 6, based on the views of individuals with special needs, the theme "Suggestions for Improving University Life for Individuals with Special Needs" was identified. Three related sub-themes emerged: academic inclusivity, social support, and accessible campus. Under the academic inclusivity sub-theme, participants suggested that academic staff should receive further training in special education. They emphasized the need for instructors to adopt inclusive practices in teaching, assessment, and content development, ensuring that students with disabilities are

considered in curriculum design, instructional delivery, and exam formats. In the social support sub-theme, participants proposed that information regarding students' disabilities should be shared with instructors and classmates at the beginning of the academic year to promote awareness.

Table 6. Opinions and Suggestions of Individuals with Special Needs for Improving University Life

Theme	Sub-theme	Code	Theme
Suggestions of Individuals with Special Needs for Improving University Life	Academic Inclusivity	Competent and Inclusive Academic Staff	Ö2 Ö4 Ö7 Ö8
		Inclusive Curriculum, Content, and Assessment Practices	Ö1 Ö7 Ö8
	Social Support	Confidential Disclosure and Awareness	Ö4 Ö5
		Peer Support	Ö7
		Empathy	Ö3
		Academic Coaching and Mentoring	Ö5
	Accessible Campus	Accessible Campus Practices	Ö6 Ö7 Ö8

They also highlighted the importance of receiving more peer support, fostering empathy among those around them, and expanding academic coaching and mentoring programs specifically tailored to students with disabilities at universities. Finally, under the *accessible campus* sub-theme, participants recommended implementing various practical improvements to facilitate the daily lives of students with disabilities—such as accessible transportation, enhanced signage, and support services designed to promote independence and inclusion. Some of the notable suggestions from individuals with special needs regarding this theme are as follows:

"Some instructors try to treat students with disabilities like everyone else—as best as they can—but we still need a bit of positive discrimination. They should be inclusive educators, not act like guards or gatekeepers."
— Ö4 (Competent and Inclusive Academic Staff)
"I really wish our instructors understood the capacities of students with disabilities. If they reassured us a bit and showed some trust, there would be no problems."
— Ö7 (Competent and Inclusive Academic Staff)
"There are too many overlapping courses at the university. You leave one class and go straight into another without any break. When courses are scheduled back-to-back like that, it gets overwhelming. We can't keep up like students without disabilities."
— Ö1 (Inclusive Curriculum and Course Content)
"Instructors should provide more course materials in both audio and written formats so that all students can participate more equally in class."
— Ö7 (Inclusive Curriculum and Course Content / Competent and Inclusive Academic Staff)
"Instructors should offer us more audio and written materials."
— Ö8 (Inclusive Curriculum and Course Content)
"I don't want to be the one to inform every instructor about my disability. Instead, I suggest that the department head notify instructors in a sealed envelope and request necessary adjustments. Sure, I can tell a teacher I have a visual impairment, but a student who doesn't want to say it should still have the instructor informed beforehand. It would be easier for me too if the instructor came prepared."
— Ö4 (Confidential Disclosure / Awareness)
"Strengthening peer support systems is important."
— Ö7 (Peer Support)
"The instructor's attitude toward the student should be thoughtful. You really need to have experienced something similar yourself to understand. If you haven't lived it, you can't truly understand what a student with a disability is going through."
— Ö3 (Empathy)
"Someone going to university for the first time wouldn't even know how to be exempt from an English course. An advisor should meet with students, especially based on the number of hearing-impaired students in the class and explain clearly: 'You're exempt from this course, you can replace it with another one.' This kind of information must be provided."
— Ö5 (Academic Coaching / Mentoring)
"To improve the process, the first thing needed is to increase accessibility on campus."
— Ö7 (Accessible Campus Practices)
"The campus should be more accessible."
— Ö8 (Accessible Campus Practices)

4. Discussion

This study was conducted to explore the challenges, experiences, and suggestions of individuals with special needs (ISNs) enrolled in faculties of sport sciences. The prerequisite for the social inclusion and integration of individuals with disabilities is, in essence, the development of an "accessible living" mindset. This refers to eliminating the barriers that hinder the integration of ISNs into society in every aspect of life. Within this framework, eight individuals (five male, three female) with various disabilities participated in the study. These participants had physical, visual, or hearing impairments and were enrolled in different departments of the faculty of sport sciences, including coaching, physical education and sports, recreation, and sports management. While three of the participants had congenital disabilities, five acquired their disabilities later in life. Participants represented various age groups and were active in sports such as bocce, goalball, amputee football, taekwondo, and karate.

When participants responded to the question "How does studying in the faculty of sport sciences make you feel?", the overarching theme "Impact of Educational Experience in the Faculty of Sport Sciences on Life" emerged, along with the sub-themes personal development, professional development and attitude, and negative experiences. Participants expressed that studying in the faculty gave them a sense of life satisfaction, strengthened their perseverance, supported their personal transformation, helped develop a healthy lifestyle, and enabled them to build a social network. They also reported feeling a sense of belonging and progress in their professional knowledge and skills. As evidenced in participant narratives, studying in the faculty of sport sciences fostered a strong sense of resilience and inner strength. For instance, one participant shared: "Studying in the faculty feels like hearing everything around me. I push my mental limits by overcoming obstacles. It empowers me. I don't just see—I feel." (P7 – Perseverance). Despite these positive emotions, participants also reported occasional stress, particularly linked to the inadequacy of existing campus facilities (P4). It is evident that lack of physical accessibility and societal attitudes toward disability can contribute to emotional strain. Inadequate infrastructure and limited interaction with the broader student body can negatively affect emotional well-being (Mengi, 2019). Equal access to education for ISNs, just as for their typically developing peers, is essential to reduce such stressors. Sevinç and Çay (2017) also reported that the lack of adequate facilities during university education had a negative impact on students with disabilities. Similarly, Mengi (2019) emphasized that insufficient facilities led to stress and feelings of exclusion among disabled students.

Participants' responses to the question "What are your experiences with theoretical and practical courses, and what challenges do you face?" revealed the theme "Course Experiences and Pedagogical Barriers", with sub-themes including practical course experiences, theoretical course experiences, and educational exclusion. Findings indicated that participants experienced difficulties in participating in practical sessions, required additional support, and struggled with communication in some learning environments. They expressed that their needs were often overlooked in course planning and assessment processes, highlighting a lack of inclusivity. For example, one participant stated: "Although I have low vision, I still struggle in practical classes. And there are students who are completely blind—an additional instructor or assistant should be assigned to help us." (P4 – Need for Assistance). Sarıkaya and Börekçi (2016) found similar results, noting that educational adaptations and teaching resources often failed to accommodate students with special needs, with faculty members lacking sufficient preparation. This is echoed in other studies (Jangra et al., 2007; Kalia et al., 2010; Montarzino et al., 2007). Therefore, it is crucial to increase the sensitivity and pedagogical competencies of faculty members, particularly through adaptive physical education courses and disability-awareness training across all levels of education (Kaygısız et al., 2011; Tekin, 2019).

When asked about their experiences and thoughts regarding interactions with others in the university environment, participants revealed the theme "Social and Academic Interactions in the Faculty of Sport Sciences". Two sub-themes related to academic staff—approach and competence and attitudes and communication problems—were identified, as well as two sub-themes concerning peers: peer interaction and support and negative peer attitudes. While participants reported receiving support and maintaining positive communication with academic staff, they also noted that instructors often lacked inclusive pedagogical practices and awareness about disability issues. This aligns with findings by Dökmen and Kışlak (2004), who emphasize the importance of instructors' adaptation skills, classroom management, professional knowledge, and pedagogical approaches. Regarding peer interactions, participants similarly reported both supportive and challenging experiences. Some felt that their peers lacked awareness of disability-related issues. Numerous studies support the claim that societal awareness of disability remains limited (Marston & Golledge, 2003;

McAlliste & Gray, 2007). Burcu (2002) also noted that individuals with special needs may encounter difficulties with peer acceptance and communication. Therefore, increasing inclusive environments within and beyond the classroom is essential to improving peer relationships (Pištav Akmeşe & Kayhan, 2020).

Responses to the question "What challenges do you face at your university?" revealed the theme “Challenges Encountered and Coping Strategies”, with sub-themes accessible campus and coping with challenges. This was the most frequently reported area of difficulty. Participants highlighted issues such as inadequate campus transportation, missing or improperly constructed tactile ground surfaces, insufficient Braille signage, and a lack of audio and visual guidance. One participant noted: "Some instructors’ names are not posted at eye level, but rather above the door. This makes it difficult for visually impaired students. There should be tactile writing, but since it’s missing, blind students cannot locate instructors’ offices." (P4 – Braille Signage Issue). Although participants received support from peers and faculty, they still felt the negative impact of these physical and systemic barriers (Sevinç & Çay, 2017). Sarı (2005) reported similar findings, emphasizing the steepness of ramps, inaccessible classrooms, and inadequate restroom facilities as key challenges for students with disabilities.

When asked "What would you suggest to improve the process?", participants proposed solutions under the theme “Suggestions for Improving University Life”, including the sub-themes academic inclusivity, social support, and accessible campus. They called for increased competence among academic staff in addressing the needs of students with disabilities, particularly in assessment, classroom management, and course content design. Participants emphasized that instructors should be educated about how to plan inclusive teaching strategies. They also recommended that peers adopt more empathetic attitudes and that universities develop structured mentoring systems to support students with disabilities. Most importantly, participants expressed a strong need for accessible campuses and classrooms, and for practical implementations that support daily life. These results are consistent with Erkal and Şahin (2012), who found that universal accessibility was one of the most emphasized needs in educational settings for individuals with disabilities.

5. Conclusions

In conclusion, the findings suggest that while individuals with special needs studying in faculties of sport sciences gain a sense of achievement and perseverance, they face significant physical and systemic challenges, particularly in transportation, accessibility, classroom conditions, and learning materials. Although they receive occasional support from peers and faculty, participants noted that the academic staff often lack sufficient knowledge and awareness of inclusive education practices. Peer support was also found to be limited due to low levels of disability awareness. Participants identified social support and personal motivation as primary coping mechanisms and recommended awareness-raising initiatives to improve inclusivity in higher education. Based on the findings, it is recommended that targeted awareness and training programs be implemented to facilitate the integration of individuals with special needs into educational and social life.

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Research Article

The Effects of Pilates Exercise as a Recreational Activity on Quality of Life and Psychology in Women

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Abstract: The aim of the study was to examine the effects of Pilates exercises on women's quality of life and psychological resilience levels. The sample group of this study consisted of 315 female individuals between the ages of 18-54. Demographic information form, Brief Psychological Resilience Scale and Quality of Life Scale (SF-12) were used as data collection tools. In statistical tests, it was determined that the data did not show normal distribution and the differences between the groups were analyzed with Mann-Whitney U and Kruskal-Wallis tests. The relationships were determined by Spearman correlation analysis. The results of the study revealed that practicing Pilates had a significant effect on quality of life, but did not make a significant difference on psychological resilience. In addition, the frequency of Pilates was determined as an important factor affecting the quality of life of the participants. Significant differences were found on psychological resilience according to age and education level, and it was found that working individuals and individuals living in the city had higher levels of psychological resilience. Although a low-level relationship was found between Pilates participation and psychological resilience, this relationship was not statistically significant. In conclusion, while Pilates exercises improve quality of life, they have less pronounced effects on psychological resilience.

Keywords: Pilates exercise, psychological resilience, recreational activity, quality of life.

1. Introduction

Pilates was developed by Joseph Hubertus Pilates in the early 20th century and became popular on a global scale, especially in the United States from the 1920s onwards. Pilates, which is considered an important exercise method in the field of healthy living and physical fitness today, has a systematic approach shaped by the disciplines of anatomy, kinesiology and physiology. These exercises, which can be adapted to individual needs, support a holistic understanding of health by increasing physical and mental awareness (Eruzun & Türkmen, 2018).

The sedentary lifestyle, stress and health problems brought by modern life negatively affect the quality of life of individuals (Aykın, 2018; Akarsu et al., 2023). Women, in particular, may face various difficulties in maintaining the balance between work, family and social life. Today, various approaches are being developed to protect physical and mental health, and the contribution of recreational activities to the well-being of individuals is gaining more and more importance (Demirtaş et al., 2017; Dinç et al., 2018; Durhan et al., 2022; Başkan et al., 2017). In this context, Pilates is a low intensity but effective exercise method that both improves physical health and provides mental balance (Vancini et al., 2017; Wells et al., 2012).

Pilates exercises are known for their positive effects on physical health and also make significant contributions to mental and emotional well-being (Smith, 2006). Studies show that regular Pilates exercises increase muscle strength, flexibility and balance, while reducing individuals' stress levels and improving their general well-being (Isacowitz, 2022; Sanioğlu

& Maçkalı, 2021). Studies conducted particularly on women have shown that Pilates provides significant benefits in terms of psychological relaxation, increased self-confidence and stress management (Rydeard et al., 2006; Shim et al., 2010).

In this study, the physical and psychological effects of Pilates will be discussed within a theoretical framework. First of all, the Holistic Health Model emphasizes that the physical, mental and emotional health of an individual is interconnected and draws attention to the role of regular exercise in increasing the quality of life (Matsalla & Warners, 2012; Bayrakdar et al., 2020). Within the framework of this model, Pilates contributes to a holistic understanding of health by supporting the physical health of individuals as well as positively affecting their psychological well-being. In addition, the Self-Determination Theory explains individuals' motivations within the framework of three basic psychological needs: autonomy, competence and sense of belonging (Deci & Ryan, 2000). It is thought that Pilates exercises contribute to the individual's increasing body awareness, developing physical competence and creating a positive perception of himself (Gökmen, 2015; Şimşek & Katırcı, 2011; Yakut et al., 2006). Accordingly, it is expected that individuals' commitment to exercise will increase and they will acquire a sustainable physical activity habit (Bayrakdar et al., 2019).

Psychological Resilience Theory, which offers an important theoretical approach in increasing individuals' stress coping skills and psychological resilience, emphasizes the role of regular physical activity in individuals' stress management and mental balance (Fredrickson, 2004). In this context, it is thought that Pilates exercises increase individuals' psychological resilience by making them more resistant to stress factors. The development of individuals' ability to cope with the difficulties they encounter in their daily lives stands out as an important factor that increases their general quality of life. Considering that Pilates reduces individuals' stress levels and provides mental relaxation with controlled movements and breathing techniques, it can be said that it has a strong connection with this theory (Demir & Çilli, 2018; Vural et al., 2010).

The research aims to comprehensively address the effects of Pilates exercise on women's quality of life and psychological well-being. The role of Pilates on coping with stress, happiness level, psychological resilience and general quality of life will be evaluated, and how exercise contributes to the spiritual and social development of individuals beyond being a physical activity will be examined. In addition, the contributions of regular practice of Pilates as a recreational activity to women's daily lives will also be discussed. Considering the effects of recreational activities on the way an individual evaluates their free time, Pilates is thought to be an exercise that strengthens social ties, increases self-confidence and contributes positively to general psychological well-being. The findings of this study are expected to make significant contributions to the literature in the fields of sports sciences, psychology and health. It is anticipated that it will guide the development of new approaches, especially to encourage women's participation in physical activity, increase their quality of life and enable them to acquire sustainable healthy living habits.

2. Materials and Methods

2.1. Research Group

When the research conducted by Ulukan (2020) was taken as a reference, the effect size = 1.6, alpha = 0.05 and power = 0.95 for the psychological resilience scores obtained from two different groups (those who do pilates and those who do not) were determined as 176 in total. Accordingly, the sample group of our research consisted of 159 women (PG) (height: 164.35 ± 5.86 cm, weight: 62 ± 9.92 kg, BMI: 22.94 ± 3.34 kg/m2) who did pilates exercises and 156 women (NPG) (height: 163.68 ± 6.1 cm, weight: 64.64 ± 12.62 kg, BMI: 24.09 ± 4.34 kg/m2) who did not do pilates exercises, a total of 315 women.

2.2. Research Design

This research was designed within the scope of the relational screening model. The relational screening model is a quantitative research method used to understand and explain the relationships between variables (Karasar, 2016). Data were collected with the scale method within the scope of the quantitative research technique. Within the scope of the research, demographic, socioeconomic, quality of life and psychological resilience levels of individuals who do and do not do pilates were compared. The research data were presented with descriptive statistics and the relationships

between the variables were examined with statistical analyses. In this context, the status of doing pilates (doing and not doing) was considered as an independent variable; the effects of other independent variables such as age, marital status, education level, employment status, profession, income status, place of residence, frequency of doing pilates on quality of life and psychological resilience were analyzed.

2.3. Data Collection

After obtaining the necessary permissions, the Demographic Information Form, Brief Psychological Resilience Scale and Quality of Life Scale prepared by the researcher were used as data collection tools. Data collection tools were applied on a voluntary basis. Participants were informed about the research before the tools were applied. The application of the data collection tools took an average of 20 minutes.

Demographic Information Form: The demographic information form includes demographic questions regarding age, gender, height, weight, marital status, education status, employment status, profession, income status, and place of residence, and was created by the researchers.

Brief Psychological Resilience Scale (BPRS): This scale is a tool developed to measure individuals' psychological resilience and their capacity to recover. It was first designed by Smith et al. (2008) and then adapted to Turkish by Doğan (2015). This scale is a 5-point Likert-type measurement tool and consists of 6 items in total. Scoring is done with the options "Not at all appropriate" (1), "Not appropriate" (2), "Somewhat appropriate" (3), "Appropriate" (4) and "Completely appropriate" (5). Items 2, 4 and 6 in the scale are reverse coded and these items must first be translated according to the scoring key. High scores obtained after this process indicate that the individual has a high level of psychological resilience, while low scores indicate a lower level of psychological resilience (Doğan, 2015).

Quality of Life Scale (SF-12): The Quality-of-Life Scale is a tool that evaluates the general satisfaction level of individuals with their lives and whether they are healthy. Quality of life is a subjective perception that individuals show when evaluating their own life experiences and is generally directly related to life satisfaction. In our study, the adapted version of WHOQOL-BREF (World Health Organization Quality of Life Form) SF-12 was used. The Quality-of-Life Scale, developed by Ware et al. (1995) and adapted by Soylu and Kütük (2022), was used. In order to measure quality of life, Short Form-36 was developed by Ware et al. (1995). SF-12 Quality of Life Scale was created by taking 12 different items from 8 subheadings of SF-36. Turkish validity and reliability study was conducted by Soylu and Kütük (2022). The scale asks about the functional status, well-being and general health perception of the individual. The Quality-of-Life Scale is usually applied on a 5-point Likert-type scale, and participants are asked to answer each question from "Strongly Disagree" to "Strongly Agree". This scale measures individuals' perceptions and satisfaction levels regarding their quality of life, and its validity and reliability have been tested in various cultural contexts (Soylu & Kütük, 2022).

2.4. Data Analysis

To calculate the sample size, the t tests - Means: Difference between two independent means (two groups) module was used in the G*Power 3.1.9.2 statistics program. The research data were analyzed with the SPSS-27 statistics package program. The Shapiro-Wilk test and the Kolmogorov-Smirnov test were applied to evaluate the conformity of the data to normal distribution in the research. Along with these tests, the skewness and kurtosis values of the variables were also examined (±1.5) in order to support the normality assessment (Büyüköztürk et al., 2020). According to the test results, it was determined that not all variables showed normal distribution ($p<0.05$). Accordingly, non-parametric statistical analysis methods were preferred for the data that did not meet the normality assumption. Within the scope of descriptive statistics, the central tendency measures of the data (mean, median, standard deviation) were calculated, and the general characteristics of their distribution were determined. In the analysis, the Mann-Whitney U test was used for comparing paired groups, and the Kruskal-Wallis test was used for comparing more than two groups. In cases where significant differences were found, pairwise comparison method was used to determine which groups the difference was between. Spearman correlation analysis was used to determine the direction and strength of the relationships between continuous variables. In all statistical analyses, the significance level was accepted as $p<0.05$.

2.5. Ethics Committee Permission

Participants were given permission to participate voluntarily with the informed consent form. In addition, this study was found ethically appropriate by the Giresun University Social Sciences Science and Engineering Sciences Research

Ethics Committee (Date: 06.01.2025, Number: 01/13, Protocol: E-50288587-050.01.04-60783). Before data collection, participants were thoroughly informed about the study through a detailed presentation and subsequently provided written consent. The research was carried out in accordance with the ethical guidelines of the Declaration of Helsinki.

3. Results

Table 1. Comparison of quality of life and psychological resilience levels according to pilates practice status

Variables	Statistics	PG (N=159)	NPG (N=156)	M-WU	p
Quality of Life	Mean± SD	32.57±5.71	23.45±6.43	3751.000	**0.000****
	Avg. Rank	212.41	102.54		
	Tot. Rank	33773.00	15997.00		
Brief Psychological Resilience	Mean± SD	17.35±3.02	17.98±3.15	12366.000	0.964
	Avg. Rank	157,77	158.23		
	Tot. Rank	25086.00	24684.00		

***p<0.01; PG: Pilates Group, NPG: Non-Pilates Group, M-WU: Mann-Whitney U, N: Number of people, Mean: Average, SD: Standard deviation*

As a result of the Mann-Whitney U analysis conducted on the quality of life and psychological resilience scales according to the pilates status in Table 1, it was seen that the effect of the "pilates status" variable on the total quality of life score was significant (U=3751.000; p<0.01), while its effect on the total psychological resilience score was not significant (U=12366.000; p>0.05). When the means were examined, it was determined that the life quality averages of individuals doing pilates (32.57±5.71) were significantly higher than those Non-pilates group. (23.45±6.43).

Table 2. Comparison of quality of life in terms of demographic and socioeconomic characteristics of Pilates groups

Variables	Group	N	Mean	SD	Avg. Rank	K-W	p
Age	18-24 age	31	31.90	5.49	74.79	0.789	0.852
	25-34 age	75	32.56	5.80	79.66		
	35-44 age	38	33.05	6.16	84.61		
	45-54 age	15	32.87	4.91	80.80		
Educational Status	Literate or primary school graduate	1	40.00	-	150.00	5.962	0.202
	Secondary school	6	35.33	8.66	97.17		
	High school	22	30.50	6.36	64.05		
	College / University	110	32.66	5.45	81.04		
	Postgraduate	20	33.20	5.09	83.18		
Occupation	Retired	3	32.33	2.89	70.50	3.235	0.519
	Housewife	16	32.06	7.52	76.13		
	Civil servant	49	32.59	5.06	78.80		
	Worker	13	35.00	7.07	101.54		
	Other	78	32.28	5.56	78.33		
Income Status	10.000- 24.000 TRY	53	31.83	6.26	75.22	1.980	0.577
	25.000- 39.000 TRY	42	32.64	5.65	80.29		
	40.000- 54.000 TRY	32	34.00	5.19	89.44		
	55.000 and above	32	32.31	5.35	78.11		

***p<0.01; K-W: Kruskal-Wallis, Pairwise Comparisons, M-WU: Mann-Whitney U, N: Number of people, Mean: Average, SD: Standard deviation*

Table 2. (Continue)

Variables	Group	N	Mean	SD	Avg. Rank	K-W	p
Pilates Frequency	Once a month, less than once a week (1)	18	27.61	6.45	45.58	12.770	0.002**
	Once a week (2)	20	31.05	7.28	73.20		
	2-4 times a week (3)	121	33.57	4.86	86.24		3>1
		N	Mean	SD	Avg. Rank	M-WU	p
Marital Status	Married	76	32.87	5.67	81.30	3055.000	0.732
	Single	83	32.31	5.78	78.81		
Working Status	Yes	120	32.73	5.69	81.68	2138.500	0.419
	No	39	32.10	5.84	74.83		
Place of Living	City	128	32.53	5.48	79.56	1928.000	0.807
	Country	31	32.77	6.72	81.81		

***p<0.01; K-W: Kruskal-Wallis, Pairwise Comparisons, M-WU: Mann-Whitney U, N: Number of people, Mean: Average, SD: Standard deviation*

Table 3. Comparison of quality of life levels in Non-Pilates groups by demographic and socioeconomic factors

Variables	Group	N	Mean	SD	Avg. Rank	K-W	p
Age	18-24 age	26	21.81	7.51	66.79	3.440	0.329
	25-34 age	71	23.14	5.70	77.29		
	35-44 age	41	24.90	6.89	87.48		
	45-54 age	18	23.78	6.24	79.75		
Educational Status	Literate or primary school graduate	4	26.25	7.68	96.25	3.383	0.496
	Secondary school	6	20.50	6.06	58.08		
	High school	43	22.51	6.55	73.15		
	College / University	94	24.05	6.37	82.26		
	Postgraduate	9	22.44	6.21	70.56		
Occupation	Retired	7	22.29	6.82	68.36	2.378	0.667
	Housewife	38	24.37	6.43	83.80		
	Civil servant	34	24.50	6.66	84.84		
	Worker	54	22.83	6.22	74.85		
	Other	23	22.22	6.59	72.02		
Income Status	10.000- 24.000 TRY	53	22.04	6.90	68.00	6.699	0.082
	25.000- 39.000 TRY	42	22.98	5.49	76.12		
	40.000- 54.000 TRY	39	25.15	6.36	91.38		
	55.000 and above	22	24.77	6.55	85.50		
		N	Mean	SD	Avg. Rank	M-WU	p
Marital Status	Married	91	23.29	6.29	77.27	2845.500	0.687
	Single	65	23.69	6.67	80.22		
Working Status	Yes	100	23.15	6.31	76.28	2578.000	0.411
	No	56	24.00	6.67	82.46		
Place of Living	City	91	23.52	6.37	79.28	2886.500	0.798
	Country	65	23.37	6.57	77.41		

K-W: Kruskal-Wallis, M-WU: Mann-Whitney U, N: Number of people, Mean: Average, SD: Standard deviation

In Table 2, as a result of the Kruskal-Wallis analysis performed on the quality of life scale according to the age, education status, occupation, income status and pilates frequency of the pilates groups, it was seen that only the effect of the " pilates frequency " variable on the total quality of life score was significant (KW=12.770; p<0.01). When the means were examined, it was determined that the mean of those doing pilates 2-4 times a week (33.57±4.86) was higher than the mean of those doing pilates more than once a month or less than once a week (27.61±6.45). In addition, as a result of the Mann-Whitney U analysis performed on the quality of life scale according to the marital status, employment status and place of residence of the pilates doers in Table 2, it was seen that the effect of the variables on the total quality of life score was not significant (p>0.05).

In Table 3, as a result of the Kruskal-Wallis analysis conducted on the quality of life scale of the Non-Pilates groups according to age, education level, occupation and income status, it was seen that the effect of the variables on the total quality of life score was not significant (p>0.05). In addition, in Table 3, as a result of the Mann-Whitney U analysis conducted on the quality of life scale of the Non-Pilates groups according to marital status, employment status and place of residence, it was seen that the effect of the variables on the total quality of life score was not significant (p>0.05).

Table 4. Psychological resilience comparison of Pilates practitioners by demographic and socioeconomic factors

Variables	Group	N	Mean	SD	Avg. Rank	K-W	p
Age	18-24 age (1)	31	17.58	2.63	84.32	14.795	0.002** 3>2, 3>4
	25-34 age (2)	75	16.83	2.59	70.63		
	35-44 age (3)	38	18.92	3.03	101.97		
	45-54 age (4)	15	15.60	4.15	62.23		
Educational Status	Literate or primary school grad. (1)	1	7.00	-	3.00	14.916	0.005** 5>3
	Secondary school (2)	6	17.33	6.25	72.67		
	High school (3)	22	16.00	4.39	58.05		
	College / University (4)	110	17.47	2.37	80.75		
	Postgraduate (5)	20	18.75	1.62	106.05		
Occupation	Retired	3	17.67	1.15	75.67	7.555	0.109
	Housewife	16	15.94	3.99	58.59		
	Civil servant	49	17.76	2.58	83.47		
	Worker	13	15.23	4.64	60.42		
	Other	78	17.74	2.60	85.64		
Income Status	10.000- 24.000 TRY	53	16.79	3.32	75.75	4.058	0.255
	25.000- 39.000 TRY	42	17.38	3.15	79.38		
	40.000- 54.000 TRY	32	17.19	2.10	73.97		
	55.000 and above	32	18.44	2.98	93.88		
Pilates Frequency	Once a month, less than once a week	18	17.17	3.13	79.42	1.901	0.387
	Once a week	20	18.10	3.26	92.98		
	2-4 times a week	121	17.26	2.98	77.94		
		N	Mean	SD	Avg. Rank	M-WU	p
Marital Status	Married	76	17.08	3.34	74.99	2773.000	0.181
	Single	83	17.61	2.71	84.59		
Working Status	Yes	120	17.57	3.06	84.36	1816.500	0.033*
	No	39	16.72	2.88	66.58		
Place of Living	City	128	17.68	2.53	84.34	1429.000	0.014*
	Country	31	16.03	4.35	62.10		

**p<0.05, **p<0.01; K-W: Kruskal-Wallis, Pairwise Comparisons, M-WU: Mann-Whitney U, N: Number of people, Mean: Average, SD: Standard deviation*

In Table 4, as a result of Kruskal-Wallis analysis performed on the psychological resilience scale according to age, education level, profession, income level and frequency of doing pilates, it was seen that the effect of the variables "age (KW=14.795; p<0.01) and education level (KW=14.916; p<0.01)" on the total score of psychological resilience was significant. When the means were examined, it was determined that the means of those between the ages of 35-44 (18.92±3.03) were higher than the means of those between the ages of 25-34 (16.83±2.59) and 45-54 (15.60±4.15), while the means of those with postgraduate education (18.75±1.62) were higher than the means of those with high school education (16.00±4.39). In addition, as a result of the Mann-Whitney U analysis conducted on the psychological resilience scale of those doing pilates according to marital status, employment status and place of residence in Table 4, it was seen that the effect of the variables of "employment status (U=1816.500; p<0.05) and place of residence (U=1429.000; p<0.05)" on the total psychological resilience score was significant (p>0.05). When the means were examined, it was determined that the means of those working (17.57±3.06) were higher than the means of those not working (16.72±2.88), while the means of those living in the province (17.68±2.53) were higher than the means of those living in the district (16.03±4.35).

Table 5. Psychological resilience comparison in Non-Pilates groups by demographic and socioeconomic factors

Variables	Group	N	Mean	SD	Avg. Rank	K-W	p
Age	18-24 age (1)	26	17.65	2.15	79.08	8.891	0.031* 2>4, 3>2
	25-34 age (2)	71	18.32	3.12	83.09		
	35-44 age (3)	41	18.49	3.63	82.88		
	45-54 age (4)	18	15.94	2.62	49.58		
Educational Status	Literate or primary school grad.	4	19.75	8.42	88.00	0.441	0.979
	Secondary school	6	19.00	6.93	75.75		
	High school	43	17.95	3.55	76.80		
	College / University	94	17.85	2.26	79.53		
	Postgraduate	9	18.00	2.83	73.44		
Occupation	Retired	7	14.86	3.67	42.79	5.797	0.215
	Housewife	38	18.45	3.46	82.33		
	Civil servant	34	18.03	1.91	85.21		
	Worker	54	18.15	3.62	76.18		
	Other	23	17.70	2.34	78.59		
Income Status	10.000- 24.000 TRY	53	18.23	4.30	71.42	3.061	0.382
	25.000- 39.000 TRY	42	17.60	2.72	76.92		
	40.000- 54.000 TRY	39	18.10	1.82	85.59		
	55.000 and above	22	17.91	2.58	86.02		
		N	Mean	SD	Avg. Rank	M-WU	p
Marital Status	Married	91	18.25	3.42	79.99	2821.500	0.617
	Single	65	17.60	2.71	76.41		
Working Status	Yes	100	17.94	3.12	79.63	2687.000	0.669
	No	56	18.05	3.24	76.48		
Place of Living	City	91	17.52	2.33	75.38	2673.500	0.296
	Country	65	18.63	3.96	82.87		

**p<0.05, K-W: Kruskal-Wallis, Pairwise Comparisons, M-WU: Mann-Whitney U, N: Number of people, Mean: Average, Std: Standard SD: Standard deviation*

In Table 5, as a result of the Kruskal-Wallis analysis performed on the psychological resilience scale according to age, education status, occupation and income status of the Non-Pilates groups it was seen that only the effect of the "age" variable on the total score of psychological resilience was significant (KW=8.891; p<0.05). When the means were examined, it was determined that the means of those between the ages of 25-34 (18.32±3.12) and 35-44 (18.49±3.63) were higher than the means of those between the ages of 45-54 (15.94±2.62). In addition, as a result of the Mann-Whitney U analysis performed on the psychological resilience scale according to marital status, employment status and place of residence of the Non-Pilates groups in Table 5, it was seen that the effect of the variables on the total score of psychological resilience was not significant (p>0.05).

Table 6. Relationship between quality of life and level of psychological resilience

Pilates Doing Status	Parameter	Coefficient	Psychological Resilience
PG	Quality of Life	r	0.056
		p	0.483
		n	159
NPG		r	0.064
		p	0.425
		n	156

**Spearman correlation, PG: Pilates Group, NPG: Non-Pilates Group*

In Table 6, Spearman correlation test was applied to determine whether there is a relationship between the quality of life and psychological resilience levels of Pilates group and Non-Pilates group. In the test results, it was determined that the relationship between the quality of life and psychological resilience levels of both those who do pilates and those who do not do pilates was low and not significant (p>0.05).

4. Discussion

Our findings showing the effects of Pilates on quality of life and psychological resilience emphasize the importance of exercise on the physical and mental well-being of individuals. First of all, it was determined that the quality of life of individuals who do Pilates is significantly higher than those who do not. This shows that regular physical activity positively affects individuals' general health perception and that increasing body awareness increases satisfaction with life. Pilates provides physical comfort by increasing flexibility, posture and muscle strength (Canukazov et al., 2019), while also improving individuals' ability to cope with stress (Cengiz & Delen, 2019). On the other hand, the fact that Pilates does not have a direct effect on psychological resilience suggests that mental resilience is shaped not only by physical activity but also by the individual's social environment, personality traits and life experiences.

In this context, when the studies in the literature are examined; Özdemir and Uysal (2017) concluded in their study that pilates exercises increase the quality of life in women. Vergili (2012) concluded in his study that women who do pilates exercises change their quality of life positively. Saltan (2018) investigated the effect of pilates exercise on the quality of life. At the end of the study, he concluded that pilates-based exercises increase the quality of life of women.

In the literature, unlike our study, there are studies showing that pilates exercise strengthens psychological resilience (Özdemir & Uysal, 2017). In their study, Mokhtari et al. (2013) investigated the depression levels of elderly women who did pilates exercises. They had the participants do pilates exercises regularly for 12 weeks, and it was found that the participants' depression levels decreased at the end of the study. In the study conducted by Hassan and Amin (2011), the effects of pilates exercises on the mental and physical structure were investigated. In the study, the participants did pilates exercises regularly for 12 weeks, and positive effects were found on psychological well-being. In addition to the positive effects of pilates exercise on psychological well-being, there are also studies similar to our study in which it had no effect. Tükel (2021) examined the psychological resilience levels of individuals participating in recreational activities in his study. No significant difference was found in the psychological resilience score averages of the participants who actively participated in the activities. Rushing et al. (2022) concluded that restrictions on participation in different leisure sports negatively affect psychological resilience by causing emotional unrest, including stress,

frustration, hopelessness, and conflict. In the study conducted by Bayrakdar et al. (2020), it was determined that there was no change in mental health summary scores as teachers' physical activity levels increased.

In our study, the relationship between the frequency of exercise and quality of life revealed that doing pilates regularly yields more positive results. The fact that individuals who do pilates at least 2-4 times a week have a higher quality of life than those who exercise more irregularly supports the idea that physical activity requires a certain process and continuity in order to be effective. However, the fact that variables such as marital status, employment status and place of residence do not have a significant effect on quality of life in individuals who do pilates shows that life satisfaction does not only depend on the individual's physical activity level, but also that social and economic conditions play an important role.

The finding that age and education level are the determining factors in terms of psychological resilience emphasizes the role of the individual's developmental process and coping strategies acquired through education on psychological resilience. The higher level of psychological resilience in older age groups indicates that individuals become more experienced in stress management as they age and are more resistant to the challenges of life. Similarly, the higher level of psychological resilience in individuals with higher levels of education suggests that individuals' problem-solving skills improve through education and that they develop more effective strategies for coping with stress. The significant effect of employment status and place of residence on psychological resilience points to the role of the social environment in the individual's mental health. The higher level of psychological resilience in employed individuals indicates that work life provides individuals with a certain social support and contributes to individuals feeling more productive and strong. In addition, the fact that individuals living in cities have higher psychological resilience than those living in districts suggests that access to more social and cultural activities in big cities may support psychological resilience.

When similar studies in the literature are examined, Sanioğlu and Maçkalı's (2021) study also revealed that the psychological resilience scores of women between the ages of 18-50 differed depending on the age variable. Sanioğlu and Maçkalı (2021) also stated that success in business and professional life can increase the psychological resilience of individuals.

When evaluated in terms of individuals who do not do Pilates, the fact that age has a significant effect on psychological resilience is a finding that supports the fact that the individual's skills to cope with stress improve as their life experience increases. However, the fact that variables such as education, occupation, income status, marital status, employment status and place of residence do not have a significant effect on psychological resilience suggests that the factors affecting psychological resilience among individuals who do not do Pilates are based more on individual differences.

Finally, the low level and statistically insignificant relationship between quality of life and psychological resilience indicates that these two variables do not directly affect each other. While quality of life is affected by multidimensional variables such as physical health, social relationships and environmental factors, psychological resilience is shaped by the individual's internal motivations, character structure and past experiences. This result reveals that although physical activity has a positive effect on general well-being, psychological resilience should be supported not only by doing sports but also by other experiences and skills gained in the individual's life.

5. Conclusion

This study has shown that doing pilates regularly significantly increases the quality of life of individuals. The quality of life of individuals who do pilates was found to be significantly higher than those who do not; it was observed that individuals who do pilates regularly, especially 2-4 times a week, have higher life satisfaction than those who exercise less frequently. This finding shows that pilates contributes to psychological well-being as well as physical health. However, it was determined that pilates does not have a direct effect on psychological resilience. Psychological resilience is more affected by factors such as the individual's age, level of education, employment status and the environment in which they live. The fact that individuals in older age groups and with higher levels of education have higher levels of psychological resilience shows that individual development and learned coping mechanisms strengthen psychological resilience. The fact that working individuals and those living in cities have higher levels of psychological

resilience emphasizes the role of the social environment and economic factors on psychological well-being. On the other hand, no significant relationship was found between quality of life and psychological resilience.

As a result, although it has been clearly demonstrated that pilates increases the quality of life, no evidence has been obtained that it directly affects psychological resilience. However, it should be noted that regular exercise can indirectly strengthen psychological resilience by increasing individuals' physical awareness. Therefore, individuals should be encouraged to develop sustainable physical activity habits and different supportive approaches to increase psychological resilience should also be considered.

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Research Article

The Role and Importance of Family in Golf Athletes

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Abstract: This study aims to examine the impact of family support on athletes in golf. The research sample consists of golfers aged 15-24, with a handicap of 15 or lower, who are registered with the Turkish Golf Federation. The study evaluates the participation status of these athletes in golf and analyzes the role of family factors in this process In this study, data were collected using the questionnaire technique and analyzed through the chi-square test in SPSS version 25.0. The findings indicate that family support is a significant factor influencing participants' engagement in golf ($p<0.05$). Additionally, the presence of family members involved in sports and the occupational status of parents were identified as key variables affecting participation in golf. The results suggest that family support encourages participation in golf, enhances athletes' motivation, and fosters long-term sports engagement. Accordingly, it is recommended that families take a more active role in directing their children toward sports and that policies be developed to improve access to sports education.

Keywords: Golf, family, sport preferences, family support.

1. Introduction

Many definitions of family have been proposed, with each focusing on different aspects, making it challenging to establish a universal definition (Levanda & Schult, 2018). Over time, as family structures have evolved, anthropology has defined the family as an institution formed by two individuals. Outside of school, the family is the most influential unit in a child's development (Bronfenbrenner, 1979). Sociologically, the family is considered one of the fundamental institutions, playing a crucial role in children's psychological and educational development. In all societies, the family is the smallest social unit. From birth until reaching school age, children remain in close interaction with their family members. During this period, they acquire communication skills, cultural and sporting habits by imitating family members (Côté, 1999). The behaviors of family members have significant effects on children. The family serves as a foundation where children's basic skills are taught and their physical development is encouraged (Bronfenbrenner, (1979). A family's socioeconomic status, profession, and attitudes toward sports influence a child's physical development. The demographic structure and cultural capital of a family shape all activities a child engages in, including sports. Consequently, the family's influence is evident in sports, which is considered an important cultural activity. The environment in which a child is raised affects their athletic journey and plays a crucial role in determining their success in sports (Boutcher & Rotella, 1987; Nielsen et al., 2011).

Family involvement is a key factor in shaping a child's entry into and commitment to sporting activities. A child with sports-oriented parents may develop an affinity for sports or be more inclined to engage in physical activities (Yıldız, 2015). According to Knight (2017), parents' interest and involvement in sports significantly impact children's engagement and participation in sports (Knight et al., 2017). The family's role in promoting sports participation and instilling a habit of physical activity is well-documented (Yılmaz & Kartal, 2022). In summary, research suggests that families actively engaged in sports tend to have higher participation rates and encourage their children to become

athletes. "The family is regarded as a vital influence on a child's initiation into sports and the advancement of their sports career (Yüksel, 2016). It is highlighted in research that the influence of parents is a decisive factor in children's participation in sports, shaping both their engagement and learning processes (Keegan et al., 2009).

In developed countries, sports culture is widespread, and resources for sports participation are more accessible. Families in these societies show a greater inclination to support their children's engagement in sports. In Türkiye, family members can participate in sports activities in gyms, parks, and recreational sports fields. One of the sports in which families and children spend time together or individually is golf. Golf is one of the most expensive sports worldwide (Hallmann, 2015) and is one of the few sports that can be played by individuals of all ages, genders, and skill levels (McHardy et al., 2006). Considering both equipment and course expenses, golf is costlier than many other sports. Research indicates that active and passive participation in golf has increased in popularity with significant global growth (Humphreys et al., 2014).

In Türkiye, golf has emerged as a growing sport, gaining increasing popularity. The foundation of golf in Türkiye dates back to 1895 with the establishment of the Istanbul Golf Club, while the Turkish Golf Federation (TGF) was officially founded in 1996 (TGF, 2005). Over the past two decades, golf participation in Türkiye has significantly increased, and TGF has implemented various projects to promote the sport. Additionally, national and international tournaments organized by the federation have contributed to raising awareness and expanding the sport. Since 1998, TGF has been carrying out a comprehensive project aimed at developing new golf athletes and making golf more accessible to a broader audience across Türkiye. The increasing popularity of these tournaments has significantly contributed to the advancement of golf nationwide (Agopyan et al., 2017). The increase in participation in golf in recent years and the increasing prominence of this branch in international platforms have positively affected individuals' orientation towards golf. The increase in the number of individuals playing golf has also increased the interest of families in this sport and encouraged them to direct their children to golf (Yüksel,2019).

Golf, which has gained importance especially on a global scale, has changed the perspective of individuals and families towards the sport. Although often regarded as an individual sport, family support plays a crucial role in the development of golf athletes (Dorsch et al.,2019; Burke et al.,2023). Family members strengthen their children's commitment to the sport through participation in tournaments, training processes and equipment support. In this context, the role of the family in golf is not only limited to encouragement but also stands out as a fundamental element that increases individuals' interest in the sport and their level of success.

The increasing interest in golf and the widespread participation of young athletes in our country in international competitions have brought to the forefront the need to examine the factors affecting participation and participation in golf. In this context, the present study aims to investigate the role and significance of the family in golf, a sport that is growing in popularity each day.

2. Materials and Methods

2.1. Research Group

The participants of this study consisted of athletes aged 15-24 years who play golf affiliated with the Turkish Golf Federation and have a handicap of 15 or lower. The sample consisted of 59 athletes (32 females and 27 males) aged between 12 and 18 years, all of whom had at least three years of golf experience and competed in the Turkish Golf League. All participants voluntarily participated in the study. When the age distribution was analyzed, it was seen that the majority of the participants were in the "15-19 age group". In addition, most of the participants were identified as students. The majority of the athletes had a handicap between "0 and 7".

2.2. Research Design

In the study, a questionnaire served as the tool for data collection. Various studies in the literature were reviewed, and the survey questions were developed based on those from relevant studies (Kaya, 2016; Aygün & Yetim, 2017; Gökçe et al., 2019; Örel et al., 2022). The questionnaire was adapted to golf by the researchers in collaboration with field experts to ensure its suitability for the study's objectives. The first section of the questionnaire included 11 aimed at gathering information on the demographic characteristics of the participants. The second section comprised 10 questions designed

to assess the reasons for participants' engagement in golf and their expectations from the sport. The questionnaire was administered to the participants through face-to-face interviews.

2.3. Data Collection

The role of family in shaping children's involvement in golf has not been comprehensively understood. Therefore, further research is needed to understand family decision-making processes and their influence on children's sports involvement and career development. This study aims to examine the family's role in children's participation in golf and contribute to the sport's popularization in Turkey. The main objective is to explore the significance of family for children and young people interested in golf.

Two research questions were addressed in this study:

(1) Does the demographic status of the family have an effect on participation in golf?
(2) Does the family have an effect on the reasons why athletes who participate in golf prefer golf?

2.4. Data Analysis

The data collected in this study were analyzed using the SPSS 25.0 statistical software package. The data were analyzed using descriptive statistics, including frequency distributions (%), and a chi-square test was applied. The normality of the data was assessed using the Kolmogorov-Smirnov test. A significance level of $p < 0.05$ was set for the analysis. Accordingly, the relationships between individuals' reasons for taking up golf, their engagement in golf professionally, and their expectations from the sport were examined in relation to variables such as gender, education, age, occupation, and income. The primary objective of the study was to determine whether individuals' motivations for participating in golf and their expectations from the sport varied based on demographic factors.

2.5. Ethics Committee Permission

This study received ethical approval from the Social Sciences Institute of Akdeniz University (Date: 06.12.2023 – Meeting: 22 – Number: 542). At the outset of the research, written informed consent was obtained from both the athletes' parents and coaches. Participation in the study was based on voluntary consent, and all ethical principles and guidelines were strictly followed throughout the research process. Before data collection, participants were thoroughly informed about the study through a detailed presentation and subsequently provided written consent. The research was carried out in accordance with the ethical guidelines of the Declaration of Helsinki.

3. Results

In the study conducted to determine the role and importance of family in golf sport, 59 voluntary and good golf players were selected as the sample. The effect of the participants' families on their preference for golf was analyzed and the data obtained were presented in tables.

Table 1. Descriptive Statistics of Participants Demographics

Demographic Variables	Groups	N	%
Gender	Female	32	54,2
	Male	27	45,8
Father's Education Level	Primary School	1	1,7
	Middle School	7	11,9
	High School	12	20,3
	University	28	47,5
	Postgraduate	11	18,6
Father's Occupation	Public Sector Employee	2	3,4
	Private Sector Employee	54	91,5
	Retired	3	5,1

Table 1. (Continue)

Demographic Variables	Groups	N	%
Gender	Female	32	54,2
	Male	27	45,8
Father's Education Level	Primary School	1	1,7
	Middle School	7	11,9
	High School	12	20,3
	University	28	47,5
	Postgraduate	11	18,6
Father's Occupation	Public Sector Employee	2	3,4
	Private Sector Employee	54	91,5
	Retired	3	5,1

Table 1 presents the demographic characteristics of the participants. The majority were female (54.2%), while 45.8% were male. Regarding mothers' education levels, 3.4% had primary education, 15.3% had middle school education, 33.9% had high school education, 37.3% were university graduates, and 10.2% had postgraduate education. Concerning fathers' education levels, 1.7% had primary education, 11.9% had middle school education, 20.3% had high school education, 47.5% were university graduates, and 18.6% had postgraduate education. Rögardan mothers' occupations, 50.8% were private sector employees, 39.0% were housewives, and 10.2% were retired. Concerning family income levels, 62.7% of families had an income of 22,500 TL or above. In terms of the number of years participants have been engaged in golf, 40.7% had been playing for 7-10 years, 33.9% for 4-6 years, 22.0% for more than 10 years, and 3.4% for 1-3 years.

Tablo2. Comparison of Athletes Reasons for Preferring Golf According to Family Members Sports Participation

Determinant	Yes (f)	Yes (%)	No (f)	No (%)	Total (f)	Total (%)
Family	26	81.3%	6	18.8%	32	100%
Friends	9	64.3%	5	35.7%	14	100%
Physical Education Teacher	0	0.0%	4	100.0%	4	100%
Coach	3	100.0%	0	0.0%	3	100%
Famous Player	0	0.0%	1	100.0%	1	100%
Other	4	80.0%	1	20.0%	5	100%
Total	42	71.2%	17	28.8%	59	100%

Table 2 shows that the reasons young athletes choose golf differ significantly based on their families' participation in sports ($\chi^2 = 15.662$; df = 5, $p < 0.05$). The findings suggest that individuals with family members actively engaged in sports are more likely to prefer golf.

Table 3. Comparison of Factors Influencing Athletes' Golf Preference According to Family Support

Determinants of Golf Preference	Yes (f)	Yes (%)	No (f)	No (%)	Total (f)	Total (%)
Family	27	84,40%	5	15,60%	32	100%
Friends	7	50,00%	7	50,00%	14	100%
Physical Education Teacher	0	0,00%	4	100,00%	4	100%
Coach	2	66,70%	1	33,30%	3	100%
Famous Player	0	0,00%	1	100,00%	1	100%
Other	3	60,00%	2	40,00%	5	100%
Total	39	66,10%	20	33,90%	59	100%

Table 3 demonstrates a statistically significant difference in the reasons athletes choose golf, based on the presence of another family member involved in the sport ($\chi^2 = 16.222$; df = 5, $p < 0.05$). This suggests that having a family member who participates in golf may influence an individual's motivation for engaging in the sport.

Table 4. Comparison of Athletes Reasons for Preferring Golf Based on Family Support

Determinants of Golf Preference	Always		Mostly		Occasionally		Total	
	f	%	f	%	f	%	f	%
Family	26	81,30%	5	15,60%	1	3,10%	32	100%
Friends	8	57,10%	5	35,70%	1	7,10%	14	100%
Physical Education	2	50,00%	0	0,00%	2	50,00%	4	100%
Coach	2	66,70%	1	33,30%	0	0,00%	3	100%
Famous Player	1	100,00%	0	0,00%	0	0,00%	1	100%
Other	5	100,00%	0	0,00%	0	0,00%	5	100%
Total	44	74,60%	11	18,60%	4	6,80%	59	100%

An analysis of Table 4 reveals a statistically significant difference in the reasons athletes prefer golf based on whether they receive support from their families ($\chi^2 = 18.451$; df = 10, $p < 0.05$). This finding suggests that the motivations for choosing golf differ significantly according to the level of familial support. The comparative analysis conducted to identify the source of the observed difference revealed that 32 out of 59 athletes (54.2%) cited family support as the primary factor influencing their decision to pursue golf. Furthermore, 26 out of 59 athletes (59.1%) reported consistently receiving support from their families regarding golf. These findings suggest a statistically significant relationship between family support and the preference for golf. In other words, athletes who benefit from familial encouragement are more likely to engage in golf. Consequently, it can be inferred that family support serves as a critical determinant in the selection of golf as a sport.

Table 5. Comparison of Athletes' Interest in Golf Based on the Presence of Golf Players in the Family

Reason for Interest	Yes		No		Total	
	f	%	f	%	f	%
My participation in golf is influenced by my family's wishes	1	100,00%	0	0,00%	1	100%
I play golf because I enjoy the sport.	34	75,60%	1	24,40%	45	100%
I do it because sports have positive contributions.	0	0,00%	1	100,00%	1	100%
I want to make a professional career in this field.	3	27,30%	8	72,70%	11	100%
Other	1	100,00%	0	0,00%	1	100%
Total	39	66,10%	2	33,90%	59	100%

An analysis of Table 5 indicates a statistically significant difference in athletes' level of interest in golf based on whether they have family members who play the sport ($\chi^2 = 12.172$; df = 4, $p < 0.05$). According to this finding, athletes' interest in golf varies depending on whether there are individuals in their families who play the sport. The comparison results revealed that 34 out of 59 athletes (87.2%) identified the presence of family members who play golf as the most significant factor influencing their interest in the sport." In addition, it was concluded that this was an important variable in the liking of golf by all of the athletes whose families played golf. When the results obtained are evaluated holistically, it is seen that the presence of golf-playing individuals in the family is an important factor that increases the athletes' interest in golf. In other words, it was concluded that athletes who have golf-playing members in their families have a higher interest in golf.

Table 6. Comparison of Athletes' Reasons for Interest in Golf According to Mother's Occupation Variable

Reason for Interest	Private		Housewife		Retired		Total	
	f	%	f	%	f	%	f	%
My participation in golf is influenced by my family's	0	0,00%	1	4,30%	0	0,00%	1	1,70%
I play golf because I enjoy the sport.	27	90,00%	1	65,20%	3	50,00	4	76,30
I do it because sports have positive contributions.	1	3,30%	0	0,00%	0	0,00%	1	1,70%
I want to make a professional career in this field.	2	6,70%	7	30,40%	2	33,30	1	18,60
Other	0	0,00%	0	0,00%	1	16,70	1	1,70%
Total	30	100%	2	100%	6	100%	5	100%

An analysis of Table 6 reveals a statistically significant difference in athletes' level of interest in golf based on their mothers' occupational status ($\chi^2 = 15.172$; df = 4, $p < 0.05$). In addition, it was concluded that the fact that all athletes whose mothers' occupation was related to golf enjoyed the sport was a significant factor. When the results were evaluated holistically, it was revealed that the presence of golf-related occupations within the family is an important factor in increasing athletes' interest in golf.

4. Discussion

Authors should discuss the results and how they can be interpreted from the perspective of previous studies and of the working hypotheses. The findings and their implications should be discussed in the broadest context possible. Future research directions may also be highlighted.

This study aims to contribute to the existing literature by examining the factors influencing young golfers' interest in the sport. The findings show that the reasons for choosing golf vary significantly depending on factors such as parental education level, family sports participation habits and the presence of family members interested in golf.

An analysis of the participants' duration of involvement in golf shows that the majority have between 7 to 10 years of experience, suggesting that they began playing the sport at a young age and have maintained long-term engagement. Family support emerged as a significant factor in this process. Most participants reported that they started playing golf under the guidance of their families. This supports the idea that sports-related behaviors often develop within the family context, with parents playing a crucial role in shaping their children's involvement in athletic activities (Snyder & Spreitzer, 2013; Becker et al., 2007; Greendorfer & Lewko, 2013). Similar findings were also reported in the present study, further confirming the importance of family involvement in early sport socialization.

The study also found that the reasons for choosing golf differed depending on whether family members participated in sports. A large proportion of the athletes stated that their family members were actively engaged in sports and that this was one of the most important influences on their decision to pursue golf. These findings highlight the role of family sports culture in fostering children's engagement and interest in sports. In particular, parental support and role modeling play a crucial role in initiating early sports participation and sustaining it as a lifelong habit. Family involvement has the potential to strengthen children's motivation and commitment to athletic activities. Previous research supports these conclusions. Gao et al. (2023) highlighted parents' role in creating a motivational climate; and Knoester & Bjork (2025) demonstrated strong links between socioeconomic status, sport culture, and youth sport commitment. Snyder & Spreitzer (2013) emphasized the impact of social support from families on children's commitment to sports. Similarly, children often perceive their parents as role models, developing an interest in sports by observing their behaviors (Snyder & Purdy, 1982; Greendorfer & Lewko, 2013). Additional studies have also shown that parental participation in sports is a key determinant of children's orientation toward athletic activities (Kepoğlu, 1995; Yüksel, 2019; Yılmaz et al., 2022). In this context, parental encouragement and involvement in physical activity are fundamental in shaping children's long-term sports habits.

The findings also suggest that parental education and economic status significantly influence children's choice of sport, including golf. This aligns with the findings of Yücel et al. (2015), who reported that a family's socioeconomic status

plays a critical role in determining which sports children pursue, their access to proper training, equipment, and other opportunities.

Furthermore, the study revealed that having another family member involved in golf significantly affected participants' decisions to take up the sport. Active family involvement—such as attending tournaments, joining training sessions, and offering moral support—was found to enhance children's interest and commitment to golf. In skill-intensive and strategic sports like golf, parental guidance in developing fundamental abilities is especially important. Parents with knowledge of golf can provide meaningful support by assisting with technical skill development and facilitating access to appropriate resources. This finding is consistent with existing literature. Burke et al. (2023), in their research on young golfers, emphasized the importance of "Individual Parental Support Preferences," noting that emotional, informational, and autonomy-supportive parenting practices positively influence athletic development. Knoester and Bjork (2025) linked parental socioeconomic background to long-term sport commitment. In addition, golf is considered a relatively high-cost sport, and the financial capacity of families can significantly influence children's access to training opportunities, equipment, and tournament participation (Knoester & Bjork, 2025).

In our study, it was found that the reasons why young golfers prefer this sport are closely related to family support. Family support in golf is a critical factor in terms of commitment and success in the sport. Family support plays an important role in children learning golf, developing their skills and establishing a long-term relationship with the sport. This finding is in line with other studies in the literature. When parents support their children's interest in golf, children's motivation increases. Parents' encouraging and positive attitudes develop children's self-confidence and help them cope with sports-related challenges. It has been reported that parents' encouragement of their children's participation in sports activities positively affects children's choice of sport and their commitment to this sport (Wuerth et al, 2004; Harwood et al, 2015; Dong-Su et al, 2025). In addition to emotional and motivational support, economic support—such as providing access to golf equipment, lessons, and tournament participation—is often a prerequisite in golf, which is known to be a high-cost sport. Additionally, a study on competitive junior female golfers (Burke et al., 2023) also highlighted the positive aspects of family support in youth golf.

5. Conclusions

The results of this study underline the significant influence of family involvement in sport and parents' occupational status as key factors shaping participation in golf. Family support not only encourages initial participation in sport, but also boosts athletes' motivation and promotes long-term commitment to sport. Based on these results, it is recommended that families take a more proactive role in guiding their children into sport and that policies are developed to improve access to sport education and opportunities for young athletes. The study results also show that family support is closely related to young athletes' motivation to take up golf. Not only does this support foster an early interest in sport, but it also contributes to skill development and sustained participation. Encouraging and supportive parental attitudes significantly increase children's self-confidence and resilience in the face of athletic challenges.

Finally, family involvement in sport and participation in golf as a sport proves to be influential not only in shaping children's orientation towards golf, but also in their long-term career planning in sport. Families who encourage their children to play golf, actively participate in their training and provide both financial and emotional support are crucial in fostering the motivation necessary for young athletes to progress in the sport.

Limitations

This study has several limitations. First, the sample is confined to a specific age group and a particular subset of athletes, which may limit the generalizability of the findings. Expanding the sample to include participants from a wider range of geographical regions, various sports disciplines, and female athletes would enhance the scope and applicability of the research.

Additionally, the study relies solely on self-reported data from the athletes, which could introduce subjective bias. Future research should incorporate parental perspectives to gain a more comprehensive understanding of the familial influence on children's engagement in golf. By integrating multiple viewpoints, researchers could obtain richer data and conduct a more in-depth analysis of the factors shaping young athletes' participation in the sport.

Future research Directions

In families with good or very good economic status, the presence of a family member involved in any sports discipline significantly influences children's interest in golf. Based on these findings, it is recommended that financial support programs be established, scholarship opportunities be provided for talented young athletes, and policies be developed to improve access to golf education. Such initiatives would contribute to the wider dissemination of golf across various socioeconomic groups.

Furthermore, future research should conduct more comprehensive investigations to gain a deeper understanding of the role of families in shaping children's sports orientation and the underlying factors that influence this process.Parental support plays a crucial role in fostering motivation and directly contributing to athletic success. As parents are a key source of motivation, raising awareness about the importance of their involvement in their children's sports engagement is vital. Expanding educational programs and awareness campaigns to enhance parental knowledge and involvement in sports-related activities would be a valuable step in supporting young athletes.

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Research Article

Investigation of Nutrition-Exercise Behaviors of Students Studying at the Faculty of Sports Sciences

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Abstract: The aim of this research is to investigate the nutrition-exercise behaviors of students studying at the Faculty of Sports Sciences. The research data were obtained using a survey. The research group consists of 472 students, 304 of whom are men and 168 of whom are women, studying at the Faculty of Sports Sciences of Bingöl University. As a data collection tool in the study, the 'personal information form' and the 'Nutrition-Exercise Behavior Scale' (BÖDÖ), which was prepared by the researchers Yurt et al. (2016), were used. To test the hypotheses of the research, percentage, frequency, mean, and standard deviation values were used as descriptive distribution distributions. The values of skewness and kurtosis were taken into account in assessing the normality assumptions. A T-test was used for binary variables, and one-way analysis of variance (one-way ANOVA) was used for more than two groups. To find the differences, the LSD test was preferred among the post-hoc analyses. In addition, Pearson correlation analysis was performed for the relationships between the variables. As a result, it has been seen that as age progresses, attention is paid to meal order and healthy nutrition, and male students eat more unhealthily than female students. Besides, university canteens should offer healthier food to students instead of ready meals or convenience foods and also provide regular sports field opportunities, provided by the university, to their students.

Keywords: Nutrition, exercise, sport.

1. Introduction

Increasing our standard of living has become as important as increasing our lifespan. Exercise (physical activity) and nutrition are seen as the most important factors in aging in a healthy way or coping with health problems associated with aging. Exercise and nutrition are considered to be the most important factors for a healthy and long life. In other words, inactivity and a life without exercise and poor eating habits are emerging as a major problem for human health (Tainio et al., 2017).

Nutrition is defined by the digestion, consumption, absorption, and metabolism of nutrients needed by the body (Haspolat et al., 2016). Consuming nutrients in amounts sufficient to improve living standards, as well as to support the nutrients needed by the body to grow, develop, maintain health, and productivity reveals the importance of nutrition (Altun & Kutlu, 2015). Adequate and moderate nutrition is seen as taking and using the nutrients needed for the development of the body, repair and renewal of body tissues, and the functioning of the body. Nutrition is considered an indispensable factor for growth, development, maintenance of life, and protection of one's own health (Demirezen & Coşansu, 2005). Proper nutrition, physical activity, and healthy weight are important parts of a person's overall health and well-being. At the same time, these factors help reduce the risk of developing serious health problems such as high blood pressure and cholesterol, heart disease, diabetes, cancer, and stroke (Bayrakdar and Zorba, 2020). In addition, changes in the factors affecting nutritional needs or different diets can cause health problems in people (Persil, 2004).

One of the social problems in our country is poor and irregular nutrition (Fişek, 1983). University students are among the groups at risk for nutritional problems. There are studies showing that university students are not adequately fed (Tokgöz et al., 1995; Sağlam & Yurttagül, 1987). It has been observed that students' meals are irregular, they eat only one meal , they prefer to consume more ready-to-eat foods, financial problems significantly impact good nutrition, students staying in dormitories do not eat well enough due to poor dormitory conditions, they are only full (Garibağaoğlu et al., 2006; Heşeminia et al., 2002; Durmaz et al., 2002).

Along with nutrition, exercise is also considered to be important for human health. Exercise, which is accepted as a sub-dimension of physical activity, is defined as an activity that aim to improve many elements of physical fitness through planned or voluntary continuous actions (Menteş et al., 2011). Inadequate physical activity contributes to the emergence of similar chronic diseases such as cardiovascular diseases, hypertension, osteoporosis, excessive weight gain, or loss, while adequate and regular nutrition has been found to positively affect mental and physical health (Yıldırım et al., 2019; Günal et al., 2018). It is thought that regular nutrition is necessary for good health and that everyone's engagement in a routine exercise program will be beneficial for their health.

It is seen that exercise is indispensable for people to maintain their physical, psychological, and social development and daily lives, as well as basic needs such as nutrition and shelter (Karaburçak et al., 2021). Sports sciences departments in universities in our country are some of the institutions responsible for education and training regarding the physiological, physical, sociological, and psychological effects of physical activity on human health. There are five departments in these faculties, and the students studying in these departments are expected to organize various physical activities for everyone in society. They are also expected to become trainers or managers in public or private organizations in the field of sports (Şimşek & Ökmen, 2020). According to the literature, it was reported that nutrition and exercise behaviors were examined in different sample groups, and especially athletes were more balanced in these behaviors (Ataoğlu et al., 2023; Yarar et al., 2023). In this context, especially the nutrition and exercise behavior tendencies of university students, who engage in sports, are of interest. Therefore, the aim of this study is to examine the nutrition-exercise change behaviors of students in the faculty of sport sciences.

2. Materials and Methods

Research Model: This study, which was conducted with the relational survey model, examined the nutrition-exercise behaviors of students in the faculty of sports sciences. Karasar (2015) described this model as “research models that determine the presence and/or degree of change in two or more variables”.

Research Group: In order to determine the number of samples required for the research, it was determined that at least 380 participants would be needed using G*Power bivariate correlation analysis to find an effect size of 1-β power 95%; alpha = 0.05, Cohen d = 0.03 (Faul et al., 2007). In this context, the sample group consisted of 472 students in total; 168 female and 304 males, studying at the Faculty of Sport Sciences of Bingöl University (Table 1).

Data collection tools: In the first part of the study, a demographic information form was used to obtain information such as gender, age, height, weight, disease status, weight loss attempt and regular physical activity. In the second part of the study, the Nutrition-Exercise Behavior Scale (NEBS) was used. The scale was developed by Yurt et al. (2016) and validated for its validity and reliability. NEBS are a scale consisting of 45 items, 4 sub-dimensions, and a 5-point Likert-type scale. In addition, the scale consists of the options: "1 - It does not define me at all,” “2,” and "5 - It defines me completely". In the study of Yurt et al. (2016), the overall reliability coefficient of the NEBS was found to be 0.85. On the basis of sub-dimensions, the alpha coefficient was found to be 0.84 for psychological (dependent) eating behavior (PDEB), 0.77 for healthy eating-exercise behavior (HNEB), 0.72 for unhealthy eating-exercise behavior (UNEB), and 0.74 for meal pattern (MP).

Ethical Aspect of Research: This research was carried out in accordance with the decision numbered E-33117789-799-178334 dated 30.09.2024 of the Bingöl University Scientific Research and Publication Ethics Commission and ethically appropriate care procedures.

Statistical analysis: SPSS 22 package program was used in the analysis, and the margin of error was set as 5%. Descriptive methods such as standard deviation, percentage, frequency, and mean were used to analyze the data. To determine the normality assumption, skewness and kurtosis values were found to be within the reference ranges of -1

and +1. In this case, it was accepted that the data obtained had a normal distribution (Büyüköztürk, 2018). (Table 2) For comparisons between two independent groups, a t-test was applied. In addition, Pearson correlation analysis was performed to determine the relationship between the variables.

3. Results

Table 1. Personal Information of Participants

Variables	Groups	Frequency(n)	Percent (%)	X̄
Gender	Woman	168	35,6	
	Male	304	64,4	
Age (year)				22
Height (m)				172
Body Mass (kg)				66
Diagnosed Disease Status	Yes	66	14,0	
	No	406	86,0	
Initiative to Lose Weight Status	Yes	133	28,2	
	No	339	71,8	
Is there a sport you do regularly?	Yes	251	53,2	
	No	221	46,8	

Table 2. Skewness, Kurtosis and Alpha Values of the Subscales of the Scale Used

Scales	Sub-dimensions	Skewness	Kurtosis	Alpha
NEBS	PDEB	-,350	-,031	,840
	HNEB	,221	,264	,831
	UNEB	-,346	,095	,717
	MP	-,350	-,263	,771

NEBS; Nutrition-Exercise Behavior Scale, PDEB; Psychological (Dependent) Eating Behavior, HNEB; Healthy Nutrition-Exercise Behavior, UNEB; Unhealthy Nutrition-Exercise Behavior, MP; Meal Pattern

When Table 2 is examined, it is observed that the skewness and kurtosis values of the scales used in the study are in the range of -1 to +1, as stated by Büyüköztürk (2018), and the distribution is normal. In addition, Cronbach's Alpha value ranges between 0 and 1, and reliability increases as the values approach 1 (Cronbach, 1990).

Table 3. T-Test Results of Exercise Behavior Scale Subscales According to Gender Variable

Sub-dimensions	Gender	n	X̄	Sd	t	p
PDEB	Woman	168	34,58	9,64	-3,621	,000*
	Male	304	37,58	7,93		
HNEB	Woman	168	39,82	9,49	-2,444	,015*
	Male	304	42,04	9,43		
UNEB	Woman	166	46,62	6,92	-3,166	,002*
	Male	304	48,59	6,17		
MP	Woman	168	18,45	4,99	-,438	,662
	Male	304	18,67	5,30		

**P<0,05; N (472) NEBS; Nutrition-Exercise Behavior Scale, PDEB; Psychological (Dependent) Eating Behavior, HNEB; Healthy Nutrition-Exercise Behavior, UNEB; Unhealthy Nutrition-Exercise Behavior, MP; Meal Pattern*

When Table 3 examined, While no difference was detected in the meal pattern sub-dimension based on gender (p>0.05), significant differences were determined in favor of male participants in the psychological/dependent eating behavior sub-dimension (X̄=37.58, p<0.05); healthy eating exercise behavior sub-dimension (X̄=42.04, p<0.05); and unhealthy eating behavior sub-dimension (X̄=48.59, p<0.05).

Table 4. Pearson Correlation Test Results of the Subscales of the Nutrition Exercise Behavior Scale According to Age, Height and Weight Variables

Variables		PDEB	HNEB	UNEB	MP
Age	r	-,001	,144	,049	,131
	p	,981	,002*	,290	,004*
Height	r	,052	,075	,013	-,020
	p	,260	,102	,781	,663
Weight	r	-,037	,061	-,009	,025
	p	,424	,185	,842	,594

**P<0,05; N (472) NEBS; Nutrition-Exercise Behavior Scale, PDEB; Psychological (Dependent) Eating Behavior, HNEB; Healthy Nutrition-Exercise Behavior, UNEB; Unhealthy Nutrition-Exercise Behavior, MP; Meal Pattern*

When Table 4 examined, no difference was found in the sub-dimensions of the scale based on the participants' age, height, and weight variables. A low-level positive relationship was found between the age status variable and the sub-dimensions of healthy eating and exercise behavior (r=0.144; p<0.05) and meal pattern (r=0.131; p<0.05).

Table 5. T-Test Results of Nutrition Exercise Behavior Scale Subscales According to Diagnosed Disease Status Variable

Sub-dimensions	DDS	N	X̄	Ss	t	p
PDEB	Yes	66	34,58	9,55	-1,968	,050
	No	406	36,84	8,50		
HNEB	Yes	66	40,56	10,73	-,631	,528
	No	406	41,36	9,30		
UNEB	Yes	66	47,39	7,57	-,673	,501
	No	404	47,98	6,32		
MP	Yes	66	18,50	5,55	-,157	,875
	No	406	18,61	5,14		

**p<0,05; N (472), DDS; Diagnosed disease status, NEBS; Nutrition-Exercise Behavior Scale, PDEB; Psychological (Dependent) Eating Behavior, HNEB; Healthy Nutrition-Exercise Behavior, UNEB; Unhealthy Nutrition-Exercise Behavior, MP; Meal Pattern*

When Table 5 examined, no difference was found in the sub-dimensions of the nutrition exercise behavior scale of the participants according to the diagnosed disease status (p>0.05).

Table 6. T-Test Results of the Nutrition Exercise Behavior Scale Sub-dimensions According to Intervention Status in Line with Weight Loss Goal

Sub-dimensions	SİLW	N	X̄	Ss	t	p
PDEB	Yes	133	34,68	8,38	-2,916	,004*
	No	339	37,25	8,70		
HNEB	Yes	133	41,24	10,70	-,007	,994
	No	339	41,25	9,00		
UNEB	Yes	132	46,98	6,38	-1,898	,058
	No	338	48,25	6,53		
MP	Yes	133	18,86	5,00	,692	,490
	No	339	18,49	5,27		

**P<0,05; N (472) SİLW; Status of the initiative to lose weight, NEBS; Nutrition-Exercise Behavior Scale, PDEB; Psychological (Dependent) Eating Behavior, HNEB; Healthy Nutrition-Exercise Behavior, UNEB; Unhealthy Nutrition-Exercise Behavior, MP; Meal Pattern*

When Table 6 examined, there was a significant difference in the psychological/dependent eating behavior sub-dimension (X̄=37.25, p<0.05) between individuals who did not attempt to lose weight and those who made an effort to lose weight.

Table 7. T-Test Results of Nutrition Exercise Behavior Scale Subscales According to Regular Sports Participation

Sub-dimensions	SPRB	N	X̄	Ss	t	p
PDEB	Yes	251	37,26	8,16	1,971	,049*
	No	221	35,68	9,18		
HNEB	Yes	251	45,09	8,97	10,380	,000*
	No	221	36,88	8,12		
UNEB	Yes	250	48,43	6,82	1,918	,056
	No	220	47,28	6,08		
MP	Yes	251	19,61	4,89	4,612	,000*
	No	221	17,44	5,29		

**p<0,05; N (472), SPRB; A sport that is practiced on a regular basis, NEBS; Nutrition-Exercise Behavior Scale, PDEB; Psychological (Dependent) Eating Behavior, HNEB; Healthy Nutrition-Exercise Behavior, UNEB; Unhealthy Nutrition-Exercise Behavior, MP; Meal Pattern*

When Table 7 examined, no difference was found in the sub-dimensions of unhealthy eating and exercise behavior according to the participants' regular sports participation status (p>0.05). In addition, significant differences were found in favor of the participants who answered 'yes' in terms of psychological/addictive eating behavior (X̄=37.26, p<0.05), healthy eating exercise behavior (X̄=45.09, p<0.05), and meal pattern sub-dimensions (X̄=19.61, p<0.05).

4. Discussion

This study aimed to examine the nutrition and exercise habits of students at the Faculty of Sports Sciences. The findings revealed significant insights regarding the levels of nutrition and exercise behaviors among these students. No gender differences were observed in the meal pattern sub-dimension. However, significant differences favoring male participants emerged in the sub-dimensions of psychological/addictive eating behavior, healthy eating behavior, and unhealthy eating behavior related to exercise. In line with these results, Yarar et al. (2023) reported no gender differences in scores on the Behavioral Exercise Diet Scale (NEBS) among adolescent athletes. Our findings suggest that the psychological/addictive eating behavior, healthy eating-exercise behavior, and meal pattern sub-dimensions exhibit parallel trends. Additionally, male students demonstrated lower cooking skills at home compared to females, leading to a higher frequency of eating out and subsequently poorer dietary habits. This finding aligns with previous research emphasizing psychosocial and environmental factors affecting dietary behaviors in young adults (Yıldız & Varsak, 2024).

Regarding age, no significant relationships were found in the psychological/addictive eating or unhealthy eating-exercise sub-dimensions. Conversely, significant associations appeared in the healthy eating, exercise performance, and daily organization sub-dimensions. These results partially diverge from Aykut et al. (2021), who identified significant age-related differences only in the meal pattern sub-dimension. The observed divergence might be due to the complexity of behavioral patterns, where healthy eating shows some inconsistencies with exercise behaviors but overlaps with meal pattern tendencies. As students age, they tend to develop more mature eating habits and prefer healthier food choices, supporting the notion of age-related positive dietary evolution (Ayaz-Alkaya & Kulakçı-Altıntaş, 2021).

No significant differences emerged in any NEBS sub-dimensions according to students' height and weight status. The literature appears scarce regarding the relationship between anthropometric measures and NEBS Sub-dimensions, indicating a gap warranting future investigation. Similarly, no significant effects of diagnosed disease status on nutrition and exercise behaviors were detected, and existing studies have scarcely addressed this relationship (Orhan & Muslu, 2024).

A significant difference was found solely in the psychological-dependent eating behavior sub-dimension in relation to participants' weight loss attempts. Akan (2018), however, reported differences only in the unhealthy eating behavior sub-dimension under similar conditions. This discrepancy suggests that while psychological/dependent eating behavior and unhealthy eating-exercise behavior sub-dimensions may diverge, meal pattern and healthy eating-exercise behavior sub-dimensions tend to converge. Therefore, students attentive to their meals are likely to maintain healthier diets and better weight control (Akan, 2018).

Differences were also identified in psychological/dependent eating behavior, healthy eating-exercise behavior, and meal pattern sub-dimensions based on participants' regular sports participation. Akan (2018) found no differences except in the psychological (dependent) eating behavior sub-dimension. Our findings indicate some contradictions regarding psychological/dependent eating behavior and unhealthy eating-exercise behavior sub-dimensions but confirm congruence in meal pattern and healthy eating-exercise behavior. These results imply that students engaged in regular physical activity pay more attention to their dietary habits and tend to make healthier food choices without skipping meals (Malkoç et al., 2020).

In summary, this study demonstrates the interconnected nature of nutrition and exercise behaviors among sports science students. Variables such as gender, age, weight loss attempts, and regular sports participation influence specific behavioral sub-dimensions. Consistent with the literature, the findings underscore the importance of developing targeted educational programs to enhance healthy lifestyle behaviors among university students (Lucini et al., 2024; Tosun et al., 2024).

5. Conclusions

In conclusion, the findings suggest that with increasing age, individuals tend to pay greater attention to maintaining regular meal patterns and adopting healthier eating habits. Male students were found to engage in less healthy dietary behaviors compared to female students. These results highlight the need for university cafeterias to provide healthier food options instead of fast food or ready-to-eat meals. Moreover, it is recommended that universities offer students accessible facilities and spaces for regular physical activity. Additionally, it was observed that students with higher monthly incomes are more likely to maintain healthy eating habits and avoid skipping meals, which appears to positively contribute to their psychological well-being.

Limitations

Despite providing meaningful insights into the nutrition and exercise behaviors of sports science students, this study has certain limitations. First, the study sample consisted solely of students from a single faculty, which limits the generalizability of the findings to other populations or disciplines. Additionally, data collection was based on self-reported measures, which may be subject to social desirability bias or inaccurate recall. The cross-sectional design also prevents the establishment of causal relationships between variables. Future research would benefit from longitudinal studies with more diverse and representative samples, incorporating objective measurements of dietary intake and physical activity levels.

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Research Article

Examination of Physical Education and Sports Teacher Candidates' Anxiety Towards Teaching Profession in Terms of Different Variables

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Abstract: Teaching is generally considered a secure profession in society. However, the recent increase in teacher training institutions has led to a rise in the number of qualified candidates, making graduation alone insufficient and contributing to anxiety. This descriptive study aimed to examine the professional anxiety levels of prospective physical education teachers. The study sample consisted of 437 (248 male, 189 female) 3rd and 4th grade students from faculties of sport sciences during the 2022–2023 academic year. Data were collected using the "Professional Anxiety Scale for Prospective Teacher". SPSS 22.0 was used for analysis. Although non-parametric tests initially indicated non-normal distribution, Skewness-Kurtosis values within ±2 allowed for the use of parametric tests. Independent samples t-test and One-Way ANOVA were applied at the 0.05 significance level. The results revealed that male students had higher levels of professional anxiety than females. Third-year students showed significantly more assignment- and adaptation-centered anxiety than fourth-year students ($p<0.05$). Vocational high school graduates had lower professional anxiety, while imam hatip high school graduates had higher anxiety ($p<0.05$). Those with a GPA of 3.51 and above exhibited more assignment-centered anxiety. Additionally, students whose mothers had only primary education reported higher levels of general and assignment-centered anxiety than those whose mothers were high school graduates. The findings suggest that targeted activities should be implemented to help reduce professional anxiety among prospective teachers.

Keywords: Physical education and sports, pre-service teacher, teaching profession, occupational anxiety

1. Introduction

The most important element of the education system is the teacher, and the functioning of the system is closely related to the knowledge and skills of teachers. Effective teachers are recognized as teachers who have the necessary knowledge and skills in their fields and who also have professional knowledge and skills in teaching. The organization of the teaching environment by the teacher is important in terms of the correct planning of how the learning outcomes will be taught to students. While preparing the students for the learning environment, it is important to make the right decision about how to teach the knowledge to the students by using which method, technique and strategy in relation to the target behaviors (Şen & Erişen, 2002). Education is a process that enables individuals to express and realize themselves. In this process, education and training activities are carried out in a well-planned environment through educational programs. Education is also an important process that enables the individual and society to adapt to social, economic, political and cultural changes. Educational organizations, which undertake the task and responsibility of changing behavior in the direction of a certain goal, have to carry out development activities at an adequate level in order to both improve their goals and activities and to adapt educators, who play important roles in the advancement of these goals

and activities, to new situations (Can, 2004). In the developing world order, there is a need for well-educated manpower in order to be among the countries that are constantly changing and following scientific, cultural and economic progress. The fulfillment of this need can be achieved through the training of teacher candidates equipped with knowledge and skills (Öztürk, 2005). The teacher is the most important pillar of the education system. Teachers play a leading role in the change and development of a country in raising well-equipped manpower, ensuring unity and solidarity in society, determining the place of individuals in social life, and transferring the culture and values of society to young generations. Teachers are artists who shape societies and shape human personality. Because of these characteristics, teaching has been a sacred profession for all segments of society (Özden, 2002). Teachers are the architects of the future of a country. It is always teachers who raise the qualified manpower necessary for the development of societies. Even the administrative level of countries is the work of teachers. Therefore, teachers play critical roles in the future, progress and governance of the country. Teachers are the most important part of the education system. Teachers play an important role in guiding the students they teach and determining their place in society (Bozdam, 2008).

As a profession, teaching is seen as safe in society, but the increase in the number of teacher training institutions in recent years has led to an increase in the number of qualified teachers. Therefore, it is seen that graduating from school is not enough and causes anxiety. It is very important for the development of our country to train teachers in a full capacity. We see that teaching is generally one of the most reliable professions at home. However, the increase in education faculties and colleges that train teachers causes an accumulation of teacher candidates. Therefore, it is seen that the Public Personnel Selection Examination, which is the criterion for teacher appointments, is not sufficient to perform the teaching profession and it has been observed that teacher candidates are in anxiety (Bozdam, 2008).

The difficulties experienced by prospective teachers in both undergraduate and KPSS exams cause anxiety, and issues such as the physical-technological facilities and culture of the regions where they are assigned, the possible administrators and colleagues they will work with, and their income status can create negative situations in the candidates. It is stated that anxiety is a directly related concept in terms of shaping the future and causes discomfort in physical and psychological life (Ceyhan, 2004).

According to Telef (2013), teachers' experiencing high levels of anxiety and job stress carries the risk of bringing consequences such as job dissatisfaction and absenteeism. He states that teachers should have a high level of positive psychology in order to provide efficient and effective education. Pre-service teachers may have concerns about the future of the angel such as difficulties in adapting to the culture of the region where they start working, difficulties in classroom management and discipline, communication problems with students, colleagues and parents, and conflicts brought by having different views in the school environment (Aktaş, 2016). Therefore, various possible concerns of prospective teachers are related to issues such as their undergraduate education process, the KPSS exam, the physical-technological facilities of the regions where they will start their profession, the administrators and colleagues they will work with, and the income level of the teaching profession. These issues may cause negative expectations, hesitations and related anxieties in prospective teachers. Pre-service teachers experience anxiety because they think that they may have problems in the future. One of the factors affecting this is economic anxiety. Pre-service teachers worry that their future professional earnings may be insufficient to meet their needs (Altun & Ateş, 2008). In addition to these, and perhaps more importantly, the necessity of having a personality and equipment worthy of the greatness of the profession and the moral weight of the responsibility to be undertaken can sometimes be an element of pressure and anxiety on teachers and therefore on prospective teachers. According to Telef (2013), teaching is one of the professions with high psychological tension. Anxiety is a factor that affects teachers' success and productivity in their profession. When teachers experience high levels of anxiety and job stress, it carries the risk of bringing consequences such as quitting, job dissatisfaction and absenteeism. He states that teachers should have a high level of positive psychology in order to provide efficient and effective education. Teachers face a number of professional concerns throughout their professional life and may become disenchanted with the teaching profession. Many reasons can be given for this situation.

These reasons include the person himself/herself, in-class and extracurricular activities, classroom management, parents, students, educational environment, course materials, school shifts, expectations of the school principal, and communication problems with colleagues (Öztürk, 2016; Tümkaya & Çavuşoğlu, 2010). In order for teachers to be successful in their professional lives, they should experience anxiety at the lowest level. A teacher who experiences

anxiety at a high level will constantly worry about whether he/she fulfills the responsibilities required by the teaching profession (Saracoğlu et al., 2009). In order for teachers to fulfill the roles and tasks expected of them successfully and to have a career in their profession, they need to feel psychologically well (Taşgın, 2006). It should be known that anxiety below or above a certain level can affect individuals negatively. It is not desirable to have no anxiety at all. In all occupational fields, anxiety affects work efficiency in that occupational field to a greater or lesser extent. Classroom teachers, who shape the future of countries, also need to struggle with anxiety. The factors that cause the anxiety experienced by classroom teachers should be identified and these anxieties should be prevented (Kuru, 2018). The aim of this study is to determine the anxiety of prospective physical education and sports teachers towards teaching profession. From this point of view, it is thought that this study, which was conducted to determine the occupational anxiety levels of prospective physical education and sports teachers, which type of occupational anxiety they are more affected by and what their anxiety levels are formed depending on, will shed light on the current situation, policy makers, decision makers and practitioners, and contribute to the literature.

2. Materials and Methods

2.1. Research Group

The study was conducted on prospective physical education and sports teachers studying at different universities in the 2022-2023 academic year on a voluntary basis. 472 prospective physical education and sports teachers participated in the study voluntarily. Incomplete or incorrectly completed scales were excluded from the study and the scales completed by a total of 437 prospective teachers (248 male, 189 female) were evaluated within the scope of the study.

2.2. Research Design

This study is a descriptive survey model study conducted to examine the classroom management skills of physical education teachers in terms of different variables. "The survey model is a research model in which it is aimed to describe a past or current situation as it is without affecting it" (Karasar, 2014).

2.3. Data Collection

The "Professional Anxiety Scale for Prospective Teachers", which was developed by Cabı & Yalçınalp (2013) and whose validity and reliability analyses were conducted, was used as a data collection tool by obtaining permission from the developer of the scale via e-mail. The items of the Vocational Anxiety Scale, which is organized in 5-point Likert type, are evaluated by the prospective classroom teachers participating in the study by choosing one of the options from "I am not worried" (1) to "I am very worried" (5). The higher the average score of the individuals in a sub-dimension indicates high professional anxiety in that field. The average of the total of the sub-dimensions shows the general level of occupational anxiety, and a high average score indicates high occupational anxiety, while a low average score indicates low occupational anxiety.

In order to collect data in the study, "Professional Anxiety Scale for Prospective Teachers" was applied to 437 prospective physical education teachers working in Gaziantep province in the spring semester of the 2022-2023 academic year. Before the measurement tool was applied to the participants, the purpose of the study was voluntarily explained to the participants together with the scale. The measurement tool used in the study was administered face-to-face by the teachers in approximately 20-30 minutes. During the completion of the measurement tools, attention was paid to the voluntariness of the participants.

2.4. Data Analysis

For the statistical analysis of the data in the study, the data obtained from the scales were coded into the computer environment and the SPSS 22.0 program was used. Descriptive statistics calculations were made in the data in the study. Non-parametric normality tests were performed to determine whether the research data were normally distributed. For the data sets that did not show normal distribution, Kurtosis-Skewness values were examined and since the values were between +2/-2, it was determined that the data showed normal distribution and parametric tests were applied. Independent sample t-test and One-Way Anova analyses were used to determine the differences between independent variables and the numerical data were interpreted in tables. The tests were used because the data were not normally distributed.

2.5. Ethics Committee Permission

Ethical permissions were obtained with the decision of Gaziantep University Social and Human Sciences Ethics Committee dated 01.11.2022 and numbered 253660.

3. Results

Table 1. Comparison of the participants' scores obtained from the scale in terms of gender variable

Factor	Group	N	Mean Rank	Sum of Rank	U	P
Task-centered anxiety	Female	189	201,77	38134,50	-2,491	,013
	Male	248	232,13	57568,50		
Economic social-centered concern	Female	189	213,66	40382,50	-,773	,439
	Male	248	223,07	55320,50		
Student communication-centered anxiety	Female	189	199,51	37706,50	-2,856	,004
	Male	248	233,86	57996,50		
Colleague and parent-centered anxiety	Female	189	200,22	37841,00	-2,752	,006
	Male	248	233,31	57862,00		
Personal development-centered anxiety	Female	189	205,17	38776,50	-2,029	,042
	Male	248	229,54	56926,50		
Appointment-centered anxiety	Female	189	215,80	40787,00	-4,464	,643
	Male	248	221,44	54916,00		
Adaptation-centered anxiety	Female	189	218,29	41257,50	-1,104	,917
	Male	248	219,54	54445,50		
School management-centered anxiety	Female	189	215,13	40660,50	-,564	,573
	Male	248	221,95	55042,50		

p<0,05

Table 1 shows the comparison of the participants' scores obtained from the scale in terms of gender variable. According to the results of the mann whitney u test, a significant difference was found in the sub-dimensions of task-centered anxiety, student communication-centered anxiety, colleague and parent-centered anxiety, and personal development-centered anxiety. There was no significant difference in the other sub-dimensions of the scale. In this sense, it was seen that males had higher scores than females in task-centered anxiety, student communication-centered anxiety, colleague and parent-centered anxiety, and personal development-centered anxiety. Therefore, it can be said that male pre-service teachers have more professional anxiety than female pre-service teachers.

Table 2. Comparison of the scores obtained from the scale in terms of the grade level of the participants

Factor	Classroom	N	Mean Rank	Sum of Rank	U	P
Task-centered anxiety	3rd grade	200	223,83	44766,00	-,737	,461
	4th grade	237	214,92	50937,00		
Economic social-centered concern	3rd grade	200	223,87	44774,00	-,743	,458
	4th grade	237	214,89	50929,00		
Student communication-centered anxiety	3rd grade	200	223,82	44764,00	-,743	,458
	4th grade	237	214,93	50939,00		
Colleague and parent-centered anxiety	3rd grade	200	226,13	45225,00	-1,099	,272
	4th grade	237	212,99	50478,00		

Table 2. (Continue)

Factor	Classroom	N	Mean Rank	Sum of Rank	U	P
Personal development-centered anxiety	3rd grade	200	222,80	44559,50	-,586	,558
	4th grade	237	215,80	51143,50		
Appointment-centered anxiety	3rd grade	200	235,92	47183,00	-2,583	,010
	4th grade	237	204,73	48520,00		
Adaptation-centered anxiety	3rd grade	200	236,48	47295,00	-2,714	,007
	4th grade	237	204,25	48408,00		
School management-centered anxiety	3rd grade	200	216,28	43256,50	-,417	,677
	4th grade	237	221,29	52446,50		

p<0,05

Table 2 shows the comparison of the scores obtained from the scale in terms of the grade level of the participants. According to the results of the mann whitney u test, a significant difference was found between the variables of assignment-centered anxiety and adaptation-centered anxiety. There was no significant difference in the other sub-dimensions of the scale. It was seen that 3rd grade pre-service teachers' assignment-centered anxiety and adaptation-centered anxiety scores were higher than those of 4th grade pre-service teachers. From this point of view, it can be said that the occupational anxiety of pre-service teachers studying in the 3rd grade is higher than pre-service teachers studying in the 4th grade.

Table 3. Comparison of the participants' scores obtained from the scale in terms of the type of high school they graduated from

Factor	Graduated high school	N	X̄	SD	Sum of Rank	Kruskal Wallis		Difference
						X^2	p	
Task-centered anxiety Economic social-centered concern Student communication-centered anxiety	Anadolu	437	4,0449	,91616	220,12	8,169	,086	3<1
	Flat				226,90			3<2
	Profession				186,41			3<4
	Sport				226,83			
	I.Hatip				253,30			
Colleague and parent-centered anxiety Personal development-centered anxiety	Anadolu	437	3,4577	1,12354	204,74	23,009	,000	1<5
	Flat				213,46			2<5
	Profession				211,52			3<5
	Sport				231,70			4<5
	I.Hatip				310,31			
Appointment-centered anxiety Adaptation-centered anxiety	Flat	437	4,0488	1,03008	228,27	6,935	,139	
	Profession				206,25			
	Sport				192,31			
	I.Hatip				217,73			
	Anadolu				245,18			
Task-centered anxiety Economic social-centered concern Student communication-centered anxiety	Anadolu	437	4,0439	,98376	225,28	8,638	,071	
	Flat				228,46			
	Profession				182,18			
	Sport				216,81			
	I.Hatip				241,59			
Colleague and parent-centered anxiety Personal development-centered anxiety	Profession	437	3,9634	1,05542	222,79	6,102	,192	
	Sport				207,79			
	I.Hatip				195,74			
	Anadolu				231,37			
	Flat				250,05			

Groups: *1st group=Anatolian high school, 2nd group=Straight high school, 3rd group=Vocational high school, 4th group=Sports high school, 5th group=Imam Hatip high school.*

Table 3. (Continue)

Factor	Graduated high school	N	X̄	SD	Sum of Rank	Kruskal Wallis		Difference
						X^2	p	
Appointment-centered anxiety Adaptation-centered anxiety	Anadolu Flat Profession	437	2,7590	1,27505	225,71 206,69 227,47 177,19 237,92	7,419	,115	
Task-centered anxiety Economic social-centered concern Student communication-centered anxiety	Sport I.Hatip	437	3,9802	1,00286	226,08 217,34 179,07 219,24 261,34	12,759	,013	3<1 3<5
		437	3,6743	1,05043	213,72 216,26 187,18 238,51 294,18	19,636	,001	1<5 2<5 3<5

Groups: *1st group=Anatolian high school, 2nd group=Straight high school, 3rd group=Vocational high school, 4th group=Sports high school, 5th group=Imam Hatip high school.*

Table 3 shows the comparison of the scores obtained by the participants in terms of the type of high school they graduated from. Accordingly, when the results of the Kruskal-Wallis analysis were examined in terms of the type of high school graduated from, a significant differentiation was observed in the task-centered anxiety, economic and social-centered anxiety, adaptation-centered anxiety, and school management-centered anxiety sub-dimensions of the scale. In order to determine between which groups this differentiation was between, post hoc test was performed, and the differentiated groups are given in the table. There was no significant differentiation in the other sub-dimensions of the scale. Accordingly, in the task-centered anxiety sub-dimension of the scale, it was seen that the anxiety scores of Anatolian High School, regular high school and sports high school graduates were higher than vocational high school graduates. In other words, it can be said that the occupational anxiety of vocational high school graduates is lower than other types of graduates.

In the economic social-centered anxiety sub-dimension of the scale; it was seen that the vocational anxiety scores of imam hatip high school graduates were higher than other graduates. Therefore, it can be said that graduates of imam hatip high school have more economic social centered anxiety than others. In the adjustment-centered anxiety sub-dimension of the scale, it was seen that the occupational anxiety scores of Anatolian high school graduates and imam hatip high school graduates were higher than vocational high school graduates. In other words, it can be said that vocational high school graduates have lower occupational anxiety than the others. In the school management-centered anxiety sub-dimension of the scale, it was seen that the occupational anxiety scores of imam hatip high school graduates were higher than those of Anatolian, regular and vocational high school graduates. Therefore, it can be said that the school management-centered anxiety of imam hatip high school graduates is higher than the others.

Table 4 shows the comparison of the participants' scores obtained from the scale in terms of the type of academic AGP. Accordingly, when the results of the Kruskal-Wallis analysis were analyzed in terms of the type of academic AGP, a significant difference was found in the assignment-centered anxiety dimension of the scale. In order to determine between which groups this differentiation was between, post hoc test was performed, and the differentiated groups are given in the table. There was no significant difference in the other sub-dimensions of the scale. In this sense, it was observed that pre-service teachers with an academic grade point average of 3.51 and above had higher assignment-centered anxiety than the other groups. Therefore, we can say that as academic achievement increases, preservice teachers' occupational anxiety increases.

Table 4. Comparison of the scores obtained from the scale in terms of the participants' academic grade point (AGP) type variable

Factor	Academic grade point average	N	X̄	SD	Sum of Rank	Kruskal Wallis		Difference
						X^2	p	
Task-centered anxiety	2,01-2,50	54	4,0449	,91616	232,79	5,913	,116	
	2,51-3,00	189			205,61			
Economic social-centered concern	3,01-3,50	171			223,41			
	3,51 ve üstü	23			263,85			
Student communication-centered anxiety	2,01-2,50	54	3,4577	1,12354	218,44	1,859	,602	
	2,51-3,00	189			210,78			
Colleague and parent-centered anxiety	3,01-3,50	171			225,54			
	3,51 ve üstü	23			239,22			
Personal development-centered anxiety	2,01-2,50	54	4,0488	1,03008	246,21	3,915	,271	
	2,51-3,00	189			209,94			
Appointment-centered anxiety	3,01-3,50	171			222,11			
	3,51 ve üstü	23			206,48			
Adaptation-centered anxiety	2,01-2,50	54	4,0439	,98376	227,52	2,795	,424	
	2,51-3,00	189			217,10			
Task-centered anxiety	3,01-3,50	171			213,30			
	3,51 ve üstü	23			257,00			
Economic social-centered concern	2,01-2,50	54	3,9634	1,05542	228,75	,816	,846	
	2,51-3,00	189			213,45			
Student communication-centered anxiety	3,01-3,50	171			222,12			
	3,51 ve üstü	23			218,50			
Colleague and parent-centered anxiety	2,01-2,50	54	2,7590	1,27505	223,17	22,045	,000	2<3
	2,51-3,00	189			189,12			
Personal development-centered anxiety	3,01-3,50	171			242,59			2<4
	3,51 ve üstü	23			279,37			
Appointment-centered anxiety	2,01-2,50	54	3,9802	1,00286	231,15	2,907	,406	
	2,51-3,00	189			211,75			
Adaptation-centered anxiety	3,01-3,50	171			218,61			
	3,51 ve üstü	23			252,96			
	2,01-2,50	54	3,6743	1,05043	233,10	3,836	,280	
	2,51-3,00	189			208,94			
	3,01-3,50	171			220,83			
	3,51 ve üstü	23			254,91			

Groups: 1st group=2.01-2.50., 2nd group=2.51-3.00., 3rd group=3.01-3.50., 4th group=3.51 and above

Table 5. Comparison of the participants' scores obtained from the scale in terms of mother's education level

Factor	Mother Education Status	N	X̄	SD	Sum of Rank	Kruskal Wallis		Difference
						X^2	p	
Task-centered anxiety	Primary School	354	4,0449	,91616	219,22	16,701	,001	3<1
	Middle School	36			266,72			
Economic social-centered concern	High School	34			146,96			3<1
	University	11			238,73			
Student communication-centered anxiety	Primary School	354	3,4577	1,12354	219,40	6,990	,072	
	Middle School	36			239,65			
Colleague and parent-centered anxiety	High School	34			169,57			
	University	11			251,77			

Groups: *1st group=Primary school, 2nd group=Middle school, 3rd group=High school, 4th group=University.*

Table 5. (Continue)

Factor	Mother Education Status	N	X̄	SD	Sum of Rank	Kruskal Wallis		Difference
						X^2	p	
Personal development-centered anxiety Appointment-centered anxiety	Primary School	354	4,0488	1,03008	218,78	21,740	,000	3<1 3<2 3<4
	Middle School	36			266,88			
	High School	34			139,29			
	University	11			276,32			
Adaptation-centered anxiety Task-centered anxiety	Primary School	354	4,0439	,98376	218,71	16,506	,001	3<1 3<2 3<4
	Middle School	36			254,82			
	High School	34			150,16			
	University	11			284,18			
Economic social-centered concern Student communication-centered anxiety	Primary School	354	3,9634	1,05542	218,64	7,637	,054	
	Middle School	36			249,63			
	High School	34			170,82			
	University	11			239,82			
Colleague and parent-centered anxiety Personal development-centered anxiety	Primary School	354	2,7590	1,27505	216,92	1,432	,698	
	Middle School	36			240,38			
	High School	34			208,10			
	University	11			210,23			
Appointment-centered anxiety Adaptation-centered anxiety	Primary School	354	3,9802	1,00286	222,18	8,628	,035	3<1 3<2 3<4
	Middle School	36			229,35			
	High School	34			158,96			
	University	11			228,77			
	Primary School	354	3,6743	1,05043	217,16	1,073	,783	
	Middle School	36			236,17			
	High School	34			206,57			
	University	11			220,82			

Groups: *1st group=Primary school, 2nd group=Middle school, 3rd group=High school, 4th group=University.*

Table 5 shows the comparison of the participants' scores obtained from the scale in terms of their mother's education level. According to the results of the Kruskal-Wallis analysis, it was found that there was a significant difference in the sub-dimensions of task-centered anxiety, student communication-centered anxiety, colleague and parent-centered anxiety, and adaptation-centered anxiety. In order to determine between which groups this differentiation was between, post hoc (tamhane) test was performed, and the differentiated groups are given in the table. There was no significant difference in the other sub-dimensions of the scale.

In this sense, in the task-centered anxiety sub-dimension of the scale, it was seen that those with primary school education were higher than those with high school graduates. In other words, it can be said that those whose mother's education level is primary school have higher occupational anxiety than high school graduates. In the student communication-centered anxiety sub-dimension of the scale; it was seen that those whose mothers' education level was primary school, secondary school and university were higher than those with high school graduates. In other words, it can be said that those whose mother's education level is high school have lower levels of professional anxiety than other graduates. In the colleague and parent-centered anxiety sub-dimension of the scale, it was seen that those whose mothers' education level was primary school, secondary school and university were higher than those with high school graduates. In other words, it can be said that those whose mother's education level is high school have lower professional anxiety than other graduates. In the assignment-centered anxiety sub-dimension of the scale, it was seen that those with primary school, secondary school and university education levels were higher than those with high school graduates. In other words, it can be said that those whose mother's education level is high school have lower occupational anxiety than other graduates.

Table 6. Comparison of the participants' scores obtained from the scale in terms of father's education level

Factor	Father Education Status	N	X̄	SD	Sum of Rank	Kruskal Wallis		Difference
						X^2	p	
Task-centered anxiety Economic social-centered concern	Primary School	240	4,0449	,91616	231,06	5,508	,138	
	Middle School	88			202,55			
	High School	87			201,17			
	University	21			213,52			
Student communication-centered anxiety Colleague and parent-centered anxiety	Primary School	240	3,4577	1,12354	230,48	8,575	,036	
	Middle School	88			220,32			
	High School	87			184,53			
	University	21			214,74			
Personal development-centered anxiety Appointment-centered anxiety	Primary School	240	4,0488	1,03008	227,83	5,216	,157	
	Middle School	88			218,40			
	High School	87			192,33			
	University	21			220,79			
Adaptation-centered anxiety Task-centered anxiety	Primary School	240	4,0439	,98376	233,18	12,468	,006	3<1 3<2 3<4
	Middle School	88			203,64			
	High School	87			184,97			
	University	21			251,98			
Economic social-centered concern Student communication-centered anxiety	Primary School	240	3,9634	1,05542	230,91	7,799	,050	
	Middle School	88			213,32			
	High School	87			188,15			
	University	21			224,10			
Colleague and parent-centered anxiety Personal development-centered anxiety	Primary School	240	2,7590	1,27505	213,92	2,123	,547	
	Middle School	88			229,95			
	High School	87			213,23			
	University	21			244,71			
Appointment-centered anxiety Adaptation-centered anxiety	Primary School	240	3,9802	1,00286	236,78	12,616	,006	3<1 3<2
	Middle School	88			205,18			
	High School	87			187,70			
	University	21			193,02			
	Primary School	240	3,6743	1,05043	228,40	3,640	,303	
	Middle School	88			211,65			
	High School	87			202,29			
	University	21			201,26			

Groups: *1st group=Primary school, 2nd group=Middle school, 3rd group=High school, 4th group=University.*

Table 6 shows the comparison of the participants' scores obtained from the scale in terms of their father's education level. According to the results of the Kruskal-Wallis analysis, it was found that there was a significant difference in the sub-dimensions of colleague- and parent-centered anxiety and adaptation-centered anxiety. In order to determine between which groups this differentiation was between, post hoc (tamhane) test was performed and the differentiated groups are given in the table. There was no significant difference in the other sub-dimensions of the scale. In this sense, in the colleague- and parent-centered anxiety sub-dimension of the scale, it was seen that those whose father's education level was primary school, secondary school and university were higher than those who were high school graduates. In other words, it can be said that those whose mother's education level is high school have lower professional anxiety than other graduates. In the assignment-centered anxiety sub-dimension of the scale, it was seen that those with primary and secondary school education levels were higher than those with high school graduates. In other words, it can be said that those whose mother's education level is high school have lower occupational anxiety than other graduates.

4. Discussion

In this part of the study, the results obtained in order to examine the occupational anxiety of prospective physical education and sports teachers towards the teaching profession in terms of different variables are given.

When we look at whether the anxiety of the research group towards their profession differs according to the gender variable, a significant difference was determined in the task-centered anxiety, student communication-centered anxiety, colleague and parent-centered anxiety, and personal development-centered anxiety sub-dimensions of the scale. There was no significant difference in the other sub-dimensions of the scale. In this sense, it was seen that males had higher scores than females in task-centered anxiety, student communication-centered anxiety, colleague and parent-centered anxiety, and personal development-centered anxiety. Therefore, it can be said that male pre-service teachers have more professional anxiety than female pre-service teachers. In his study, Kara (2020) reported that the occupational anxiety levels of male pre-service teachers were significantly higher than female pre-service teachers. In their research, Uygun et al. (2016), Baştürk (2007) stated that male pre-service teachers had higher levels of occupational anxiety. Bilgici and Deniz (2016), on the other hand, found that male pre-service preschool teachers had high task-centered anxiety.

On the contrary, Deniz & Tican (2017) reported that female pre-service teachers' student/communication-centered, colleague and parent-centered, and adjustment-centered anxiety levels were significantly higher than male pre-service teachers. Likewise, researchers in different studies have concluded that women have higher levels of occupational anxiety. Again, when the literature was examined, it was found that female pre-service teachers had higher levels of professional anxiety than male pre-service teachers (Tabancalı et al., 2016; Dilmaç, 2010).

When we looked at whether the anxiety states of the research group towards their professions differed according to the grade level variable, a significant difference was found between the variables of assignment-centered anxiety and adaptation-centered anxiety. There was no significant difference in the other sub-dimensions of the scale. It was seen that 3rd grade pre-service teachers' assignment-centered anxiety and adaptation-centered anxiety scores were higher than those of 4th grade pre-service teachers. From this point of view, it can be said that the occupational anxiety of pre-service teachers studying in the 3rd grade is higher than pre-service teachers studying in the 4th grade. In his study with pre-service teachers, Gümrükçü-Bilgici (2016) concluded that there was a significant difference between the levels of occupational anxiety and the grades studied. On the other hand, different researchers have concluded that there is a significant difference between occupational anxiety and the grade level variable in their studies (Coşkuner & Uğurlu, 2020, Harmandar Demirel et al., 2018). We can say that these results support our study. On the contrary, Türkdoğan (2014) expressed the opinion that there was no significant difference between pre-service teachers' professional anxiety and grade level.

When we looked at whether the anxiety states of the research group towards their professions differed according to the type of high school graduated from, a significant differentiation was observed in the sub-dimensions of the scale; task-centered anxiety, economic social-centered anxiety, adaptation-centered anxiety, school management-centered anxiety. There was no significant differentiation in the other sub-dimensions of the scale. Accordingly, in the task-centered anxiety sub-dimension of the scale, it was seen that the anxiety scores of Anatolian High School, regular high school and sports high school graduates were higher than vocational high school graduates. In other words, it can be said that the occupational anxiety of vocational high school graduates is lower than other types of graduates. In the economic social centered anxiety sub-dimension of the scale; it was seen that the vocational anxiety scores of imam hatip high school graduates were higher than other graduates. Therefore, it can be said that graduates of imam hatip high school have more economic social-centered anxiety than others. In the adaptation-centered anxiety sub-dimension of the scale, it was observed that the vocational anxiety scores of Anatolian high school graduates and imam hatip high school graduates were higher than vocational high school graduates. In other words, it can be said that vocational high school graduates have lower occupational anxiety than the others. In the school management-centered anxiety sub-dimension of the scale, it was seen that the occupational anxiety scores of imam hatip high school graduates were higher than those of Anatolian, regular and vocational high school graduates. Therefore, it can be said that imama hatip high school graduates have more school management-centered anxiety than others.

Çubukçu and Dönmez (2011), in their study on prospective teachers from different branches, reported that there was a significant difference between the level of professional anxiety and the type of high school graduated from. Alisinanoğlu

et al. (2010) stated that there was a significant difference in the anxiety level of prospective teachers in terms of the type of high school graduated from. In the study of Gümrükçü-Bilgici (2016), we can say that the level of occupational anxiety of pre-service preschool teachers differs significantly depending on the type of high school graduated.

When we examined whether the anxiety states of the research group towards their professions differed in terms of the academic grade point average variable, a significant difference was determined in the assignment-centered anxiety dimension. In this sense, it was observed that pre-service teachers with an academic grade point average of 3.51 and above had higher assignment-centered anxiety than the other groups. Therefore, we can say that as academic achievement increases, pre-service teachers' occupational anxiety increases.

Tümerdem (2007) included findings supporting this finding in his study. In the study, it was found that pre-service teachers at the "medium" achievement level had the highest level of professional anxiety. In different studies conducted in the literature, it was concluded that there were significant differences between professional anxiety and grade point average variable (Türkdoğan, 2014; Dursun & Karagün, 2012; Temiz, 2011). The reason why the AGP variable is not related to occupational anxiety is that AGP only shows academic success. Having a high AGP does not necessarily mean that a person will not feel anxiety. He/she may also feel anxiety to achieve more success. On the other hand, a person with a low AGP does not necessarily mean that he or she is constantly anxious. This person can minimize his/her anxiety level by turning to other areas where he/she feels competent.

When we looked at whether the anxiety states of the research group towards their professions differed according to the mother's education level variable, it was found that there was a significant difference in the sub-dimensions of task-centered anxiety, student communication-centered anxiety, colleague and parent-centered anxiety, and adaptation-centered anxiety. There was no significant difference in the other sub-dimensions of the scale. In this sense, in the task-centered anxiety sub-dimension of the scale; it was seen that those whose mother's education level was primary school were higher than those with high school graduates. In other words, it can be said that those whose mother's education level is primary school have higher occupational anxiety than high school graduates. In the student communication-centered anxiety sub-dimension of the scale; it was seen that those whose mothers' education level was primary school, secondary school and university were higher than those with high school graduates. In other words, it can be said that those whose mother's education level is high school have lower levels of professional anxiety than other graduates. In the colleague- and parent-centered anxiety sub-dimension of the scale, it was seen that those whose mother's education level was primary school, secondary school and university were higher than those with high school graduates. In other words, it can be said that those whose father's education level is high school have lower professional anxiety than other graduates. In the assignment-centered anxiety sub-dimension of the scale, it was observed that those with primary school, secondary school and university education levels were higher than those with high school graduates. In other words, it can be said that those whose father's education level is high school have lower levels of occupational anxiety than other graduates.

Şen (2016) found that the occupational anxiety levels of pre-service teachers differed significantly depending on the educational status of the mother. Therefore, we can say that the findings of this study are similar to our results. On the contrary, Türkdoğan (2014), in his study among pre-service teachers, stated that the occupational anxiety levels of the students did not differ significantly in terms of the mother's education level.

When we looked at whether the anxiety levels of the research group towards their professions differed according to the father's education level variable, it was found that there was a significant difference in the sub-dimensions of colleague and parent-centered anxiety and adaptation-centered anxiety. There was no significant difference in the other sub-dimensions of the scale. In this sense, in the colleague- and parent-centered anxiety sub-dimension of the scale; it was seen that those whose father's education level was primary school, secondary school and university were higher than those with high school graduates. In other words, it can be said that those whose mother's education level is high school have lower professional anxiety than other graduates. In the assignment-centered anxiety sub-dimension of the scale, it was seen that those with primary and secondary school education levels were higher than those with high school graduates. In other words, it can be said that those whose mother's education level is high school have lower occupational anxiety than other graduates.

Şen (2016), in his study with pre-service preschool teachers, found that the occupational anxiety levels of pre-service teachers differed significantly depending on the educational status of the father. However, Öztürk (2018) revealed in his study that the occupational anxiety levels of prospective classroom teachers did not cause a significant difference according to the educational status of the father. Similarly, Türkdoğan (2014) stated in his study among the students of the faculty of education that the occupational anxiety levels of prospective teachers did not differ significantly according to the educational status of the father.

5. Conclusion

As a result, it was determined that the anxiety levels of the research group towards their professions differed in terms of gender variable and the occupational anxiety levels of male pre-service teachers were higher than female pre-service teachers. It was found that there was a significant difference between the variables of assignment-centered anxiety and adaptation-centered anxiety in terms of the grade level of the scale, and the occupational anxiety of the pre-service teachers studying in the 3rd grade was higher than the pre-service teachers studying in the 4th grade. In terms of the type of high school the participants graduated from, vocational high school graduates had lower professional anxiety than other high school types, while imam hatip high school graduates had higher professional anxiety. In terms of the academic grade point average variable, it was observed that pre-service teachers with a grade point average of 3.51 and above had higher assignment-centered anxiety than the other groups. In addition, in terms of the mother's education level variable, it was seen that those with primary school education had higher levels of occupational anxiety than those with high school graduates, while in the sub-dimension of assignment-centered anxiety; it was concluded that those with primary school, secondary school and university education levels were higher than those with high school graduates. Different activities can be organized to minimize the anxiety levels of teachers regarding their profession. Some of the personal rights of teachers can be improved and their motivation can be increased. Recommendations; comparisons can be made between different branch teachers. Comparisons can be made in terms of different class levels. The research can be applied to teachers working in different provinces.

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Research Article

The Metaphorical Perception of Fencing Referees Towards the Concept of Fencing

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Abstract: The aim of the research is to reveal the metaphorical perceptions of the fencing referees towards the concept of fencing. 80 fencing referees who are actively licensed participated in the research. Phenomenology design, one of the qualitative research methods, was used. In obtaining the data, a personal information form was applied to each referee, and the referees were asked, "Fencing is like/similar to……; because……" were asked to complete the sentence. All participants took part in the research voluntarily. The data were analyzed by content analysis technique. In the data analysis, the stages of coding, category development, validity and reliability, creating and interpreting themes were followed. When the referees' perceptions of fencing were examined, it was concluded that they perceived fencing as a strategy, struggle, emotion, and life element. Although it is thought that the research can be a source of ideas for field education and other studies to be conducted in the field, it is considered that research conducted in larger sample groups and different disciplines will contribute to the field.

Keywords: Fencing, referee, sports, perception, metaphor.

1. Introduction

Fencing is a sport discipline that requires physical skills and technique, individuals' working capacity and willingness to work as a determining factor, requires the mind to compete over time to cope with unpredictable challenges (Cheris, 2002), requires skills such as agility, quickness and reaction to adapt to situations with instantaneous variability (Yao, 2022), is performed in three disciplines: epee, foil, and sabre within the framework of specific rules with its unique equipment and has a long history (Tümlü, 2009). Fencing is not only a physical combat sport discipline but also a thinking sport discipline known as the art of defending against an opponent's attack and, therefore, requires strategic intelligence (Barth & Beck, 2006).

In fencing, the number of variables needed to analyze strikes is very high, which makes fencing refereeing difficult and complex. Therefore, the key to success in fencing refereeing is to make the right decision by quickly gathering information from various variables and the positions of the player's limbs. Making the right decision is only possible by paying attention to the necessary environmental cues and the areas containing the essential information. The fencing referee must know they will respect the rules, ensure they are followed, and fulfill their duties with the strictest impartiality and absolute concentration (International Fencing Federation, 2021).

Referees, who play an essential role in conducting competitions fairly and by the rules, are responsible for ensuring justice in the competition with their decisions and attitudes (Karacam & Adıguzel, 2019; Pekel et al., 2023). Therefore, to make decisions appropriate to the level of the competition, they should have mental competencies such as impartiality, determination, communication, stress management, attention and concentration, analytical thinking,

empathy, and self-confidence (Mascarenhas et al., 2005; Firek et al., 2020; Gorczynski & Webb, 2021). Therefore, fencing referees' perceptions and thought processes influencing decision-making are critical (Aghakhanpour et al., 2021).

Metaphors can be used to determine the perceptions of fencing referees that affect their performance and decision-making process. While metaphors help individuals describe their perceptions of the concept in their minds with concrete concepts (Saban, 2004), they contribute to interpreting and clarifying the concept by seeing different aspects of the concept and revealing how concepts are perceived (Randall & Jennifer, 2005). Metaphors can reflect individuals' life experiences and determine their perceptions (Godor, 2019). In this way, connections are established between our minds and concepts without changing the underlying meanings of the concepts (Kövecses, 2002).

It is thought that examining the perceptions of fencing referees towards the concept of fencing with the help of metaphors will allow evaluation of the referees' thought systems, conceptual errors, ideas, and opinions about fencing.

When the literature is examined, there are metaphor studies on the concepts of different sports disciplines, sports, physical education, physical education, physical education teacher, coach, and referee (Ayyıldız, 2016; Çalışan & Pekel, 2024; Demiral & Demir, 2018; Karaşahinoğlu & İlhan, 2019; Kozak et al., 2020; Yazıcı, 2020; Ceylan & Kozak, 2021; Güllü, 2021; Karagün, 2021; Petroniene et al., 2021; Pekel et al., 2022; Makaracı et al., 2024). However, there is no research examining the perceptions of fencing referees towards the concept of fencing. Therefore, the primary purpose of this research is to explore the perceptions of fencing referees toward the concept of fencing with the help of metaphors.

2. Materials and Methods

2.1. Research Group

In this research, the research group was determined through convenience sampling. A total of 80 referees, 54 males and 36 females, actively working as licensed referees in Turkey, participated in the research.

2.2. Research Design

In this research, phenomenology design, one of the qualitative research methods, was used to determine the perceptions of active fencing referees about the concept of fencing through metaphors. This research method aims to determine the perceptions and events in the natural environment holistically and realistically (Yıldırım & Şimşek, 2006).

2.3. Data Collection

As a data collection tool, a personal information form was applied to the active fencing referees participating in the research, and they were asked to complete the sentence “Fencing is like/similar to .....; because.....” to determine the metaphors related to the concept of fencing. The relation between the metaphor and its source was determined using the word “like.” The reason and meaning attributed to the metaphor were tried to be revealed with “because.” While informing the participants, care was taken to avoid directive statements.

The research group was informed about the basic design and importance of the research. After the information, the relevant data collection tool was sent as a digital Google form to the fencing referees who wanted to participate voluntarily. The data obtained were evaluated, and forms that were unsuitable for the purpose or incorrectly answered were not included in the data set.

2.4. Data Analysis

This research used the content analysis method to analyze and evaluate the data. Content analysis identifies, counts, and interprets recurring issues, problems, and concepts in qualitative data (Miles & Huberman, 1994; Denzin & Lincoln, 1998; Silverman, 2000).

First, the data were numbered from 1 to 80 for data analysis. The numbered metaphors were examined, and coding was performed in line with the explanations. During coding, a code list was created in line with the meanings expressed by the metaphors. The relationship between the codes was examined, and the data were made meaningful by determining the categories that best describe the feature. Metaphors are frequently used in qualitative research due to their features, such as analyzing the multiplicity of the data obtained (ease of categorization), establishing a pattern between the data, and providing convenience in transferring the data to the reader (Sadık & Sarı, 2012). In qualitative research, to ensure

validity and reliability, the data and analyses were checked by the individuals being researched, and the interpretations of the data set and analyses were presented to experts (Ekiz, 2009). In addition, the research was evaluated using Miles and Huberman's (1994) formula (Reliability = agreement/agreement + disagreement). In qualitative research, a desired level of reliability is achieved when the agreement between the researcher and expert evaluations is 90% and above (Saban, 2008). This research showed that the metaphors were grouped under the same themes with a 94% agreement rate. As another reliability method, direct quotations were made by including the explanations used by the fencing referees to describe the metaphors.

Microsoft Excel database program was used to analyze the data. Metaphors with similar meanings were grouped into 4 themes (Table 1).

While creating the data set, blank forms that did not specify a metaphor, forms that specified more than one metaphor, or forms that specified a metaphor but did not provide a reason were excluded from the data set. In addition, some referees stated their thoughts about fencing instead of using a metaphorical image. However, they expressed a metaphoric image and did not provide any basis for the metaphor. For these reasons, 5 forms were excluded from the research.

2.5. Ethics Committee Permission

Ethical approval was obtained for his research from the Ethics Committee of Gazi University with decision number E-77082166-604.01.02-197013. Before data collection, participants were thoroughly informed about the study through a detailed presentation and subsequently provided written consent. The research was carried out in accordance with the ethical guidelines of the Declaration of Helsinki.

3. Results

As a result of the analyses, the metaphors were divided into meaningful themes according to their differences and similar characteristics and transformed into tables. A few examples of the metaphors were also included. The metaphors produced by the fencing referees participating in the research for the concept of "fencing" are given in Table 1.

Table 1. Distribution of the metaphors produced by fencing referees about the concept of fencing according to the characteristics and categories attributed to the source from the subject

Conceptual Themes	Codes
Strategy	Standing chess, brain training, chess, chess of swords, strategy game, war
Struggle	Long road, labyrinth, struggle, passion, inner strength, he fierce clash of two gunslingers, war
Emotion	Love, nicotine addiction, the rose that does not fade when plucked, substance abuse, family, food for the soul
Life	Life, real life, life itself, carbohydrates

It was observed that the same codes were used for some themes (Table 1). The metaphors in these codes are included in different themes because they have different meanings. For example, participant 20 stated the "war" metaphor with the explanation, "Fencing is like a war because even if the opponent is your brother, you attack him to win." The code was included in the theme of "being an element of struggle." Participant 36 defined the metaphor of "war" as "fencing is like war because it is important which action you take at which time. The code was included in the theme of "being an element of strategy" because he used the metaphor of "war" with the explanation "strategy can only be successful if it is applied in place. Statements from participants that were assumed to have high representational value were included in the conceptual themes sections.

3.1. Fencing as a Strategy Element

While strategy is defined as a set of preferred ways and methods for predetermined goals when the metaphors created by the participants for the concept of fencing were examined, the strategy was examined as two subgroups within itself.

Some of the participants who were identified as having a strategy element likened fencing to chess. Participants who liken fencing to chess distinguish/are aware of the concepts of being agile/fast in fencing and making moves in a specific time interval in chess. In this respect, most participants who liken fencing to strategy say this analogy by explaining the concepts of making decisions in seconds, constantly having the brain active, doing it in the fastest way, and doing it fast, versatile, and quick.

Some of the other participants, who were determined to have a strategy element, ignored the concept of speed, unlike the first participants, and used fencing in terms of strategy in terms of "predicting the future" such as "planning the next move, analyzing the opponent, anticipating the opponent's behavior in advance, anticipating a few moves ahead, planning, predicting the next move, using brain power and planning every step."

Participant 3 said, *"Fencing is like chess played with swords. This is because the strategies employed in fencing are similar to those in chess. There are game styles based on attack superiority or defense."* When this statement is examined, it becomes clear that fencing is not merely a physical contest requiring agility and speed, but also a mental encounter based on strategy. In this context, it is evident that success depends on making the right moves at the right time and anticipating the opponent's movements, and that fencing is evaluated as a dynamic strategy game played with swords.

Participant 41 said, *"Fencing is like chess played standing up. Because in fencing, you need to predict your opponent's next few moves and create attacks and counterattacks accordingly. You need to determine your strategy well and apply your tactics accordingly."* When this answer is examined, it is understood that it is not sufficient to simply determine a general strategy for effective performance, but that it is also important to apply tactics appropriate to this strategy in a timely and correct manner.

3.2. Fencing as a Struggle Element

Individuals may sometimes encounter positive or negative situations in their private and professional lives. Compared to weaker people, mentally strong people can control what is happening in life, focus on what they need to do, stay calm in unexpected situations, and think about turning the results of disadvantageous events into advantages (Yıldız, 2017). When the metaphors created by the referees in the fencing category as an element of struggle were examined, they were explained with expressions such as war, inner strength, struggle, and maze.

Participant 19 said, "*Fencing is like war. Because even if the opponent is your brother, you attack him to win.*" is quite remarkable. The concept of attacking can be used both positively and negatively. Here, it is a positive attack on the structure of the fencing discipline. Hurting him may be practiced more to win the race than to harm his brother. A similar situation can be seen in other sports with close contact (such as wrestling). The aim is to perform sporting behavior (sportsmanship) to win the race rather than a damaging or destructive attack.

When Participant 46's response is analyzed, it is stated that "*Fencing is like the power within us. Because when power is used correctly, it takes you to the top. When it is too much, you find yourself at the bottom. Fencing raises you within yourself, and you use that power correctly. There can be no other situation. Because it does not allow this, and it is the one who establishes this balance.*" He states that the fencing discipline, and probably sports in general, can be done with a power that comes from within us and that when it is used in place and on time, it brings us to the top in terms of success or in terms of experiencing emotions, and that all of these can be used in a balanced way. He states that when fencing, we should respect the opponent and the referee by saluting them. When we win a point, in this case, we should focus on the rest of the game without immediately showing joy, saying that "it is he who establishes this balance."

Participant 76 said, "Fencing is like a maze. Because it requires dedication to reach the exit among the winding paths." When Participant 76's answer is analyzed, it is seen that a maze is a complex structure with corridors that are not any way out. Finding the right path may sometimes be necessary to take a long way and sometimes make mistakes. Passing through these paths repeatedly and continuing without giving up also requires dedication.

3.3. Fencing as an Emotion Element

Emotions, among people's most essential experiences, play a role in coping with events in interpersonal relationships and mental health issues. Emotional expression is a structure that points to some key aspects of interpersonal relationships (Wearden et al., 2000). Emotional expression, which is one of the ways of conveying our needs and

expectations to others (Ölçer et al., 2010), has different interpretations, such as taking a hostile attitude, being overly interested, being critical, or establishing intimacy (Berksun, 1992; Wearden et al., 2000). When the metaphors created by fencing referees as the element of emotion were examined, they were explained with expressions such as love, nicotine addiction, rose that does not fade when plucked, substance addiction, and food for the soul.

Participant 23 said, "Fencing is like nicotine addiction. Because it is there in every emotional intensity and worse, sometimes your hand searches for it even if it is out of control." Nicotine probably refers to cigarettes. The individual desires to leave the negative emotional state and move to a positive one (Folkman & Lazarus, 1988). In this process, they develop a coping response. In this case, they may show various behaviors. Cigarette consumption is a passive coping method and has relaxing, pleasurable, and satisfying aspects (Işıktaş et al., 2019). Therefore, the participant may be fencing as a method of stress reduction here while stating that "at some times, even out of control, his hand searches."

Participant 27's statement, "Fencing is like a rose that does not fade when you break it. Because you want to let go many times, but you can't." When the statement is analyzed, the rose metaphor points to the beautiful, the good, and some emotions. A rose is a plant that withers when plucked. In the sense of metaphor, the fact that it does not wither is probably trying to explain the feelings towards fencing. It indicates that even if "fencing" is finished, the inner desire to fencing will continue. This statement is complemented by saying, "You want to quit, but you can't."

3.4. Fencing as a Life Element

Many factors help individuals connect to life, protect their mental health, and reveal their potential (Elliot & Dweck, 1988; Emmons, 1999). The goals that individuals create in life are among the factors mentioned. Goals, which are defined as the internal representations of the results that individuals want in their lives (Austin & Vancouver, 1996), are expressed as a higher concept that includes variables such as individuals' desires and individual struggles, which are different from each other but interrelated (Kasser & Ryan, 1996). When the metaphors of the referees in the category of fencing as an element of life were examined, the concept was explained with expressions such as life, real life, and life itself.

Participant 14 stated that "Fencing is like real life. Because both try to achieve a certain goal over a certain period. There are ups and downs in this time. Still, the gain is born to the one who adapts to these problems the fastest." In this definition, the participant refers to the "perceived locus of control" by stating that real life and fencing are like each other and try to achieve a specific goal. External locus of control refers to controlling one's life by external factors (fate, luck, etc.) (Rotter, 1966). He states that the secret of success in real life and fencing lies in those who can "adapt the fastest" to the problems that arise. The expression of being able to adapt quickly to problems is like the concept of "endurance" in the sports psychology literature. In a review, it was generally stated that the concepts of "exposure to problems" and "positive adaptation" work together in resilience (Sarkar & Fletcher, 2013). Accordingly, the current participant emphasizes that adaptation is essential to achieve fencing and real-life goals.

When the metaphor created by Participant 37 is analyzed, it is stated as follows: "Fencing is like life. Because it contains many emotions in life. We reflect what we learned from our coaches and ourselves to the athlete's character and whole personality." Due to its nature, fencing is a sports discipline that requires maintaining composure, focusing, acting strategically, and managing emotions, thoughts, and behaviors. He states that these behaviors are a training process during fencing training, from the beginning to the end, and that the training gained from this sport can be used throughout life.

4. Discussion

The importance of mental strength for being a good referee in sports competitions is revealed in many studies (Duvinage & Jost, 2019; Terekli & Çobanoğlu, 2019; Uzgur et al., 2021). For referees to manage their mental processes well and minimize mistakes, evaluating their perspectives on fencing is essential. Metaphors used for different purposes in research were used to determine the perceptions of fencing referees towards the concept of fencing.

When the literature is examined, it is seen that different categories are created in metaphor studies on various subjects. In this research, the categories of strategy, struggle, emotion, and life were made due to the evaluation of the metaphors used by the referees.

When the metaphorical approaches of the referees were analyzed in terms of categories, it was seen that the referees produced metaphors mainly in the theme of strategy and struggle. Fencing requires mental characteristics such as strategy, mental endurance, focus, planning, analytical thinking, and physical characteristics such as quickness, coordination, and endurance (Roi & Bianchedi, 2008; Werner, 2010). Fencing, which has a history of four thousand years as both a sport and a martial art, has evolved from primitive equipment used in actual duels to its modern form today. In history, fencing has always been a field where the strategy and struggle factor has always been at the forefront in wars, military training, duels of nobles, and physical education in many countries of Mesopotamia and Europe (Cheris, 2002; Castle, 2003; Angelo, 2017). From this point of view, the fact that most of the metaphors presented by the referees are gathered under the category of strategy and struggle is due to the nature and history of fencing. Considering today's modern fencing, it is necessary to have a good plan to be victorious in the struggle within the framework of the rules.

When the findings obtained are evaluated in terms of refereeing, the referees must reveal the knowledge, behaviors, and attitudes that will support their decisions within the framework of a particular strategy to carry out the fencing competition process in an orderly, fair, and consistent manner and to ensure confidence in the decisions made (Mathers & Brodie, 2011; Proverbio et al., 2012; Yazıcı, 2020; Popovych et al., 2022). Making fast and accurate decisions, remaining impartial, having a cold-blooded approach, and using gestures and mimics specific to fencing refereeing correctly, appropriately, and effectively can be considered primary refereeing strategies. Therefore, strategy is inherent like fencing and an element that referees need in the management process. In addition, strategic moves in fencing are among the factors that both make the game enjoyable and increase the pleasure of watching. For this reason, the fact that referees have a strategy-oriented perspective in metaphorical terms can also be associated with the fact that they enjoy their work more during match management.

Individuals in the competitive sports environment need strategies and emotions to better cope with a series of challenges related to psychological functioning in adverse situations because emotions are essential for directing strategies appropriately and correctly (Coffey et al., 2010; Birrer et al., 2012).

Emotions appear as impulses that shape, mobilize, and direct human behavior (Janelle et al., 2020) and give meaning to an individual's life (Morgan, 2011). When the metaphors produced by the referees participating in the research are examined in terms of the emotion category, it is predicted that the emotional processes of the referees who identify fencing with positive emotions may positively affect their desire to referee in this discipline because it is known that fencing refereeing is generally preferred by people who are fencing athletes.

While contributing positively to individuals' physical, psychological, and sociological aspects, sports can help individuals increase their self-confidence and better understand the meaning of life (Yetim, 2015). Considering that fencing referees mostly have a history of sportsmanship, the fact that they know fencing as an element of life that they identify with positive emotions emphasizes the importance of sports in human life. This internal experience, which comes from the referees' sporting background, increases their emotional attachment to fencing and adds a human dimension to their decision-making processes. This situation may lead them to view fencing not only as a physical activity but also as a school of life that supports human emotional and mental development.

When the researches are examined, the undeniable fact of the importance of sports in human life in physical, spiritual, and social terms within the framework of its unifying, integrating, and socializing features (Bailey, 2006; Coalter, 2005; Russell et al., 2019). reinforces the result of the research on the element of life. Referee competence can be associated with the capacity of referees to perform successfully in their jobs, their experience as a referee, and their level of motivation (Guillen & Feltz, 2011).

5. Conclusion

To improve referee competence and increase their performance, it is thought that it is essential to know the referees first. Metaphor constitutes an essential dimension of qualitative research that allows the researcher to examine the related concept in depth. In this research, in which the perceptions of referees about the concept of fencing were discussed, the fact that fencing referees predominantly approach fencing from a combat and strategic point of view may be related to the nature of the application process of the discipline as well as the characteristics of the discipline itself with the benefits

of sportsmanship life. Indeed, fencing, with its structure that requires not only direct physical contact but also a high level of decision-making skills and foresight, naturally leads referees to develop this type of perception. However, fencing should not be considered solely on a technical and strategic level. From an emotional and life perspective, it is evident that the meanings referees ascribe to fencing are influenced not only by the characteristics of the sport but also by their personal perspectives, value systems, and individual personality traits. In this context, it can be argued that the meaning constructed around fencing is more a reflection of the individual's subjective world than the objective aspects of the sport. In other words, the relationship with fencing is a multi-layered structure shaped by individual experiences. Although the research can be a source of ideas for field education and other research to be conducted in the field, it is evaluated that research with larger groups and in different disciplines will contribute to the field. Thus, it is believed that sport is not merely a physical activity, but rather an integrated experience that encompasses the mental, emotional, and social aspects of the individual.

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Research Article

Anthropometric Measurements and Somatotype Determination in Adult Climbers

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Abstract: The aim of this study was to compare the anthropometric measurement parameters and to determine the body somatotype of mountaineering athletes and Alpine style climbers. The sample of the study consisted of 40 men who were actively mountaineering athletes, climbing Alpine style, with an average age of 27.05±2.89 years. Age, height, body weight, skinfold thickness, circumference and diameter measurements were taken. SPSS 29.0 package programme was used to analyse the data and Independent Samples T-Test was used. As a result of the analysis, it was revealed that the climbers participating in the study had normal body mass index (24.59±2.12), normal body fat percentage (13.10±4.42) and mesomorphic endomorph (4.70-5.39-1.98) characteristics. As a result of the T-Test, it was determined that there was a statistically significant difference in the endomorphic (t=5,31; p<.001), mesomorphic (t=8,57; p<.001) and ectomorphic (t=-8,60; p<.001) characteristics of the climbers. Conclusions: It was determined that Alpine climbers exhibited the characteristics of mesomorphic endomorph body structure, had normal fat percentage and body mass index, while the 4-4-3 Balanced Somatotype evaluation of Alpine climbers changed to 5-5-2 Mesomorphic - Endomorphic feature according to previous studies in terms of somatotype characteristics.

Keywords: Alpine climbing; mountaineering; anthropometry; somatotype; physical fitness.

1. Introduction

One of the most important factors in performance is physical structure (Canuzakov et al., 2018) The physical features that come with the physical structure are one of the most important steps in the utilization of the athlete's capacity (Bisharat, 2009; Krakuer, 2009; Kaya et al., 2025). It is thought that the body structure and type of the athletes are in direct proportion with the branch they are engaged in (Della, 2016). In this context, various studies have shown that age and sex-related morphological differences can significantly affect somatotype development, even from childhood (Dzhanuzakov et al., 2025). In mountaineering sport, climbing is performed in different techniques such as Alpine style climbers, expedition climbers, rock climbers (Grant et al., 1996). The alpine environment, with its intrinsic ecological problems, has captivated humanity for millennia. From antiquity to the Middle Ages, mountains were regarded with reverence, linked to spirituality, and believed to be the abodes of deities (Della, 2016). The inception of mountaineering is credited to the ascent of Mont Ventoux, as recorded by Francesco Petrarca in 1336. His expedition fostered a novel viewpoint on such pursuits, specifically to ascend a mountain just to "strive for heights." However, it required several more centuries before humanity began to ascend renowned peaks in the Alps during the 19th century (Fleming, 2006). Currently, mountaineering, rock climbing, and other alpine sports, including skiing and ski mountaineering set to debut as a new Olympic event at the Milan/Cortina 2026 Winter Olympic Games are exceedingly popular and have evolved into a thriving economy. Numerous alpine habitats have become publically accessible because to advancements in transportation and contemporary mountain-rescue techniques; yet they continue to present different hazards, including

high altitude, fall risks, avalanches, and abrupt weather fluctuations. Furthermore, alpine regions are significantly affected by climate change, resulting in heightened challenges and risks (Mourey et al., 2022).

Psychological characteristics, such as thrill seeking, differ across various alpine sports disciplines (Kopp et al., 2016), and mountaineers may exhibit reduced neuroticism and higher conscientiousness compared to the general population (Jackman et al., 2023). Despite the generally low prevalence of mental disorders among mountaineers (Niedermier et al., 2017), particular aspects of mountaineering may elevate the risk for specific mental issues, including rock climbing and eating disorders (Jouber et al., 2020), high altitude exposure and transient psychosis (Hüfner et al., 2023), as well as alpine rescue missions and post-traumatic stress disorder (Salvotti et al., 2024; Mikutta et al., 2022). The subpopulation of mountaineers has also exhibited characteristics of behavioral addiction (Habelt et al., 2023). Acute mountain sickness (AMS) is a physiological response to diminished atmospheric pressure and may serve as a limiting factor for climbers. Burtscher et al. examine potential psychological disorders linked to AMS in this publication (Burtscher et al., 2024). Özkan and Sarol, (2008) stated that 'Alpine climbing, which is one of the climbing styles of mountaineering, refers to climbing directly to the summit using mountaineering techniques and equipment, which includes rock, snow, glacier, sport climbing features, while rock climbing is a form of climbing on steep and massive granite walls using climbing techniques and safety equipment in a mountain environment' (Özkan & Sarol, 2008). Considering that each climbing style has its own dynamics, it is believed that body types will be clustered in athletes who climb in the same style (Kidd, 2009). Due to the nature of the sport, it is thought that the athlete will change the style according to his/her own body somatotype, although the first experience is to start climbing on the climbing style desired by the individual. Because, unless the characteristics of the physical structure are not suitable for the style of the sport, it will not reach the desired performance level and will require more effort (Kural, 2013; Mermier et al., 2000; Ross & Marfell, 1991).

In this study, it was aimed to investigate whether there is a significant similarity between the body measurements and body somatotype of the athletes climbing the same style. The characteristics of some anthropometric measurements of individuals climbing alpine style in mountaineering sport and whether there is a significant similarity between these measurement results and determination of body somatotype constitute the problem of this research. The independent variable of this problem is voluntary participants climbing Alpine style in mountaineering sport and the results of anthropometric measurements and body somatotype of these participants. Mountaineering, as can be understood from its name, is performed in nature and in an environment that can be considered high altitude. This study encounters limitations in the environment where mountaineering sport is performed. Harsh and harsh natural conditions (snow, glacier, cold weather, strong wind, etc.) limit the study.

2. Materials and Methods

2.1. Research Group

The study consisted of mountaineer athletes whose age, height, body weight, body mass index, body fat percentage and somatotype characteristics were studied in terms of means and standard deviations. Forty male Alpine style mountaineering climbers with age 27,05±2,89 years, height 177,40±4,89 cm, body weight 77,50±8,53 kg, body mass index 2,59±2,12, body fat percentage 13,10±4,42, somatotype characteristics Endomorphic 4,70±1,41, Mesomorphic 5,39±0,89, Ectomorphic 1,98±0,78 participated in the study voluntarily.

2.2. Research Design

Age, height, body weight, skinfold thickness (triceps, subscapular, supraspinal, abdominal thing, chest), circumference (biceps, calf) and diameter (femur, humerus) measurements were taken. Mesitaş brand, wall type, sliding callipers were used for height measurements, Newfeel brand electronic scale with digital display for body weight, Saehan brand sliding callipers for skinfold thickness, Saehan brand anthropometric tape measure for circumference measurements, Jacson and Pollock formula for body density, Siri formula for body fat percentage and Heath-Carter Somatotype method for somatotype values.

2.3. Data Collection

In order to collect the data, firstly, the previously published sources about the data and methods to be collected were reviewed. The relevant literature on the subject was examined and archive scanning was carried out. It was decided

how the measurements and methods to be taken would be. After obtaining the approval of the ethics committee, the sample group to be subject to the study was formed by taking and calculating the measurements. In accordance with the approval of the ethics committee, Informed Consent Form for Research Purpose Study was obtained from the volunteer athletes participating in the study and the measurement results obtained were recorded in the Participant Personal Information Form. All volunteer athletes participating in the study were brought together in a closed classroom environment, their measurements were taken in turn, and due care was taken by paying attention to their personal privacy.

2.3.1. Height Measurement

Height measurements of all participants were taken with a wall-type sliding caliper height gauge (Mesitaş, Turkey) with a precision of 0.01 m. The measurements were taken without socks on the feet of the participants or with socks with a thickness that would not affect the measurement. It was ensured that the floor on which the participants stood was flat. It was ensured that both feet of the participant were in a position to carry the body weight equally on the ground. It was ensured that the heels were together, touching the height scale, the scapula, hip protrusion and occipital region of the head were close to the height scale. The patient was asked to hold the height measurement while the head was in the Frankfort plane and in a deep inspiration state and to hold the heels of the feet without leaving the floor. Subsequently, the movable part of the height gauge was positioned to contact the top of the head and the hair was compressed until it was 1 mm.

2.3.2. Body weight

It was measured with an electronic scale (Seca, Vogel and Halke, Hamburg) with a precision of 0.1 kg. The participants were taken without socks on their feet or with socks whose thickness did not affect the measurement. It was ensured that the floor on which the participants stood was flat. It was ensured that both feet of the participant were in a position to carry the body weight equally on the ground. It was ensured that the participants were wearing minimal clothing (shorts, t-shirt) that would not affect the weight (Sarı & Tutar, 2025).

2.3.3. Skinfold measurement

Measurements were made in the triceps, subscapular, suprailiac, abdominal, biceps, chest, thing, calf regions with a skinfold caliper (Saehan, South Korea) that applies 10 g pressure per 1 mm2 at each opening with an error of ±2 mm. Measurements were taken by standing on the right side of the participant (Rudarlı, 2024).

2.3.4. Anthropometric Measurements

Biceps and calf circumferences were measured with an anthropometric tape measure (Saehan, South Korea) (Carter, 2002). Measurements were made by standing on the right side of the participant. Biceps, calf, humerus and femur measurements were taken from the participants.

2.3.5. Somatotype Measurements

The somatotype values of the participants were determined by Heath-Carter Somatotype Method (Ross & Marfell-Jones, 1991). The somatotype structure was determined with the formulae used in the somatotype evaluation of the participants.

Endomorf formula=-0.7182+0.1451X-0.00068X"2"+0.0000014X"3"

Mezomorf formula= 0.858(E)+0.601(K)+0.188(A)+0.161(C)-0.131(H)+4.5

Ektomorf formula= RPI:height/kg3 (RPI = Reciprocal ponderal index)

2.4. Data Analysis

In the analysis of the data obtained, the comparison of the physical fitness and somatotype characteristics of the climbers according to the Alpine climbing type was made by Independent Samples T-Test. SPSS 29.0.1.0 (SPSS, SPSS Inc, Chicago, IL, USA) package programme for MacBook Pro was used for data analysis and significance level was taken as 0.05. For the G-Power test, G*Power version 3.1.9.6 package programme for MacBook Pro was used to analyse the data and the significance level was taken as 0.05 for 0.95 Power (1-β err prob).

2.5. Ethics Committee Permission

Participants were given permission to participate voluntarily with the informed consent form. In addition, this study was approved ethically by the Ethics Committee of Istanbul Nişantaşı University (Date: 07.03.2024, Number: 2024/03), based on the application titled "Determination of Anthropometric Measurements and Somatotype in Adult Mountaineers". Before data collection, participants were thoroughly informed about the study through a detailed presentation and subsequently provided written consent. The research was carried out in accordance with the ethical guidelines of the Declaration of Helsinki.

3. Results

Graphic 1. Descriptive statistics of participants

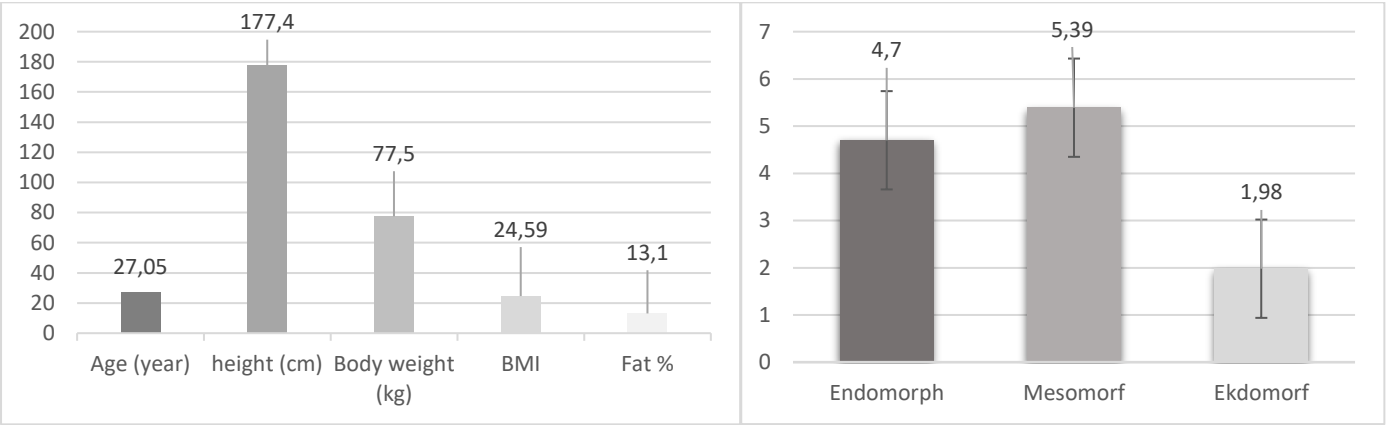


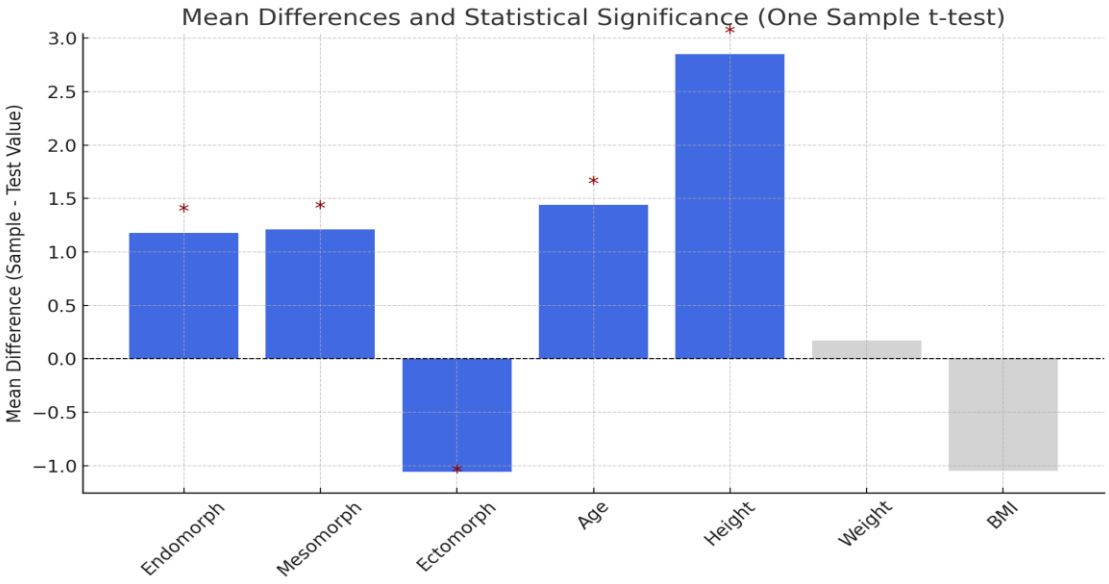
Table 2. One-sample t-test results and effect sizes (Cohen's d)

Variable	t	df	One-sided p	Two-sided p	Test Value	Sample Mean – Test Value	Cohen's d
Endomorph	5,31	39,00	<.001	<.001	3,52	1,18	0,84
Mesomorph	8,57	39,00	<.001	<.001	4,18	1,21	1,36
Ectomorph	8,60	39,00	<.001	<.001	3,04	–1.06	–1.36
Age	1,86	39,00	0,04	0,07	175,96	1,44	0,50
Height	2,11	39,00	0,02	0,04	74,65	2,85	0,58
Weight	0,50	39,00	0,31	0,62	24,42	0,17	0,02
BMI	–1.55	39,00	0,07	0,13	13,82	–1.05	–0.37

**%; percentage, kg: kilogram, cm; centimeter*

One-sample t-test analyses conducted on the participants' somatotype values revealed significant differences compared to the test values for the endomorph (t(39)=5.31; p<.001), mesomorph (t(39)=8.57; p<.001), and ectomorph (t(39)=8.60; p<.001) components. Particularly, the high level of mesomorphy and low level of ectomorphy indicate a dominant muscular and strong body structure within the sample. The endomorph level being above the test value also suggests a relatively higher body fat ratio. Significant or borderline significant differences were also observed in height (t(39)=2.11; p=.04) and age (t(39)=1.86; p=.07) variables compared to the test values. On average, participants were approximately 2.85 cm taller than expected. However, no significant differences were found in body weight (t(39)=0.50; p=.62) or body mass index (BMI) (t(39)=–1.55; p=.13). These findings suggest that the sample group possesses a muscular and athletic physique in terms of somatotype, although their overall body weight and BMI do not significantly deviate from reference values. According to Cohen's d values, very large effect sizes were detected in the mesomorph (d=1.36) and ectomorph (d=–1.36) components. A large effect size was also observed for the endomorph component (d=0.84). Medium effect sizes were found in height and age variables (d=0.58 and d=0.50, respectively), while the effects in body weight and BMI were very small (d=0.02 and d=–0.37). These results indicate that the body composition characteristics of the group include not only statistically significant but also practically meaningful differences.

Graphic 2. Mean Differences and Statistical Significence (One Sample t-test)



The graph displays the mean differences between the sample means and the test values for various variables, along with the statistical significance of these differences. Significant differences were observed for the variables Endomorph, Mesomorph, Ectomorph, Age, and Height. Specifically, the sample means for Endomorph, Mesomorph, Age, and Height were significantly higher than the test values (positive differences with $p < 0.05$). Conversely, the sample mean for Ectomorph was significantly lower than the test value (negative difference with $p < 0.05$). No significant differences were found for Weight and Body Mass Index (BMI), which are represented in gray. These findings indicate that certain physical and demographic characteristics differ significantly from the test values, highlighting meaningful variations in the sample.

4. Discussion

The aim of this study was to determine the anthropometric measurements and body somatopy of alpine style climbers among adults who are engaged in mountaineering branch. As a result of the results obtained from the sample group, it was found that the endomorph ratio was 4.70, the mesomorph ratio was 5.39, and the ectomorph ratio was 1.98. In addition, it was found that the body fat percentage was 13.10 and the body mass index was 24.59. When the literature was reviewed, it was seen that there were not many studies on these data. 16 years ago, an independent T-Test correlation was calculated with the study of Özkan and Sarol (2008). According to the test result, it was determined that there was a statistically significant difference in the endomorphic (t=5,31; p<.001), mesomorphic (t=8,57; p<.001) and ectomorphic (t=-8,60; p<.001) characteristics of the climbers and Table 2. When the findings of this study were subjected to G-Power T Test with the study conducted by Özkan and Sarol (2008), it was concluded that this study should be carried out with more people in the calculations made for Endomorphic, Mesomorphic and Ectomorphic body somatype. The instruments used for measurement were calibrated according to the measurements to be taken in a normobaric city environment. Therefore, the measurements were made in the city and room environment. It should be investigated how the same measurements will give results in hypobaric high-altitude environment. There is no data on similar studies carried out in hypobaric high-altitude environment.

Watts et al. conducted a study on young mountain climbers. The mean (SD) experience level of participants was 3.2 (1.9) years and subjects competed in 10 (5) organised competitions over a 12-month period. Despite age similarity, significant differences (p<0.01) were found between climbers and control subjects in height, mass, percentile scores for height and mass, ratio of arm span to height ('monkey index'), biilocrystalline/biacromial ratio, sum of seven and nine skinfolds, estimated body fat percentage and hand grip/mass ratio. Despite significantly lower skinfold totals and estimated body fat percentage, no differences were found between climbers and controls for absolute BMI or BMI expressed as a percentile score. According to the results obtained, it can be concluded that young climbers have similar anthropometric

characteristics to adults. Grant et al. (2001) investigated the anthropometric characteristics, strength and flexibility skills of non-climbers, recreational climbers and professional climbers. The study consisted of 3 groups. Group 1 consisted of 10 elite climbers aged 31.3 ± 5.0 years (mean ± s) who had reached the 'hard very severe' standard; Group 2 consisted of 10 recreational climbers aged 24.1 ± 4.0 years who had reached the 'severe' standard; and Group 3 consisted of 10 physically active individuals aged 28.5 ± 5.0 years who had not previously rock climbed. Tests included finger strength (grip strength, finger strength measured on climbing-specific apparatus), flexibility, bent arm hang and pull-ups. Regression procedures (analysis of covariance) were used to examine the effect of body mass, leg length, height and age. For finger strength, elite climbers recorded significantly higher values ($P<0.05$) than recreational climbers and non-climbers (four fingers, right hand: elite 321 ± 18 N, recreational 251 ± 14 N, non-climbers 256 ± 15 N; four fingers, left hand: elite 307 ± 14 N, recreational 248 ± 12 N, non-climbers 243 ± 11 N). For grip strength of the right hand, elite climbers recorded significantly higher values than recreational climbers only (elite 338 ± 12 N, recreational 289 ± 10 N, non-climbers 307 ± 11 N). The results suggest that elite climbers have greater finger strength than recreational climbers and non-climbers. Fanchini et al. compared maximal muscle strength and fast force capacity of the finger flexors between national-international level rock climbers and lead climbers. Ten rock climbers (mean ± SD, age 27 ± 8 years) and 10 lead climbers (age 27 ± 6 years) volunteered for the study. Ten non-climbers (age 25 ± 4 years) were also tested. 'Isometric maximal voluntary contraction (MVC) force and rate of force development (RFD) produced in 'curled' and 'open curled' hand positions were assessed in an instrumented grip. Climbers were found to be stronger than non-climbers. Furthermore, MVC force and RFD were significantly higher in rock climbers compared to lead climbers in both curved and open curved positions ($p<0.05$). The largest difference between rock and lead climbers (34-38%) was observed for the RFD variable. RFD may reflect the special requirements of rock climbing and seems to be more suitable for investigating muscle function in rock climbers than pure maximal power. Grant et al. (2001) conducted a study on hip and shoulder girdle strength and flexibility in elite and recreational climbers in 2007. The results of the study show that elite climbers have greater shoulder girdle endurance, finger strength and hip flexibility compared to recreational climbers and non-climbers. It is said that those aiming to lead climbs at 'el' standard or higher should consider training programmes to increase their finger strength, shoulder girdle strength and endurance and hip flexibility. Ozimek et al. (2017) conducted a study on strength and somatotype in elite and advanced climbers. Twenty climbers (age: 28.5±6.1 years) were analysed and divided into two groups according to their climbing level according to the International Rock-Climbing Research Association (IRCRA). Elite climbers represented the 8b-8c Rotpunkt (RP) climbing level (n=6) and advanced climbers represented the 7c+8a RP level (n=14). Height, weight, lean body mass, upper limb length, arm span and forearm, arm, thigh and calf circumference were measured. Participants also underwent a special test for finger strength, an arm strength test and a muscular endurance test (hanging from 2.5 and 4 cm ledges). In addition, pull-ups were performed to measure muscle resistance to fatigue. Elite climbers recorded significantly higher values for finger strength (129.08 vs. 111.54 kg; $t(18) = 2.35$, $p = 0.03$) and arm endurance (33.17 vs. 25.75 pull ups; $t(18) = 2.54$, $p = 0.02$) than advanced climbers. Furthermore, calf circumference was significantly lower in elite climbers than in advanced climbers (34.75 vs. 36.93 cm; $t(18) = 3.50$, $p = 0.003$). According to these results, it is stated that elite climbers have better physical capacity. Investigation of Kalaycı's (2023) studies there was a significant relationship between right hand grip strength, left hand grip strength, left hand fingertip grip strength, right hand palmar grip strength, left hand palmar grip strength, back strength and competition scores in male and female participants ($p<0.05$). The relationship between medicine ball throwing and righthand fingertip grip strength was significant only in women. In anaerobic power measurement, there was no significant relationship in men and women ($p>0.05$). Addition significant relationships were found between upper extremity strength values and competition results, but not in anaerobic power measurement.

Variations in anthropometric, physiological, and strength-endurance metrics were noted among sport climbers specia izing in certain subdisciplines, climbers of varying ability levels, and nonclimbers (Saul et., 2011). Nonetheless, discrepancies in the classification of climbers into several categories (e.g., advanced, elite) complicate the ability to derive satisfactory findings from the examined research and reviews. Furthermore, the sports level was frequently assessed using diverse grading systems (e.g., Union Internationale des Associations D'Alpinisme scale, French scale, British technical grading scale, Yosemite Decimal System), which might also be perplexing. This assessment involved the conversion and standardization of ascending difficulty levels to the French scale for lead climbing and the Font scale for bouldering. Body mass values exhibit substantial variation among the examined groups. Specifically, body mass was reduced in the sport climbers relative to the control participants. Furthermore, notable disparities exist between

sport climbers attaining 7c 1 RP and those achieving 6a 1 RP (9), as well as between top lead climbers surpassing 8c RP and speed climbers (Levernier et al., 2020), indicating that reduced body mass appears to significantly influence sport climbing performance. Nevertheless, variations in mass, height, and BMI are not considered pertinent indications in this evaluation, as researchers in several studies endeavored to recruit subjects of comparable age and body size. The ape index shown no significant variation among sport climbers of differing ability levels, ranging from 1 to 1.03 (Giles et al., 2021; Levernier et al., 2020; Ozimek et al., 2017). Both male and female sport climbers may have more lean muscle mass compared to control participants. Nonetheless, the difference was demonstrated in single research (Philippe et al., 2012). This phenomena can be elucidated by the study's comparison of elite female and male lead climbers with nonclimbers. The disparity in lean muscle mass was not detected between boulderers ($7B) and non-climbing persons (MacDonald & Calendar, 2011). The subsequent investigations contrasted sport climbers of varying skill levels, which may have led to the absence of substantial differences. Moreover, body fat percentage warrants particular consideration in relation to other body composition metrics. Adipose tissue is a key factor influencing circumferential measurements (Çelik et al., 2015).Advanced sport climbers had reduced lower-body fat levels in comparison to the control group and less advanced athletes. Male lead climbers exhibited the lowest body fat percentages below 10%, specifically at the 8b to 8c RP level (7.97%) (29), >8c RP (7.95%), and 8a to 8b 1 RP (9.8%) (Levernier et al., 2020; Limonta et al., 2018). Additionally, male boulderers at the >8B RP level recorded 7.43%, while male speed climbers had a body fat percentage of 9.42% (Levernier et al., 2020). Climbers with a lower level of proficiency and control participants exhibited body fat percentages above 10%. Therefore, maintaining a body fat percentage below 10% appears essential for elite sport climbers across all three climbing subdisciplines. Sports climbers exhibited markedly greater bone density in the upper limb compared to the control group (Kemmler et al., 2006; MacDonald & Calendar, 2011). In comparison to control participants, elevated bone density has been noted in male boulderers reaching the $7B level (1.1 g·cm²) and male lead climbers attaining the .8a RP level (0.972 g·cm²) (MacDonald & Calendar, 2011). Nevertheless, there is a deficiency of research concerning sport climbers of varying ability levels.

The characteristics of body composition appear much more crucial than the examined anthropometric measures in relation to sport climbing performance. Reduced body fat coupled with increased lean muscle mass may facilitate improved ergonomic mobility and diminish strain while climbing. Therefore, a nutritional assessment, encompassing the analysis of anthropometric and biochemical data, should be regarded for climbing athletes. The mechanical influence of sport climbing on bone mineral density arises from the significant muscular stress exerted throughout the activity. The distribution of load is intricate, facilitating bone adaptation, particularly in the upper limbs (Kemmler et al., 2006). Consequently, this parameter appears to be an adaptive mechanism of the skeletal system in response to sport climbing exercise.

5. Conclusion

Since the study was conducted only with 40 male mountaineer volunteers climbing in Alpine style, it will not represent the whole population. When all these were evaluated and compared with the studies in the literature, it was shown that Alpine style climbing athletes had normal body mass index (24.59±2.12), normal body fat percentage (13.10±4.42) and mesomorphic endomorph (4.70-5.39-1.98) characteristics. Although there is a finding that the body mass index of athletes climbing in Alpine style is within normal limits, it should be known that it is close to the upper limit. In athletes who differ according to their body somatotype, it should be tried to become compatible with additional training programmes, and if they exhibit physical characteristics compatible with the Alpine style body somatotype in different climbing styles, it should be considered to change the climbing style to Alpine style. This study should be carried out with a larger sample group in a high-altitude climbing environment, athletes should be observed during climbing and coach athletes who are constantly climbing should be preferred, the results obtained will better represent the universe of alpine style climbers.

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Research Article)

Leisure Behaviors in Different Cultures: Bingöl Zaza Sample

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Abstract: In our research, it was aimed to examine the leisure time behaviours of individuals in the Bingöl Zaza sample. Qualitative research method was used to examine the leisure time behaviours of individuals in the Bingöl Zaza sample. While the universe of the study consisted of those carrying the Bingöl Zaza culture, the sample consisted of 25 individuals (14 male, 11 female) who were randomly selected and participated voluntarily. The research data were collected with the semi-structured interview form developed for this study. In the analyses, the interview texts were carefully read and the data were conceptualized and themes explaining the data within a logical framework were determined according to the concepts that emerged. After the codes and themes were determined, the findings were analysed using grouped descriptive statistics. It was seen that the majority of the participants; worked 8 hours or less as a necessity and slept 7 hours or less. It was observed that the answers given to the question of who they spend their leisure time with were friends, family and alone, the answer given to the question of where they spend their leisure time was gym, shopping mall, home and outside, and the answer given to the question of participation in activities according to the customs and traditions of the society was condolence, wedding, festivals, sports activities, invitations and I do not participate. It was observed that the majority of the participants participated in the activities they were personally a part of their leisure time was sufficient, they allocated a budget for the activities, their activities reflected their culture, and their leisure time activities created a sense of happiness and pleasure in them. In this study, it was determined that there was a standardization in the leisure time behaviours of ethnic and belief groups as a result of acculturation, but ethnic cultural life was tried to be kept alive with a certain consciousness. It was determined in our study that individuals participated in more passive recreational activities. When the leisure time evaluation situations were taken into consideration, it was observed that there was not much difference between the Bingöl Zaza culture and other cultures.

Keywords: Leisure Time, Different Cultures, Zaza Sample.

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1.Introduction

The concept of leisure time, which has an important place in human life, has been defined and interpreted in various ways in different civilizations throughout history. Leisure time is the process in which individuals participate in recreational activities alone or in groups, in accordance with the cultural structure of society, without being forced, without setting any goals or objectives (Hazar, 2009). Leisure time has great importance both individually and socially in human life. This process, which is left over from the compulsory work and daily routines of individuals, does not only mean resting or having fun; it is considered as an important area that contributes to the personal development, social relations and quality of life of individuals. However, the effective utilization of leisure time can have more significant consequences on the physical, mental and emotional health of individuals. This situation has made the concept of leisure time, which increased with mechanization especially after the industrial revolution, an important subject of investigation (Yayla & Çetiner, 2019).

This study aims to examine the leisure behaviours of individuals belonging to Bingöl Zaza culture. The Zaza culture provides a unique context with its historical, social and cultural characteristics and constitutes a unique sample to understand how the concept of leisure time is approached. The aim of the study is to understand the factors shaping the leisure time activities of Zazas living in Bingöl, to reveal the place of these activities in the social and cultural lives

of individuals, and in this context, to bring a new perspective to the literature on leisure time behaviours in different cultures.

The importance of the study is based on the fact that individuals' perceptions and behaviours towards the concept of leisure time are shaped not only by individual preferences, but also by the cultural environment and social conditions in which they live. In particular, understanding the leisure time habits of different cultures can provide a valuable basis for raising awareness and consciousness on this issue. The data to be obtained from the Bingöl Zaza sample will provide important information on the concept of leisure time in the context of both region-specific and cultural diversity in general.

In this context, the study aims to analyse the effects of cultural characteristics on leisure behaviours by focusing on how individuals spend their leisure time. This analysis will contribute to understanding the attitudes of the people of the region towards leisure time and to present possible solutions for the development of these attitudes.

1.1. Concept and Definition of Leisure

Leisure time refers to the period of free time left over from work and obligations in individuals' daily lives. This period of time is a process shaped according to social norms and individual preferences, which individuals utilize for rest, entertainment or personal development. Hazar (2009), defines leisure time as the sum of freedom and pleasure-oriented activities that individuals perform without any pressure. In addition, leisure time is considered as a process that should be evaluated with activities that will contribute not only to individuals' physical but also to their mental and emotional health.

1.2. Historical Process and Changes

The industrial revolution and the subsequent mechanization process increased the importance of the concept of leisure time by increasing the leisure time of individuals (Yayla&Çetiner,2019). Technological developments and modern living conditions have caused significant changes in the leisure habits of individuals, and the concept of recreation has gained importance in terms of effective use of leisure time. Recreation includes activities that enable individuals to utilize their leisure time through physical, cultural or artistic activities (Öztürk & Taner, 2014).

1.3. Culture and Leisure

Culture is one of the main factors affecting the way individuals spend their leisure time. Each culture attributes a different meaning to leisure time within the framework of its own values, norms and lifestyle. In societies with dominant ethnic characteristics such as Zaza culture, leisure time activities are expected to differ in both individual and social contexts. Fox and Rickards (2002), stated that individuals' leisure behaviours are shaped by their efforts to adapt to their socio-cultural environment. For this reason, it is important to examine the understanding of leisure time in communities such as the Zaza culture in order to better understand the cross-cultural differences of this concept.

1.4. Importance and Benefits of Leisure

Leisure time can have positive effects on both physical and psychological health. Torkildsen (2005), states that leisure time activities that contribute to personal development improve an individual's social and emotional health and also increase productivity in business life. In addition, the importance of leisure time planning contributes to personal development in terms of both socialization levels and skill development, as it does for individuals with special needs (Kaya & Yıldırım, 2024). In this context, the correct planning of individuals' leisure time is an important factor that increases the quality of life.

In this study, it will be examined how individuals' understanding of leisure time, activity preferences and attitudes are shaped in the light of cultural, social and economic factors in the Zaza culture in Bingöl. The study aims to make a new contribution to the literature in this field and to raise awareness about the utilization of leisure time in this cultural context.

2.Method

Research Model: Qualitative research method was used to evaluate leisure time behaviours in terms of individuals with Bingöl Zaza culture. In qualitative data analysis, researchers organize data, divide them into units of analysis,

synthesize them, reveal forms, discover important variables and decide which information to reflect in the report. In the implementation phase, the interview technique was utilized depending on the nature of the study. The interview technique enables in-depth information to be obtained from the participants on any subject in their natural environment.

Research Group: Criterion sampling method, which is a type of purposive sampling method, and snowball sampling method were used in the study. Purposive sampling consists of people who have experience with the key concept that researchers examine in their studies and who are consciously selected. In this context, the population of the study consisted of individuals with Bingöl Zaza culture, while the sample consisted of 25 individuals who were randomly selected and voluntarily participated. All stages of the study were designed with ethical standards in accordance with the Declaration of Helsinki.

Data Collection: In order to obtain information from the participants within the scope of the study, first of all, the research questions were determined with the help of the literature and turned into a form. In the first part of the form to be applied to the participants, demographic characteristics such as gender, age, economic status and educational status were included. In the second part of the form, questions related to the main topic of the study were included:

- How much time do you spend per day on your work?
- How long do you sleep?
- How do you spend your time during their meaning time (free time)? During this time, with whom do you spend more time (friends, family, alone, etc.)?
- Where do you spend your free time (stay at home or go to gyms, outdoor sports, art houses, coffee houses, shopping centres, etc.)?
- What are the activities you participate in according to general community customs and habits?
- Do you participate in activities that are appropriate for and characteristic of the community, group or ethnicity to which you belong?
- Do you believe that you have enough free time?
- Do you set a budget for your leisure activities?
- Do you think that the leisure activities, games-entertainment etc. You participate in reflecting your own culture?
- Do you feel that your leisure activities give you enough rest, fun or happiness?
- It was concluded that this form, which consists of two parts, could be a healthy data collection tool within the scope of the research.

During the interviews, forms were distributed to the participants, and they were asked to answer each question. The participants were assisted by the researcher during the interviews. The data obtained from the interviews were then analysed by the researcher. The analysed data were summarized and transferred to a Word file as text. The interview forms were examined twice in order to prevent any errors.

Data Analysis: Content analysis method was used to analyse the data. Content analysis is a systematic, repeatable technique in which some words of a text are summarized with smaller content categories by coding based on certain rules (Büyüköztürk et al., 2008). Data summarized and interpreted in descriptive analysis are subjected to a deeper processing in content analysis, and concepts and themes that cannot be noticed with a descriptive approach can be discovered as a result of this analysis. For this purpose, in our study, the interview texts were carefully read and the data were conceptualized and themes explaining the data were identified within the framework of logic according to the concepts that emerged. After determining the codes and themes, the findings were analysed using grouped descriptive statistics (frequency, percentage) (ANNEX-2).

SPSS 27 and JASP statistical package programs were used in the analysis of the themes obtained, Office 360 MS Excel was used in the creation of tables and graphics, and Office 360 MS Word licensed package program was used in the writing of the research.

Ethical Aspect of Research: In order to carry out the study on data collection, tools and methods, permission was obtained from Giresun University Social Sciences, Science and Engineering Sciences Research Ethics Committee with the decision numbered E-50288587-050.01.04-10257 at its meeting dated 10/05/2024 and numbered 05/36.

3.Results

When the demographic characteristics of the individuals who participated in the study were evaluated, it was determined that 44% (n=11) were female and 56% (n=14) were male. When the age distribution of the participants is analysed, it is seen that 36% (n=9) are between the ages of17-29,32%(n=8) are between the ages of 30-39, and32%(n=8) are40years old and over. When the education levels of the participants were analysed, it was determined that 24% (n=6) were primary school graduates, 16%(n=4) were middle school graduates, 32%(n=8) were high school graduates, and 28% (n=7) were university graduates. Evaluations of the economic status of the participants revealed that 8% (n=2) had poor economic conditions, 44% (n=11) had moderate economic conditions, and 48% (n=12) had good economic conditions. When the distribution of economic status according to education level was analysed, it was determined that 17% (n=1) of the participants who graduated from primary school had poor economic conditions, 50% (n=3) had moderate economic conditions, and 33% (n=2) had good economic conditions. Among secondary school graduates, 50% (n=2) had moderate economic conditions and 50% (n=2) had good economic conditions. Among high school graduates, 50% (n=4) had moderate economic conditions and 50% (n=4) had good economic conditions. Among university graduates, 14% (n=1) had poor economic conditions, 29% (n=2) had moderate economic conditions and 57% (n=4) had good economic conditions. These findings reveal the diversity of the demographic and economic profiles of the participants and enable the evaluation of leisure behaviours in relation to these variables.

Table 1. Main Themes and Codes

Themes	Codes	Volunteer Participants (P)
Mandatory Working Hours	Not working	P5, P6, P7, P10, P11, P16, P17
	8 hours or less	P1, P8, P12, P14, P18, P19, P20, P21, P22, P23, P24, P25
	9 hours or more	P2, P3, P4, P9, P13, P15
Sleep Duration	7 hours and under	P2, P3, P4, P6, P7, P8, P10, P12, P15, P16, P18, P20, P21, P22, P25
	8 hours and over	P1, P5, P9, P11, P13, P14, P17, P19, P23, P24
Who You Spend Your Leisure Time with	Friends	P1, P5, P7, P12, P13, P14, P16, P19, P21, P22, P24
	Family	P1, P2, P3, P4, P5, P7, P9, P10, P11, P15, P16, P17, P18, P19, P20, P21, P22, P23, P25
	Alone	P3, P4, P6, P8, P20, P24
Where Leisure Time is Spent	At the gym	P1, P2, P3, P5, P12, P17, P24
	At the shopping center	P2, P3, P5, P11, P16, P22
	At home	P4, P6, P7, P8, P9, P10, P11, P13, P14, P15, P19, P20, P21, P23, P25
	Outside (café, course, picnic, etc.)	P1, P5, P7, P8, P13, P14, P18, P24, P25
Participation in Activities According to Social Customs and Traditions	Condolences	P1, P2, P4, P6, P7, P8, P9, P10, P11, P13, P14, P15, P16, P17, P18, P19, P20, P22, P24, P25
	Weddings	P1, P2, P4, P5, P6, P7, P8, P9, P10, P11, P12, P14, P16, K17, P18, P19, P22, P24, P25
	Festivals (Honey Festivals, etc.)	P2, P3, P4, P7, P8, P19, P22, P24
	Sports Activities	P1, P2, P3, P5, P10, P11, P12, P17, P18, P19, P21
	Invitations	P4, P6, P7, P10, P13, P15, P16, P17, P20
	I am not attending	P23
Participation in activities Conducted in Person	I agree	P1, P3, P4, P6, P7, P8, P9, P10, P11, P16, P17, P19, P20, P24
	I disagree	P2, P5, P12, P13, P14, P15, P18, P21, P22, P23, P25
Leisure Time Competence	Sufficient	P1, P2, P3, P4, P5, P7, P8, P9, P10, P11, P13, P14, P17, P18, P19, P20, P25
	Not Sufficient	P6, P12, P15, P16, P21, P22, P23, P24
Budget Allocated for Leisure Time	I allocate a budget	P1, P2, P3, P5, P6, P7, P9, P10, P11, P14, P16, P17, P19, P22, P24
	I do not allocate a budget	P4, P8, P12, P13, P15, P18, P20, P21, P23, P25
Reflecting Culture in Leisure Activities Participated in	Reflects my culture	P1, P2, P3, P4, P6, P7, P8, P9, P10, P11, P15, P20, P21, P22, P24
	Does not reflect my culture	P5, P12, P13, P14, P16, P17, P18, P19, P23, P25
The Pleasure of Happiness from Leisure Activities Participated in	Makes me happy	P1, P2, P3, P4, P5, P6, P7, P10, P11, P12, P13, P14, P15, P16, P17, P18, P19, P20, P21, P22, P25
	Does not make me happy	P8, P9, P23, P24

As a result of the interviews, ten (10) themes about how individuals spend their leisure time were highlighted and are shown below;

a) Mandatory working hours

b) Sleep duration

c) Who you spend your leisure time with
d) Where leisure time is spent
e) Participation in activities according to community customs and traditions
f) Participation in activities conducted in person
g) Leisure time competence
h) Budget allocated for leisure time
i) Participation in leisure activities reflects the culture
j) Happiness satisfaction of the leisure time activities participated in

Table 2 shows the answers of the participants to the question about mandatory working hours. As seen in Table2, 28%(n=7) of the participants stated that they did not work, 48% (n=12) stated that they worked 8 hours or less, and 24% (n=6) stated that they worked 9 hours or more.

Table 2. Mandatory Working Hours

Theme	Code	n	%
Mandatory Working Hours	Not working	7	28,00
	8 hours or less	12	48,00
	9 hours or more	6	24,00

As seen in Table 3, 60%(n=15) of the participants stated that they slept 7 hours or less, while 40% (n=10) stated that they slept 8 hours or more.

Table 3. Sleep Duration

Theme	Code	n	%
Sleep Duration	7 hours or less	15	60,00
	8 hours or more	10	40,00

Table 4 shows the answers of the participants to the question about who they spend their leisure time with. As can be seen in Table 4, 44% (n=11) of the participants answered the question of who they spend their leisure time with as friends, 76% (n=19) answered as family, and 24% (n=6) answered as alone.

Table 4. With whom Leisure Time is Spent

Theme	Code	Answer	n	%
With Whom Leisure Time is Spent	Friend	No	14	56,00
		Yes	11	44,00
	Family	No	6	24,00
		Yes	19	76,00
	Alone	No	19	76,00
		Yes	6	24,00

Table 5. Where Leisure Time is Spent

Theme	Code	Answer	n	%
Where Leisure Time is Spent	Sports Hall	No	18	72,00
		Yes	7	28,00
	Shopping Center	No	19	76,00
		Yes	6	24,00
	At home	No	10	40,00
		Yes	15	60,00
	Outside (Cafe, Coffee House, Course, Picnic, etc.)	No	16	64,00
		Yes	9	36,00

Table 5 shows the answers given by the participants to the question about where they spend their leisure time. Some participants stated that they spend their leisure time in more than one place. As can be seen in Figure 5, 28% (n=7) of

the participants answered the question of where they spend their leisure time as gym, 24% (n=6) as shopping center, 60% (n=15) as home, and 36% (n=9) as outdoors (cafes, coffeehouses, courses, picnics, etc.).

Table 6. Event Participation by Community Customs and Traditions

Theme	Code	Answer	n	%
Event Participation According to Community Customs and Traditions	Condolence	No	5	20,00
		Yes	20	80,00
	Wedding	No	6	24,00
		Yes	19	76,00
	Festivals (Honey Festivals etc.)	No	17	68,00
		Yes	8	32,00
	Sport Activities	No	14	56,00
		Yes	11	44,00
	Invitations	No	16	64,00
		Yes	9	36,00
	Disagree	No	24	96,00
		Yes	1	4,00

Table 6 shows the answers of the participants to the question about activity participation according to community customs and traditions. Some participants stated that they participate in more than one activity in their leisure time. As can be seen in Figure 6, when analysed across the group, it was seen that 80% (n=20) of the participants answered condolences, 76% (n=19) weddings, 32% (n=8) festivals (honey festivals, etc.), 44% (n=11) sports activities, 36% (n=9) invitations, and 4% (n=1) disagreed with the question on activity participation according to community customs and traditions.

Table 7. Participation in Activities Conducted in Person

Theme	Code	n	%
In-Person Event Participation	I agree	14	56,00
	Disagree	11	44,00

As can be seen in Table 7, 56% (n=14) of the participants agreed and 44% (n=11) disagreed with the question of whether the participants personally participated in the activities they were involved in.

Table 8. Leisure Time Competence

Theme	Code	n	%
Leisure Time Competence	Sufficient	17	68,00
	Not Sufficient	8	32,00

As seen in Table 8, 68% (n=17) of the participants stated that their leisure time was sufficient, while 32% (n=8) stated that their leisure time was not sufficient.

Table 9. Budget Allocated for Leisure Time

Theme	Code	n	%
Budget Allocated to Leisure Time	Budget Allocation	15	60,00
	No Budget Allocation	10	40,00

Table 9 shows the answers of the participants to the question about the budget allocated for leisure time. As seen in Figure 9, 60% of the participants (n=15) stated that they allocate a budget for the activities they do in their leisure time, while 40% (n=10) stated that they do not allocate a budget for the activities they do in their leisure time.

Table 10. Reflection of Culture in Leisure Time Activities Participated

Theme	Code	n	%
Participation in Leisure Time Activities Reflects Culture	Reflects My Culture	15	60,00
	Does Not Reflect My Culture	10	40,00

Table 10 shows the answers of the participants to the question about the reflection of culture in the leisure time activities they participate in. As seen in Figure 10, 60% (n=15) of the participants stated that the activities they do in their leisure

time reflect their culture, while 40% (n=10) stated that the activities they do in their leisure time do not reflect their culture.

Table 11. Reflection of Culture in Leisure Time Activities Participated in

Volunteer Participant (VP)	Age	Gender	Education Status	Economic Situation
VP1	34	Male	University	Good
VP2	30	Male	High School	Good
VP3	29	Male	High School	Centre
VP4	38	Male	High School	Centre
VP5	22	Female	High School	Good
VP6	37	Female	Primary School	Good
VP7	56	Female	Primary School	Good
VP8	58	Male	Primary School	Centre
VP9	37	Female	University	Centre
VP10	50	Female	Primary School	Bad
VP11	13	Female	Middle School	Good
VP12	23	Male	High School	Centre
VP13	54	Male	Middle School	Good
VP14	23	Female	University	Good
VP15	41	Female	Middle School	Centre
VP16	29	Female	Primary School	Centre
VP17	17	Male	High School	Good
VP18	53	Male	Middle School	Centre
VP19	36	Male	University	Good
VP20	50	Female	Primary School	Centre
VP21	48	Male	High School	Good
VP22	28	Male	University	Good
VP23	18	Female	High School	Centre
VP24	33	Male	University	Centre
VP25	31	Male	University	Bad

Table 12. Happiness Satisfaction of Leisure Time Activities

Theme	Code	n	%
Happiness Pleasure of Participated Leisure Time Activities	Makes You Happy	21	84,00
	Doesn't Make You Happy	4	16,00

Table 12 shows the answers of the participants to the question about the happiness satisfaction of the leisure time activities in which they participated. As seen in Figure 11, 84% (n=21) of the participants stated that the leisure time activities in which they participated created happiness satisfaction for them, while 16% (n=4) stated that the leisure time activities in which they participated did not create happiness satisfaction for them.

4.Discussion

As a result of the interviews, ten themes were highlighted: compulsory working time, sleep time, with whom leisure time is spent, where leisure time is spent, participation in activities according to social customs and traditions, participation in activities carried out personally, adequacy of leisure time, budget allocated to leisure time, reflection of the culture of the leisure time activities participated in, happiness satisfaction of the leisure time activities participated in.

In our study, the majority of the participants stated that they had a compulsory working time of 8 hours or less. In this direction, it is thought that people other thanthe6 people who stated that they have a compulsory working time of 9 hours or more can provide themselves with the time to allocate leisure time. Kartal (2022) examined leisure time behaviours in different cultures on the sample of Assyrians and reported that individuals with working hours over 8 hours do not participate in leisure activities because their leisure time is not sufficient.

In our study, participants stated that they had a sleep duration of 8 hours or more and 7 hours or less. It was observed that the majority (60%) had a sleep duration of 7 hours or less. It is thought that this may be due to the inclusion of young individuals in our study. Considering that most of the individuals participating in our study are adults, it is expected that they follow the recommended sleep duration. In addition, statistically and theoretically, it is known that the activities included in recreational activities support a healthy life. In a healthy life, the sleep duration of young adults varies between 6 hours and 10 hours (Güçlücan, 2019). In this direction, the sleep duration of the participants in the study corresponds to the healthy sleep duration.

In our study, participants stated that they usually spend their leisure time with their families, friends and alone. It was seen that the majority of the participants (76%) spent time with their families. In this direction, it can be thought that people have strong social ties and attach importance to family ties in our society. In our study, participants stated that they usually spend their leisure time at the gym, shopping center, home or outdoors (cafes, coffee houses, courses, picnics, etc.). It was observed that the majority of the participants (60%) spent time at home. In addition, participants generally prefer to chat with friends or family members when they spend time at home. In this context, it can be thought that the culture of the region they live in causes people to exhibit chatting and chatting behaviours in their leisure time. When the literature is examined, Kurar and Baltacı (2014) reported in their study that the participants spent their leisure time with family or doing sports. Özdağ et al. (2009) stated in their research that people spend their leisure time with their families, going to sports and traveling. In Demir and Demir's (2006) study, it was reported that individuals mostly turn to similar leisure time activities and that factors such as family, environment, friendships, responsibilities, age and gender are factors in the selection of these activities. Çoban and Özel (2022), in their study examining leisure time behaviours in Eskişehir sample, stated that the most important cultural structure of Eskişehir is the hammam and coffeehouse culture. In our study, some participants stated that they went to coffeehouses in their leisure time. Similar to our study, Çoban and Özel (2022) also reported that the participants preferred to spend their time with their families and friends. In a study conducted by Kurar (2020) to determine the recreation experience preferences, expectations and satisfaction levels of the locals living in Alanya, it was determined that the locals mostly spend time with their friends in their leisure time. Similarly, in a study conducted by Bölükbaş (2019), it was concluded that the majority participated in leisure activities with a group of friends. Başkan and Karaküçük (2015) examined leisure time behaviours in different cultures in the sample of Armenians. In their study, it was determined that Armenian citizens living in rural areas mostly engage in church-centered activities, hunting, some festivals, meetings and housework, and give a special place to Armenian songs and dances. In the same study, it was also stated that they engage in activities such as watching television and going to coffeehouses in common with other ethnic groups and the general society. In the study by Kartal (2022), in which they examined leisure time behaviours indifferent cultures on the sample of Assyrians, it was stated that the participant group participated in religious activities in their leisure time. Kül Avan and Karaküçük (2020) examined leisure time behaviours in different cultures on the sample of Cappadocia and found that the participants mostly participated in coffee houses, sports, shopping and watching TV among leisure time activities according to general social life. In addition, it was found that the participants spent their leisure time with their family, friends or alone. The results of this study are similar to our study. When foreign studies were examined, it was determined that participants shopped, visited relatives and friends, engaged in tourism, and participated in entertainment-based activities as a result of the study conducted in China (Yin, 2005). Looking at leisure time activities in Germany, it is seen that people garden, shop and solve crossword puzzles (Statista et al., 2019). Baştuğ et al. (2017) found that people living in Germany and Australia participate in outdoor and sports activities more than other activities. In a study conducted by Fox and Rickards (2002) in the United Kingdom, it was found that the most frequently attended activities of individuals were attending movies, plays, musicals, painting, sculpture and photography exhibitions.

In our study, the participants stated that they participate in condolences, weddings, festivals (especially honey festivals), sports activities (horse racing, astroturf, etc.), invitations (house sittings, planned conversations with friends, etc.) according to the customs and traditions of society. It was seen that most of the participants (80%) participated in condolences. In this context, it can be thought that neighbourhood relations are high in the culture where individuals live and these relations are valued more. It was also observed that there are local festivals (e.g. honey festival) and the interest in this activity is high in the middle-aged population. Only one of the participants stated that he did not participate in any activity. When the literature is examined, in the research conducted by Çoban and Özel (2022) in Eskişehir sample, it was found that locals mostly participate in social and cultural activities in their leisure time. In the study conducted by Güçer et al. (2019), preferred was determined that the most preferred leisure time activities by the

locals are activities such as going to the plateau, watching TV and listening to music. In a study examining the leisure time activities of Safranbolu people, it was revealed that people spend their leisure time with their families with passive activities such as watching television, relaxing, walking, and listening to music (Türker et al., 2016). In a study conducted by Okumuş (2013), it was revealed how people spend their leisure time at home in Eskişehir Odunpazar during Ramadan nights. In the study, it was concluded that leisure time evaluation covers dimensions and functions such as rest, entertainment, games, friendship, social relations, education, politics, food and beverage culture, socialization, economy, family, women and spending time. In another study conducted by Okumuş (2015), it was revealed how people in Eskişehir Odunpazar spend their leisure time at home in summer-winter, day-night, Ramadan. In this study, people from all walks of life experience recreation, entertainment, games, friendship, social relations, education, politics, food and drink culture, socialization, economy, spending time, religion, women and family, art and music. In Kül Avan and Karaküçük's (2020) study on leisure time behaviours in different cultures in the sample of Cappadocia, the leisure time activities of the participants according to their own culture were listed as attending festivals, worshiping, religious conversations, participating in conversations and religious visits.

In our study, the majority of the participants (56%) stated that there were activities that they were personally involved in and that they participated in these activities. In this direction, it can be said that individuals in the region where we conducted the research as summers possibility by taking part in the activities themselves. In addition, the fact that individuals have a say in the organization of activities is an indication that they support those activities and tend to participate in them in their leisure time.

In our study, the majority of the participants (68%) stated that the leisure time left for them outside of work was sufficient. In this direction, it can be inferred that the geographical region does not have an element that may constitute an obstacle to leisure activities in terms of time. When the literature is examined, it was determined that the participants considered their leisure time sufficient in the study conducted by Kül Avan and Karaküçük (2020) in which they examined leisure time behaviours in different cultures in the Cappadocia sample.

In our study, the majority of the participants (60%) stated that they allocated a special budget for their leisure time activities. This shows that people in there gondola not have any financial obstacles to participate in any leisure time activity. When the literature is examined, Çoban and Özel (2022) found that the highest rate among the factors that prevent people from participating in leisure time activities in Eskişehir sample was found to be at the income level. In our study, most participants stated that they could allocate a budget for leisure time activities. In one study, the reason for this was evaluated as the convenience provided by social and economic conditions (Sutinen et al., 2003). Ina study by Kül Avan and Karaküçük (2020), in which leisure time behaviors in different cultures were examined in the sample of Cappadocia, unlike our study, it was determined that the participants mostly did not allocate a budget for leisure time activities. In a study conducted by Gomez (2006), it was stated that the reasons why some ethnic groups do not participate in recreational activities are not due to cultural differences, but due to socio-economic characteristics.

In our study, the majority of the participants (60%) stated that the activities they performed during leisure time reflected their own culture. This situation shows that people in the region have a leisure culture. In addition, the answers given to this question are an indication that individuals are connected to the culture of the geography in which they are located. When the literature is examined, Çoban and Özel (2022) found that the activities that the locals participated in their leisure time reflected their culture in the research they conducted in Eskişehir sample. In the research of Kül Avan and Karaküçük (2020), in which they examined leisure time behaviors in different cultures in the sample of Cappadocia, unlike our study, it was determined that the leisure time activities that my participants participated in mostly did not reflect their culture. In the study by Şen Demir and Demir (2014), it was stated that the cultural characteristics of individuals can affect the determination of the types of activities, the way and purpose of participation, and factors such as family structure, lifestyle, tastes and habits, social environment, etc. can play an active role in determining the tendency to participate in all kinds of activities other than business life.

In our study, the majority of the participants (84%) stated that the leisure time activities they participated in increased happiness pleasure for them. There is a son for this can be explained by the fact that the culture adopted by the individuals in our study supports leisure activities, provides individuals with areas where they can socialize and provide activities in which they can be personally involved. When the literature is examined, Özdağ et al. (2009) state in their research that leisure activities have a relaxing, educational, peaceful and happiness-inducing effect on the

person. Balish et al. (2016) also concluded that there is a positive relationship between individuals who engage in recreation and their happiness. Kaya et al. (2024) state that social structures are effective in the transfer of regional characteristics and the selection of cultural reflections in cultural promotion through the different applications they use in leisure activities. In another study, Musson (2017) reported that recreation can increase the level of happiness in life. In other studies, it has been stated that recreation has an effect on individuals' life satisfaction (Kaya et al., 2018). In addition, there are studies revealing that the quality of life of adults who participate in physical activities as recreational activities is high (Güllü & Çiftçi, 2016). In Ortaç's (2019) research, it is seen that participation in recreational activities has an effect on quality of life. In this context, it can be said that the sphere of influence of recreational activities that provide opportunities for the protection and strengthening of the psychological and physical health of men and women of all age groups is quite comprehensive.

As a result, it has been determined that the mandatory working time of individuals with Bingöl Zaza culture is different from each other, the majority of them have a maximum working time and this situation creates a preference to allocate time to create leisure time for themselves. In addition, it has been determined that these individuals sleep between 6 hours and 10 hours, which is called healthy, sleep time. It has been determined that individuals with Bingöl Zaza culture utilize their leisure time differently from each other, some prefer to spend time with family, some with friends, and some alone. It has been observed that these individuals stay at home in their leisure time or like to go out, to the gym and to the shopping center. In addition, it has been observed that these individuals care about their religious duties, ties with their relatives, festivals reflecting their culture, and leisure time activities. It has been determined that individuals with Bingöl Zaza culture are members of events and participate in these events. It has also been determined that individuals think that the leisure time left to them outside of work is sufficient. In addition, individuals stated that they allocated a special budget for the activities they carried out in their leisure time and that the activities they participated in reflected their culture. Finally, individuals stated that the leisure time activities they participated in created a sense of happiness.

5.Conclusion

Based on all these inferences, it was determined in this study that there is a standardization in the leisure time behaviours of ethnic and belief groups as a result of acculturation, but ethnic cultural life is tried to be kept alive with a certain consciousness. For this reason, it is thought that cultural differences should be kept alive, taught to new generations and measures should be taken to prevent the loss of richness arising from differences. In our study, it was determined that individuals participated in more passive recreational activities. In this respect, the functionality of recreation units in local governments should be increased and people should be enabled to engage in active recreational activities in these areas as individuals or groups. Although the majority of the individuals thought that the activities they participated in reflected their culture, a significant group stated that the activities did not reflect their culture. In this respect, it is thought that the local administration should organize recreational activities that can in still the culture of the region. Considering that each culture has its own beliefs, values, attitudes and judgments, we can say that these phenomena are an important factor in determining people's behaviours and the activities they are oriented towards. Considering the leisure time evaluation situations, it is observed that there is not much difference between Bingöl Zaza culture and other cultures.

Limitations

The main limitation of this study is that the general inability of the findings obtained is limited since the participant group consists only of individuals from Bingöl Zaza culture. Another limitation is that since the qualitative data collection method was used in the study, the participants' responses are based on subjective values and the possibility of making comparisons with other regions or cultures is limited. Future studies can take a comparative approach to leisure behaviours among different ethnic and cultural groups and examine cross-cultural similarities and differences more comprehensively by using quantitative methods and larger samples. In addition, there is a need for studies evaluating the effects of leisure activities on individuals' quality of life, social connectedness and happiness levels from a cross-cultural perspective.

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Research Article

The Effect of Music on Sport Applied Lessons of Sport Sciences Faculty Students

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Abstract: The aim of this study was to examine the effect of music on students' motivation, attention, and performance during practical courses at the Faculty of Sports Sciences. A total of 312 students (190 women, 122 men) voluntarily participated in the study from a state university in Turkey during the 2024–2025 academic year. The research utilized a descriptive survey model, and data were collected using the "Effect of Music in Sports Applications Scale" which includes sub-dimensions of psychological resilience, physical strength-performance, and motivation. The scale was applied simultaneously with the physical activities. Independent samples t-tests and one-way ANOVA were conducted to analyze the data. The findings revealed that gender, age, years of regular sports participation, weekly exercise frequency, and type of sports activity (team or individual) significantly influenced the effects of music. Participants who believed that music positively affected their performance had significantly higher scores in all subdimensions. The study concludes that music is an effective external stimulant that can enhance psychological and physical performance in practical sports courses and suggests its integration into physical education practices.

Keywords: Alpine climbing; mountaineering; anthropometry; somatotype; physical fitness.

1. Introduction

Sports education is a multifaceted and dynamic process that aims to support not only the physical development of individuals but also their cognitive competencies, emotional well-being, and social interaction skills (Condello et al., 2021; Kao, 2019). The successful and sustainable implementation of this process is directly related to the appropriateness of teaching methods and the influence of environmental factors (Chu et al., 2022; Martín-Rodríguez et al., 2024). Especially in applied courses, students' level of active participation, intrinsic motivation, and overall performance are among the primary determinants that shape the quality and depth of learning outcomes (Raza et al., 2020; Wei et al., 2023). In this context, music used in educational settings has emerged as a prominent pedagogical tool due to its notable emotional resonance and physiological impact (Frid, 2019).

The effects of music on humans have been extensively investigated across diverse scientific disciplines for many years (Welch et al., 2020; Erfanian et al., 2019). Particularly in the realm of sports and exercise, research reveals that music has a measurable and favorable impact on psychological states, reduces the perceived exertion levels during physical activity, and significantly enhances motivational drive (Yapıcı et al., 2023; Uğurlu et al., 2023). Music, through its rhythmic properties, can synchronize and regulate movement tempo, making it one of the key variables influencing athletic performance (Wright & Palmer, 2020). This influence is observable both in casual recreational activities and within the scope of elite-level professional sports performance (Rose et al., 2021; Hammerschmidt & Wöllner, 2023). However, despite the growing body of literature on the use of music in exercise settings, its specific impact on educational outcomes in applied sports courses remains underexplored.

Applied courses offered in faculties of sport sciences serve as critical experiential learning platforms where students are able to translate theoretical knowledge into practical skills and gain firsthand professional experience (Bartlett & Drust, 2021; Finlay et al., 2022). Structuring the teaching strategies employed in these courses in a way that maximizes student engagement and fosters enthusiasm significantly contributes to the effectiveness and retention of the learning process (Munna & Kalam, 2021; Chans & Portuguez Castro, 2021). The fact that music is often perceived as a positively stimulating external factor, particularly among young adults, underscores the importance and necessity of in-depth research in this area (Gupta & Singh, 2020; Cloutier et al., 2020).

Therefore, the aim of this study is to comprehensively examine the effects of music integrated into applied courses within the Faculty of Sport Sciences. Specifically, it aims to evaluate how the use of music during these sessions influences students' motivation, participation, and perceived learning outcomes. This study aims to examine the impact of music on students' psychological and physical responses during sports practices. The research hypothesis (H_1) proposes that music significantly increases students' psychological resilience, physical strength and performance, and motivation levels during sports activities. In contrast, the null hypothesis (H_0) assumes that music has no significant effect on students' psychological resilience, physical strength and performance, or motivation levels in the context of sports practices.

2. Materials and Methods

2.1. Research Group

The sample of the study consisted of a total of 312 students studying at the Faculty of Sport Sciences of a state university in Turkey in the 2024-2025 academic year. 190 of the participants were women, and 122 were men students. The students were selected using a convenience sampling method and included in the study on a voluntary basis. Students were informed about the purpose of the study, and ethical consent was obtained. All participants were aged 18 years and over. Demographic data were collected to contribute to the analysis process.

2.2. Research Design

In this study, a descriptive survey model was planned to determine the effect of music use on students during applied sports lessons. In the study, it was aimed to evaluate the instant effects of music in the sportive practice process. The questionnaire was administered directly during the sport practice, not before or after the applied lesson, and data were collected on students' experiences during the applied sports lesson simultaneously with music. With this method, it is aimed to examine the effects of music on the applied course processes of the students of the faculty of sport sciences. Specifically, the study targeted three key performance indicators: (1) motivation, (2) psychological resilience, and (3) physical strength and performance. These indicators were evaluated through a scale specifically structured to measure students' subjective perceptions of how music influenced these performance components during the lesson. No direct objective performance metrics (e.g., time, repetition count, or measurable physical outputs) were used; instead, the focus was on self-reported experiences aligned with these performance categories.

2.3. Data Collection

In the collection of data, the Scale of the Effect of Music in Sportive Practices (SUMEÖ), the validity and reliability study of which was conducted by Karayol and Turhan (2020), was used. This scale is structured with a 5-point Likert-type rating system. The scale consists of three sub-dimensions: Psychological Resilience (items 17, 16, 12, 13, 18, 15, 14) - α=0.806, Physical Strength and Performance (items 8, 7, 9, 10, 11, 6) - α=0.785, and Motivation (items 4, 3, 2, 5, 1) - α=0.718. The total scale reliability coefficient (α) is 0.885. In this study, the scale was administered only during the sportive practice so that students' simultaneous experiences with music were directly assessed.

2.4. Data Analysis

Data analysis was carried out using SPSS 25.0 statistical software. Percentages, frequency distributions, and descriptive statistics regarding the demographic characteristics of the participants were calculated. An independent sample t-test was used to examine the effect of music during the practice lessons of the students studying at the Faculty of Sport Sciences. One-way analysis of variance (ANOVA) was used to compare three or more independent groups. In all

statistical analyses, the significance level was determined as $p < 0.001$, and p values below this value were considered statistically significant.

2.5. Ethics Committee Permission

This study was carried out with the permission of Kırıkkale University Social and Human Sciences Researches Ethics Committe (Date: 17.03.2025, Decision No: 3/11). Before data collection, participants were thoroughly informed about the study through a detailed presentation and subsequently provided written consent. The research was carried out in accordance with the ethical guidelines of the Declaration of Helsinki.

3. Results

Table 1. Frequency and Percentage Distributions of the Participants According to Their Answers to the Questions in the Personal Information Form

Variables	Groups	N	%
Total number of participants		312	100
Gender	Women	190	60.9
	Men	122	39.1
Age	19	89	28.5
	20	80	25.6
	21	77	24.7
	22	66	21.2
How many years have you been doing sports regularly? (Your Sports Age)	1-3 years	71	22.8
	4-6 years	104	33.3
	7-9 years	83	26.6
	Over 10 years	54	17.3
How many days a week do you exercise?	1-2 days	51	16.3
	3-4 days	148	47.4
	5-6 days	90	28.8
	7 days	23	7.4
Do you think that music has a positive effect on your performance during your sports practical lessons?	Yes	164	52.6
	No	148	47.4
Sports Event Category	Individual sports	102	47.4
	Team sports	210	52.6

Table 2. Effect of Music on Sports Practical Lessons According to Gender

Sportive Implementation Phase	Group	n	mean	t	p	Cohen's d	Descriptor
Psychological Resilience	Women	190	75.3± 11.3	-5,607	0.010*	0.65	Large
	Men	122	82.3± 10.4				
Physical Strength and Performance	Women	190	80.9± 9.6	-6,156	0.046*	0.72	Large
	Men	122	73.6± 10.6				
Motivation	Women	190	83.5± 9.3	4,874	0.006*	0.58	Large
	Men	122	77.6± 11.1				

*p<0.001**

Table 1 presents the frequency and percentage distributions of the participants' responses to the personal information form. When the gender distribution of the participants is examined, the majority of the sample is men, while the rest are women. When the age groups are examined, the highest participation belongs to the 19-year-old group, while the other age groups are distributed in the 20, 21, and 22 age categories, respectively. When the duration of the participants' sports activities is taken into account, a significant portion of the sample has been doing sports regularly for 4-6 years. According to the weekly sports frequency, the majority of the participants prefer to do sports 3-4 days a week, whereas

a smaller group does sports 1-2 days and 5-6 days. The majority of the participants stated that music has a positive effect on their performance during sports practical lessons.

Table 2 shows that men students received statistically significantly higher scores than women students in the "psychological resilience" sub-dimension of the scale. In contrast, women students scored statistically significantly higher than men students in the "physical strength and performance" and "motivation" sub-dimensions. These differences were found to be statistically significant, with high effect sizes.

Table 3. Music's Impact on Sports Practice: Gender and Age Differences

Sportive Implementation Phase	Group	n	mean	F	p	Tukey
Psychological Resilience	19 [1]	89	77.6± 9.9	5,86	0.001*	1=2<3<4
	20 [2]	80	78.1± 10.5			
	21 [3]	77	81.0± 10.6			
	22 [4]	66	83.9± 10.4			
Physical Strength and Performance	19 [1]	89	84.5± 10.8	12,24	0.001*	4=3<2<1
	20 [2]	80	81.3± 11.6			
	21 [3]	77	76.3± 10.9			
	22 [4]	66	75.3± 10.5			
Motivation	19 [1]	89	77.5± 12.0	1,58	0.001*	1=2<3<4
	20 [2]	80	76.8± 13.0			
	21 [3]	77	79.2± 11.9			
	22 [4]	66	80.8± 11.9			

*p<0.001**

According to Table 3, a significant difference was found across all sub-dimensions of the scale based on age groups ($p<0.001$) when the effect scores of music on applied lessons in the Faculty of Sports Sciences were compared. In the "Psychological Strength" and "Motivation" sub-dimensions, the effect of music on applied lessons increases with age. Conversely, in the "Physical Strength and Performance" sub-dimension, the effect of music is greater among younger age groups. These results suggest that while the impact of music on physical strength and performance tends to decrease with age, its influence on psychological aspects and motivation grows stronger. Overall, the findings indicate that age plays a role in the psychological and physical responses to music in sports-related practices.

Table 4. Sport Age to the variable According to Sporty Applied to the lessons Oriented the Music The effect

Sportive Implementation Phase	Group	n	mean	F	p	Tukey
Psychological Resilience	1-3 years [1]	71	76.3± 10.1	16,71	0.001*	1=2<3=4
	4-6 years [2]	104	77.2± 10.3			
	7-9 years [3]	83	81.4± 11.1			
	10 years and above [4]	54	82.6± 9.7			
Physical Strength and Performance	1-3 years [1]	71	74.8± 10.1	26,46	0.001*	1=2<3=4
	4-6 years [2]	104	75.9± 11.2			
	7-9 years [3]	83	82.5± 10.9			
	10 years and above [4]	54	83.1± 10.7			
Motivation	1-3 years [1]	71	75.3± 11.3	14,42	0.001*	1=2<3<4
	4-6 years [2]	104	76.1± 10.9			
	7-9 years [3]	83	78.3± 11.1			
	10 years and above [4]	54	82.9± 10.7			

*p<0.001**

According to Table 4, a significant difference was found in the sub-dimensions of "Psychological Strength," "Physical Strength and Performance," and "Motivation" based on the variable of sports age ($p < 0.001$). Participants with 1–3 years and 4–6 years of sports experience had lower scores, while those with 7–9 years and over 10 years of experience showed higher scores. It was observed that the effect of music on applied sports lessons increases across all sub-dimensions as sports age increases. These findings suggest that individuals demonstrate higher physical and psychological performance with longer durations of regular sports participation. This may be attributed to the fact that as individuals gain more sports experience, they find it easier to integrate external factors such as music into their sports practices.

Table 5. Per week Sport Don't do that Day Number of to the variable According to Sporty Applied to the lessons Oriented the Music The effect

Sportive Implementation Phase	Group	n	mean	F	p	Tukey
Psychological Resilience	1-2 days [1]	51	73.7± 9.6	17,86	0.001*	1=2<3=4
	3-4 days [2]	148	74.2± 10.3			
	5-6 days [3]	90	78.1± 10.1			
	7 days [4]	23	77.5± 10.4			
Physical Strength and Performance	1-2 days [1]	51	71.4± 10.7	19,16	0.001*	1=2<3<4
	3-4 days [2]	148	72.5± 10.6			
	5-6 days [3]	90	79.4± 10.4			
	7 days [4]	23	83.5± 9.5			
Motivation	1-2 days [1]	51	71.3± 11.2	15,69	0.001*	1<2<3=4
	3-4 days [2]	148	73.7± 10.1			
	5-6 days [3]	90	75.2± 8.2			
	7 days [4]	23	76.8± 9.5			

*p<0.001**

Table 5 shows that as the number of days individuals engage in sports per week increases, there are significant increases in the scores for "Physical Strength and Performance," "Motivation," and "Psychological Resilience." In particular, individuals who participate in sports 5–6 days or 7 days per week scored higher in these sub-dimensions compared to those who engage in sports 1–2 days or 3–4 days per week. According to the results of the ANOVA and Tukey tests, these differences are statistically significant ($p < 0.001$). These findings indicate that the frequency of weekly sports participation positively affects both sports performance and psychological indicators.

Table 6. Sporty Application in the Phase of the Music Effect Your Points: Sports Event by Category Comparison

Sportive Implementation Phase	Group	n	mean	t	p	Cohen's d	Descriptor
Psychological Resilience	Team	210	77.6± 10.4	9,42	0.001*	0.65	Medium
	Individual	102	70.7± 11.2				
Physical Strength and Performance	Team	210	76.3± 10.3	5,51	0.001*	0.38	Medium
	Individual	102	72.4± 10.5				
Motivation	Team	210	75.6± 11.1	7,11	0.001*	0.49	Medium
	Individual	102	70.3± 10.5				

*p <0.001**

Table 6 presents the comparison of music's effect scores during the sports application phase based on the type of sports activity (team vs. individual sports). The results show significant differences in the sub-dimensions of "Psychological Strength," "Motivation," and "Physical Strength and Performance." Participants engaged in team sports scored significantly higher than those involved in individual sports across all sub-dimensions. These differences were statistically significant ($p < 0.001$), with moderate effect sizes (Cohen's d = 0.38–0.65). These findings suggest that music

during practice has a more pronounced positive impact on the psychological and physical performance of individuals participating in team sports.

Table 7. Sporty Application in the phase of The Music Effect, your points According to its Effect on Participants' Performance Comparison

Sportive Implementation Phase	Group	n	mean	t	p	Cohen's d	Descriptor
Psychological Resilience	Yes	164	79.5± 10.1	8,19	0.001*	0.64	Medium
	No	148	72.7± 11.3				
Physical Strength and Performance	Yes	164	84.4± 10.0	10,36	0.001*	0.81	Medium
	No	148	76.1± 10.5				
Motivation	Yes	164	82.4± 9.8	11,14	0.001*	0.87	Medium
	No	148	73.7± 10.1				

*p <0.001**

Table 7 demonstrates that participants who reported that music had an impact on their performance scored significantly higher in the sub-dimensions of "Psychological Resilience," "Motivation," and "Physical Strength and Performance" during the sports practice phase. These differences were found to be statistically significant ($p < 0.001$), with moderate to high effect sizes (Cohen's d = 0.64–0.87). These findings provide strong evidence that the perceived impact of music positively influences sports performance across both psychological and physical dimensions.

4. Discussion

In this study, the effects of music use during applied courses among students of the Faculty of Sport Sciences were analyzed. The findings revealed that music had an impact across all sub-dimensions of the scale during sportive practices. According to the findings based on the gender variable, men students scored higher than women students in the 'psychological resilience' sub-dimension, while women students scored higher than their men counterparts in the 'physical strength and performance' and 'motivation' sub-dimensions. This suggests that the way individuals relate to music in the context of sport may differ by gender, potentially influencing emotional states and stress-coping mechanisms. These results indicate that gender plays a determinative role in certain psychological and physical variables during sportive practices. Similarly, the literature highlights that women individuals may develop higher levels of intrinsic motivation, particularly in exercise environments enhanced by music. Ekiz and Atasoy (2021) reported that the perceived effect of music during sportive practices was higher in men than in women.

Regarding the age variable, it was found that as age increases, so does the effect of music in the sub-dimensions of 'psychological resilience' and 'motivation' during applied courses. However, in the 'physical strength and performance' sub-dimension, the effect of music appeared to be more pronounced at younger ages. This implies that the physical benefits of music during sport may diminish with age, while its psychological influence becomes more significant over time. Cloutier et al. (2020) noted in their research that there was no difference in the attentional effects of background music between younger and older individuals. Similarly, Ekiz and Atasoy (2021) found no significant age-related differences in the effects of music during sportive practices.

With respect to the variable of sport age (i.e., the number of years individuals have been engaged in sports), it was observed that the effect of music increased across all sub-dimensions as sport age increased. This finding emphasizes the cumulative influence of long-term physical activity on both psychological and physical aspects, reinforcing the idea that sustained engagement in sport enhances the receptivity and effectiveness of music during exercise. Turhan (2021), however, reported no significant differences in the sub-dimensions of psychological resilience, physical strength and performance, and motivation with regard to sport age. In contrast, Bektaş and Demir (2022) found that individuals with a sport age of 4–5 years or more exhibited higher levels of motivation.

In terms of weekly training frequency, results showed that the impact of music on sportive practices was high across all sub-dimensions, including physical strength and performance, motivation, and psychological resilience. This

suggests that the more frequently individuals engage in regular physical activity, the more pronounced the psychological and physiological benefits of music become. The continuity of exercise as a habitual activity appears to strengthen individuals' mental and physical structures. Supporting this, Gürpınar et al. (2021) reported that listening to music during physical activity can positively affect university students' level of physical activity and reduce negative attitudes toward exercise.

In comparisons based on the type of sports activity, participants engaged in team sports scored higher in all variables than those involved in individual sports. This may be attributed to the synergistic effects of social interaction, collective performance, and shared goals in team sports, which are further amplified by the use of music in applied sport courses.

Lastly, when analyzing individual perceptions regarding the effect of music on performance, it was found that those who believed music was effective scored significantly higher in all dimensions. This highlights that the impact of music is both cognitive and emotional and that personal beliefs about its usefulness are directly reflected in sportive performance. Supporting this, Çelik and Karabilgin (2022) noted that using music during training promotes self-confidence, self-worth, focus, and motivation to continue training. In contrast, Özdemir and Coşkuner (2018) found no significant effect of music in physical education classes in their research on students.

5. Conclusion

The findings of this research demonstrate that music has a significant positive impact on students' sportive performance during applied physical education courses, based on variables such as age, years of sports experience, gender, weekly activity frequency, type of sport, and its influence on performance. The structured and rhythmic nature of music enhances students' participation in practical lessons, boosts their physical performance, and supports their psychological resilience. Furthermore, music positively influences not only physical effort but also key psychological variables that shape athletic performance, such as attention levels, motivation, and mental endurance.

In this context, the conscious and strategic use of music within faculties of sport sciences holds the potential to improve the overall quality of the educational process. When instructors incorporate music as an instructional tool in practical courses, it contributes to the development of student-centered and interactive learning environments. Increasing educators' awareness of the pedagogical benefits of music can enhance both the effectiveness of instruction and the holistic development of students in terms of physical and psychological competencies.

Limitations

The study is limited by the absence of a control group and the timing of the scale administration. We administered the scale during the practice session to capture students' immediate responses and minimize recall bias, but this approach may have potential distracting effects. Additionally, the music selection was confined to high-tempo, instrumental, or minimally vocal electronic music commonly played in university sports halls. The music was selected through a collaborative decision between instructors and students, and the same music tracks were used across all groups to standardize the study.

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Research Article

Muscle Strength, Power and Flexibility Changes in Wrestlers According to the Structure of Resistance Training: Pyramidal Model Comparison

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Abstract: Resistance training is a widely used method to improve physical fitness and athletic performance. This study aimed to investigate the effects of double pyramidal and fast pyramidal resistance training on selected physical and physiological characteristics in male wrestlers from the junior category. Thirty male athletes, aged between 17 and 20, who had been wrestling regularly for at least three years in the junior category, were randomly assigned to one of three groups: double pyramidal resistance training, fast pyramidal training, and a control group. The training groups followed their respective training protocols three times per week for eight weeks. Measurements included body composition, lower extremity muscle strength, peak and average power, 30-meter sprint performance, muscular endurance, and flexibility. Data were analyzed using multivariate analysis of covariance (MANCOVA) and the Scheffe post-hoc test at a significance level of 0.05 using SPSS 21. The findings indicated that the double pyramidal group experienced significantly greater improvements in body weight, body mass index, fat mass, lower extremity strength, and power output compared to the control and fast pyramidal groups ($P<0.05$). Conversely, the fast pyramidal group showed significantly better results in 30-meter sprint performance than the other two groups ($P<0.05$). Additionally, both training groups exhibited higher muscular endurance and flexibility levels than the control group ($P<0.05$). The results suggest that while double pyramidal resistance training is more effective for enhancing muscular strength and power, fast pyramidal training provides better outcomes for sprint performance. Coaches and sports scientists can implement these methods based on the specific performance goals of junior wrestlers.

Keywords: Resistance training, pyramidal training, wrestling.

1. Introduction

Physical exercise is of great importance for athletes as it is a systematic process to improve their physical qualities and contributes to the improvement of sports performance. Athletes with good physical condition can significantly increase their chances of becoming champions in competitions. Physical conditioning is an athlete's ability to cope with physical demands and enables optimal performance (Sabillah et al., 2022). Accordingly, strength and conditioning programs need to be systematically and scientifically based to optimize athletes' physical readiness, regulate weight management, and develop the motor skills required in competitions (Hoseini et al., 2014). Physical preparation and correct, regular, sustainable training practices are the key elements that improve an individual's physical readiness (Bile & Suharharjana, 2019; Fachrezzy et al., 2021). Every training process requires a training program that includes both physical development and technical skills.

Wrestling is one of the sports where strength and endurance are at the forefront (Juhanis, 2016). Various physical conditioning components such as compensatory strength, muscular endurance, explosive power, flexibility and general

cardiovascular endurance play a critical role for success in this sport. In wrestling training, these components are addressed as key success parameters to improve physical performance. However, the most dominant physical conditioning component in wrestling is strength, and therefore, the strength parameters required in wrestling differ compared to other sports (Kara & Özal, 2022). Muscle strength is recognized as one of the most decisive factors for achieving a high level of success in wrestling. Resistance training stimulates muscle protein synthesis, which promotes hypertrophy and leads to notable gains in muscular strength (Coffey & Hawley, 2007). Indeed, intensive training processes have been reported to provide wrestlers with various gains in terms of both performance and physiological adaptation (Demirhan et al., 2020). In addition to this increase in muscle strength, resistance training has been reported to increase anaerobic capacity and explosive power (Surakka, 2005). In addition, factors such as age and gender have an effect on muscle hypertrophy depending on the training protocol applied (Schoenfeld, 2010). In addition to these physiological adaptations, other performance components related to the functioning of the neuromuscular system also improve with resistance training. Speed reflects the activity pattern of the nervous system and speed can be increased by power-speed training (Baytaş et al., 2024). However, during resistance training, it is recommended to pay more attention to flexibility training to increase flexibility and reduce stiffness in muscles (Pekünlü, 2019).

Studies have shown that resistance training can significantly increase lower extremity muscle strength and anaerobic power (Slade et al., 2002). Another study showed that 24 weeks of resistance training with 82% maximum repetition intensity resulted in 63-91% increase in muscle strength and 17-25% increase in anaerobic power (Fatouros et al., 2005). It has also been reported that muscle glycogen stores, an important fuel source in activities requiring rapid repetition, increase after speed training (Wisløff et al., 2004). In addition, it has been shown that speed and resistance training increases the activity of glycolytic enzymes such as phosphofructokinase, myokinase, creatine phosphokinase and lactate dehydrogenase (Gençoğlu & Gümüş, 2024; İmer Kaplan, 2019; Samavati Shari et al., 2018). It has been determined that pyramidal resistance training increases muscle strength and muscle hypertrophy, double pyramidal and reverse pyramidal loading methods provide similar results on muscle strength and hypertrophy in young wrestlers, but the reverse pyramidal method is more effective in increasing muscle endurance (Hassanzadeh et al., 2023; Nezami et al., 2016). Studies have concluded that speed and resistance training can improve flexibility, hamstring muscle strength and anaerobic power, but resistance training is more effective on hamstring muscle strength (Türksoylu & İşlegen, 2013). However, scientific studies examining the effects of different loading strategies on muscle adaptations are still limited.

Accordingly, more scientific research is needed to determine the most effective training model to maximize maximal strength, speed and anaerobic performance in wrestlers. This study was conducted based on the hypothesis of determining which of the resistance-based pyramidal training or speed-oriented pyramidal training models leads to greater improvements in wrestlers' physical and physiological performance.

2. Materials and Methods

2.1. Research Model

This study employed a quasi-experimental design that featured pre- and post-testing in both the experimental and control groups (Karasar, 2007).

2.2. Research Group

For this study, 30 male junior wrestlers from Istanbul Bahçelievler Municipality Sports Club, aged between 17-20 years, were selected by purposive sampling method. The conditions for participation in the study were to have participated in national or international competitions and to have been practicing wrestling regularly for at least three years. Athletes who used performance enhancing drugs or had physical problems that could negatively affect training performance such as injuries to any limb or body pain were excluded from the study. Participants were asked to maintain their usual diet and daily activities throughout the study. A pilot study conducted prior to the main research, involving a sample of 10 participants, revealed a medium effect size ($f = 0.32$) based on the differences between pre-test and post-test results. Based on this finding, a total sample size of 30 participants was considered statistically sufficient. A total of 30 athletes were randomly allocated into three distinct groups: 10 in the double pyramidal training group (DPT), 10 in the speed pyramidal training group (SPT), and 10 in the control group (CG). Written informed consent was obtained from all participants.

2.3. Data Collection

Personal and demographic information of the athletes were obtained using the athlete information form prepared by the researcher. In the pre-test phase, age, height, weight and body fat percentage of the subjects were measured. Participants were asked to avoid intense physical activity in the 24 hours before the tests and to get as much adequate and regular sleep as possible before the night of the measurements.

2.3.1.Anthropometric measurements

Subcutaneous fat was measured with a skinfold caliper using the Jackson-Pollock 7-point method. The sit-to-stand test was used to measure flexibility characteristics. Before performing this test, the participants performed a light warm-up and were warned to avoid fast movements. In addition, the shoes were removed, the body was bent forward with the hands stretched straight and the body was held in this position for a few seconds. Participants' hands were parallel and completely straight during the test.

2.3.2.Strength test

Muscle strength was measured by one repetition maximal test (RM1) method. Prior to and following the resistance training sessions, the warm-up protocol consisted of 5 repetitions at 30%, 4 repetitions at 50%, 3 repetitions at 70%, and 1 repetition at 90% of the subjects' estimated maximum. During the experiment, it was aimed to increase 90% RM1 by 2.5-10 kg to achieve maximal strength. RM1 was calculated with three-step tests and 4-minute rests (Mitter et al., 2023). For the evaluation of muscular endurance, the participants were asked to squat and the movements were performed using a 60% load of 1 repetition maximum (1RM). The participants were asked to perform the maximum number of repetitions possible with this load. The execution tempo of the movement was determined as 1 second for the ascent (concentric phase) and 2 seconds for the descent (eccentric phase). The repetition numbers obtained as a result of this test were recorded as data reflecting the lower extremity muscular endurance of the wrestlers.

2.3.3.Anaerobic power

Sargent vertical jump test was used to determine anaerobic power and to evaluate vertical jump performance (Günay, 2008). In this test, the subjects performed four jumping attempts with 1 minute rest periods. The results, jump height and maximum and average power were calculated using the formulas used.

2.3.4.Speed test

Speed was assessed by a 30-meter sprint run in seconds. All subjects ran 30 meters three times after warm-up and rested for 5 minutes after each run. The best time was recorded as the lowest running time obtained from this test

2.3.5.Study design

The resistance training program included a 10-minute general warm-up followed by resistance training consisting of strength exercises (squat, leg press, forelimb extension, and hindlimb flexion). The warm-up protocol consisted of 5 minutes of light jogging followed by dynamic stretching exercises (e.g., leg swings, hip circles, arm rotations). This protocol was intended to prepare the muscles and joints for training and to reduce the risk of injury. The warm-up protocol was based on the standard routine commonly performed by wrestlers. In the first group, double pyramidal resistance loading method (80%/4 repetitions, 85%/3 repetitions, 90%/2 repetitions, 95%/1 repetitions, 95%/1 repetitions, 90%/2 repetitions, 85%/3 repetitions, 80%/4 repetitions) was applied. The training started with 80% of the maximal repetition load (1RM), reaching 95% RM1 with 5% increments in each set, then gradually decreasing the loading and increasing the number of repetitions to return to the starting level of 80% RM1. As a result of this protocol, each muscle group was subjected to a total of 12 sets of loading (Cardozo & de Souza Destro, 2023).

The speed-based pyramidal group performed the same exercises with lower loads (in the range of 40%–60% of 1RM) but at a higher speed. This group also completed their training three times per week for eight weeks. The control group continued only their regular wrestling training and did not perform any additional resistance exercises.

As a result, the experimental group performed the specified training program for eight weeks, with three sessions of 40 minutes per week (Kraemer & Ratamess, 2004). In addition, no training was applied to the control group during this

period. After eight weeks of training, a similar post-test was conducted with the same tests. All exercise programs and tests were conducted under the supervision of the researcher and two experienced assistant coaches. The participants' attendance rate was high, and full participation was achieved in all sessions. No injuries or health problems occurred during the eight-week intervention period.

2.4. Statistical Analysis Methods

In order to compare the physiological changes caused by eight weeks of exercise training, the data were first analyzed with the Kolmogorov-Smirnov test for normal distribution. The results of this analysis showed that the data were normally distributed. Multivariate analysis of covariance (MANCOVA) was applied to make the results significant and then post hoc Sheffe's test was performed in SPSS version 21 using a significance level of 0.05 >p.

2.5. Ethics Committee Permission

The study was conducted in accordance with the Declaration of Helsinki and with the approval of İstanbul Aydın University Ethics Committee numbered 2025/03. In addition, the study was conducted in accordance with the "Directive on Scientific Research and Publication Ethics of Higher Education Institutions". Before data collection, participants were thoroughly informed about the study through a detailed presentation and subsequently provided written consent. The research was carried out in accordance with the ethical guidelines of the Declaration of Helsinki.

3. Results

Table 1. Body Weight (kg) Values

Variable	Pre-Test	Post-Test	Percentage Change	Significance Level		
				CG	DPT	SPT
CG	75.75 ± 5.18	75.58 ± 5.50	-0.06 ± 1.48	-	<0.001	0.130
DPT	81.46 ± 6.61	83.43 ± 4.84	3.51 ± 1.61	<0.001	-	<0.001
SPT	77.23 ± 7.27	79.46 ± 7.11	1.23 ± 1.30	<0.130	<0.001	-

CG; Control group, DPT; double pyramidal training group, SPT; speed pyramidal training group.

When Table 1 is analyzed, significant increases were observed in the SPT and DPT groups, while no significant change was found in the control group. Especially the increase in the DPT group (3.51 ± 1.61 kg) was statistically significant ($p < 0.001$). Although the increase in the SPT group (1.23 ± 1.30 kg) was higher than that of the control group, this difference was not statistically significant ($p = 0.130$). However, the improvement in the SPT group was significantly lower compared to the DPT group ($p < 0.001$).

Table 2. Body Mass Index (BMI) Values

Variable	Pre-Test (kg/m²)	Post-Test (kg/m²)	Percentage Change	Significance Level (p)		
				CG	DPT	SPT
CG	25.37 ± 1.44	25.36 ± 1.51	-0.06 ± 1.44	-	<0.001	0.166
DPT	27.73 ± 1.95	28.58 ± 1.18	3.05 ± 1.40	0.001		<0.001
SPT	25.50 ± 1.66	25.19 ± 1.65	-1.23 ± 1.84	<0.166	<0.001	

CG; Control group, DPT; double pyramidal training group, SPT; speed pyramidal training group.

When Table 2 is analyzed, no significant change in BMI was observed in the control group ($p > 0.05$). In the DPT group, a significant increase in BMI was observed (3.05 ± 1.40%, $p < 0.001$). In contrast, the SPT group showed a significant decrease in BMI (–1.23 ± 1.84%, $p < 0.001$). Additionally, the difference between the DPT and SPT groups was statistically significant ($p < 0.001$). These findings indicate that different training programs have a significant effect on BMI.

When Table 3 is analyzed, although a 4.73% increase in 1RM was observed in the control group, this change was not statistically significant ($p > 0.05$). In the DPT group, a significant increase of 13.04% in 1RM was found ($p = 0.001$). Similarly, the SPT group showed a statistically significant increase of 6.71% ($p < 0.004$). Furthermore, the difference between the DPT and SPT groups was statistically significant ($p < 0.004$). These results indicate that both training

programs provided significant improvements in lower extremity muscle strength, with the DPT group achieving the highest gains.

Table 3. Lower Extremity Muscle Strength (1 Repetition Maximum - 1RM) Values

Variable	Pre-Test	Post-Test	Percentage Change	Significance Level (p)		
				CG	DPT	SPT
CG	83.00 ± 6.32	86.50 ± 6.69	4.73 ± 1.93	-	<0.001	0.702
DPT	89.50 ± 6.25	101.00 ± 6.15	13.04 ± 5.52	0.001		<0.004
SPT	83.50 ± 6.26	89.00 ± 6.68	6.71 ± 5.52	<0.702	<0.004	

CG; Control group, DPT; double pyramidal training group, SPT; speed pyramidal training group.

Table 4. Lower Extremity Muscular Endurance Values

Variable	Pre-Test	Post-Test	Percentage Change	Significance Level (p)		
				CG	DPT	SPT
CG	20.70 ± 7.32	23.30 ± 7.82	12.30 ± 4.33	-	<0.001	0.008
DPT	19.30 ± 7.26	26.30 ± 7.11	37.49 ± 16.27	<0.001		0.452
SPT	20.80 ± 7.91	27.80 ± 15.89	27.86 ± 10.19	0.008	0.452	

CG; Control group, DPT; double pyramidal training group, SPT; speed pyramidal training group.

When Table 4 is analyzed, although muscular endurance increased by 12.30% in the control group, this increase remained lower compared to the SPT and DPT groups. In the DPT group, muscular endurance increased by 37.49%, and this improvement was statistically significant ($p < 0.001$). Similarly, a significant increase of 27.86% was observed in the SPT group ($p = 0.008$). Compared to the control group, the improvements observed in both the DPT and SPT groups were statistically significant ($p < 0.001$ and $p = 0.008$, respectively). However, the difference between the DPT and SPT groups was not statistically significant ($p = 0.452$). These results indicate that the training programs implemented in both the DPT and SPT groups provided significant improvements in lower extremity muscular endurance.

Table 5. Flexibility (cm) Values

Variable	Pre-Test	Post-Test	Percentage Change	Significance Level (p)		
				CG	DPT	SPT
CG	35.50 ± 1.15	36.90 ± 1.07	3.97 ± 1.22	-	<0.001	0.001
DPT	35.70 ± 1.07	39.75 ± 1.30	9.38 ± 3.75	<0.001		0.560
SPT	36.00 ± 1.08	38.85 ± 1.03	7.94 ± 1.54	0.001	0.560	

CG; Control group, DPT; double pyramidal training group, SPT; speed pyramidal training group.

When Table 5 is analyzed, although a 3.97% increase in flexibility was observed in the control group, this improvement remained lower compared to the DPT and SPT groups. In the DPT group, flexibility increased by 9.38%, and this increase was statistically significant ($p < 0.001$). Similarly, the SPT group showed a significant improvement of 7.94% ($p = 0.001$). Compared to the control group, the increases observed in both the DPT ($p < 0.001$) and SPT ($p = 0.001$) groups were statistically significant. However, the difference between the DPT and SPT groups was not statistically significant ($p = 0.560$). These findings indicate that the training programs implemented in both the DPT and SPT groups led to significant improvements in flexibility.

When Table 6 is analyzed, a slight decrease of 0.31% in body fat percentage was observed in the control group; however, this change was not statistically significant ($p = 0.812$). In the DPT group, body fat percentage increased by 6.71%, and this increase was statistically significant ($p < 0.001$). On the other hand, the SPT group showed a significant decrease of 5.28% in body fat percentage ($p = 0.012$). The differences between the control group and both the DPT ($p < 0.001$) and SPT ($p = 0.012$) groups were statistically significant. Additionally, the difference between the DPT and SPT groups was

also statistically significant (p = 0.001). These results indicate that the SPT training program was effective in reducing body fat percentage, whereas the DPT group experienced a significant increase in body fat.

Table 6. Changes in Body Fat Percentage (BFP)

Variable	Pre-Test	Post-Test	Percentage Change	Significance Level (p)		
				CG	DPT	SPT
CG	9.72 ± 0.86	9.69 ± 0.98	-0.31 ± 0.00	-	<0.001	0.812
DPT	10.92 ± 1.39	11.63 ± 1.24	6.71 ± 3.74	<0.001		0.001
SPT	10.65 ± 1.30	10.74 ± 1.01	-5.28 ± 3.80	0.012	0.001	

CG; Control group, DPT; double pyramidal training group, SPT; speed pyramidal training group.

Table 7. Changes in Sergeant Jump Test (cm)

Variable	Pre-Test	Post-Test	Percentage Change	Significance Level (p)		
				CG	DPT	SPT
CG	37.9 ± 7.00	39.05 ± 7.80	+1.1 ± 6.5	-	<0.001	0.030
DPT	37.45 ± 7.8	44.3 ± 7.52	+6.85 ± 5.5	<0.001	-	<0.001
SPT	39.35 ± 6.9	42.55 ± 6.46	+3.2 ± 4.17	0.030	<0.01	-

CG; Control group, DPT; double pyramidal training group, SPT; speed pyramidal training group.

When Table 7 is analyzed, jump distance increased by 1.1% in the control group; however, this improvement was minimal. In the DPT group, jump distance increased by 6.85%, and this change was statistically significant (p < 0.001). Similarly, in the SPT group, jump distance increased by 3.2%, and this change was also statistically significant (p = 0.030). The differences between the control group and both the DPT (p < 0.001) and SPT (p = 0.030) groups were statistically significant. Furthermore, the difference between the DPT and SPT groups was also statistically significant (p < 0.001). These results indicate that both the DPT and SPT training programs were effective in improving jump performance, with the DPT group showing the greatest improvement.

Table 8. Changes in Peak Power

Variable	Pre-Test	Post-Test (kg/m²)	Percentage Change	Significance Level (p)		
				CG	DPT	SPT
CG	6890.1 ± 467.19	6966.2 ± 437.37	+76.1 ± 88	-	<0.001	0.201
DPT	7027.2 ± 381.91	7586.0 ± 435.66	+558.8 ± 117	<0.001	-	<0.001
SPT	7002.4 ± 454.60	7166.2 ± 419.52	+163.8 ± 1.40	0.201	<0.001	-

CG; Control group, DPT; double pyramidal training group, SPT; speed pyramidal training group.

When Table 8 is analyzed, an increase of +76.1 ± 88 in peak power was observed in the control group; however, this change was not statistically significant (p > 0.05). In the DPT group, peak power increased by +558.8 ± 117, and this improvement was statistically significant (p < 0.001). In the SPT group, peak power increased by +163.8 ± 1.40, but this change was not statistically significant compared to the control group (p = 0.201). The increase observed in the DPT group was significantly higher than both the control and SPT groups (p < 0.001). These results indicate that the DPT training program was the most effective method for improving peak power, while the SPT program produced a more limited effect.

When Table 9 is analyzed, average power decreased by –35.2 ± 26 in the control group, but this change was not statistically significant (p = 0.584). In the DPT group, average power increased by +48.4 ± 17, and this improvement was statistically significant (p < 0.001). In the SPT group, average power increased by +46.2 ± 61; however, this change was not statistically significant compared to the control group (p = 0.584). On the other hand, the increase observed in the DPT group was significantly greater than that in both the control and SPT groups (p < 0.001). These results indicate that the DPT training program was more effective in improving average power, while the SPT program provided a more limited contribution.

Table 9. Changes in Average Power

Variable	Pre-Test	Post-Test (kg/m²)	Percentage Change	Significance Level (p)		
				CG	DPT	SPT
CG	1152.3 ± 136.25	1117.1 ± 120.07	-35.2 ± 26	-	<0.001	0.584
DPT	1199.4 ± 147.04	1247.8 ± 195.61	+48.4 ± 17	<0.001	-	<0.001
SPT	1194.5 ± 178.54	1240.7 ± 199.84	+46.2 ± 61	0.584	<0.001	-

CG; Control group, DPT; double pyramidal training group, SPT; speed pyramidal training group.

Table 10. Results of Sprint Test (30 Meters)

Variable	Pre-Test	Post-Test	Percentage Change	Significance Level (p)		
				CG	DPT	SPT
CG	5.17 ± 0.54	4.98 ± 0.59	-0.19 ± 0.86	-	<0.701	0.001
DPT	5.33 ± 0.49	4.75 ± 0.39	-0.58 ± 0.73	<0.701	-	<0.014
SPT	5.25 ± 0.40	4.76 ± 0.36	-0.49 ± 0.30	0.001	<0.014	-

CG; Control group, DPT; double pyramidal training group, SPT; speed pyramidal training group.

When Table 10 is analyzed, although sprint time decreased by –0.19 ± 0.86 seconds in the control group, this change was not statistically significant ($p > 0.701$). In the DPT group, sprint time decreased by –0.58 ± 0.73 seconds, and this reduction was statistically significant compared to the control group ($p < 0.014$). Similarly, in the SPT group, sprint time decreased by –0.49 ± 0.30 seconds, and this change was statistically significant ($p = 0.001$). While significant reductions in sprint time were observed in both the DPT and SPT groups, no significant improvement was found in the control group. These results indicate that the training programs applied had a moderate effect on sprint performance.

4. Discussion

The findings of this study showed that body weight, body mass index, lower extremity muscle strength, peak power and average power factors increased as a result of training with pyramidal pair programs. These findings were consistent with the studies of some researchers (Hoseini et al., 2014; Rastegar Moghaddam Mansouri et al., 2014; Gettman et al., 1978), while they differed from the studies of some other researchers (Wiemann and Hahn, 1997; Samavati Sharif et al., 2018; Samavati Sharif et al., 2016). These findings suggest that pyramidal velocity training does not have any effect on these factors, and only pyramidal pair training causes an increase in these factors. The fact that pyramidal pair training causes an increase in muscle strength makes this increase an expected result in lower extremity muscle strength, and as a result, an increase in the maximum jump height (sargent jump test) value is observed. As a result of our findings, since Sargent jump height was utilized in the calculation of maximum power and average power, an increase in these values was also observed. Although not always statistically significant, similar positive trends in anaerobic capacity and average power were also observed in Olympic-level wrestlers during competition preparation periods (Sever et al., 2017). However, when the findings are taken into account, it is seen that the increased body weight is noteworthy. Our findings show that pyramidal pair training causes an increase in body weight. However, this increase is thought to be due to the increase in muscle mass, not fat mass. However, no improvement was observed in other variables. On the other hand, the decrease in body fat percentage observed in the pyramidal speed group is consistent with previous findings showing that elite wrestlers gradually reduce their body fat levels during seasonal training periods, especially as competitions approach (Canuzakov et al., 2018).

Flexibility is influenced by many factors such as age, the type of muscle and the duration of flexibility, the structure of the joints, body type and gender. Flexibility is an important factor for physical performance and helps prevent injuries in training, competition or daily activities. In line with this, it has been shown that static and dynamic stretching protocols affect anaerobic power differently in wrestlers, and that dynamic stretching may increase muscle damage and reduce peak power output (Cengiz et al., 2014). Also, strength training and speed training are not considered to have a big impact on range of motion or flexibility. However, the findings of this study showed that strength training led to an increase in flexibility. In a study parallel to our findings, Fatouros et al. (2005) observed that heavy strength training

resulted in a flexibility increase between 63% and 93%. In another study, it was stated that strength training can increase flexibility at least as much as flexibility exercises in the short time they are applied (Morton et al., 2011).

Research attributes the main causes of speed training adaptations to two factors: hormonal changes and muscle overstretching. These two factors cause a decrease in the H reflex, which is an indicator of neural stimulation in the muscles (Ross et al., 2001). In this case, more motor units are activated for the muscle to perform a specific task. Thus, the contractile capacity (contractile strength) of the muscle increases. This increased activation of motor units is usually caused by a decrease in suppressor (inhibitory) signals. The weakening of these signals allows the muscle to activate more motor units simultaneously (Farrell et al., 2011). During the training process, these inhibitory signals may decrease or become ineffective over time. As a result, the muscle can produce higher levels of power. This suggests that an increase in strength can be achieved through a decrease in neural suppression (Ingle et al., 2006). In resistance training, a different mechanism comes to the fore. Muscle tension and hormonal changes during such training trigger protein synthesis and gene activation in muscles. This process leads to structural changes, especially in proteins such as MHC1 (muscle cell type 1 myosin heavy chain). As a result, both the diameter and length of muscle fibers increase (Gençoğlu and Gümüş, 2024). This structural growth is directly related to strength increase. Research has shown that the greater the intensity of resistance training, the greater the strength increase achieved (Fatouros et al., 2005). Furthermore, the effects on both performance and physiological adaptation may differ depending on the type of training applied.

The main limitation of this study is the relatively small sample size and the fact that it was conducted only on elite young male wrestlers. Therefore, the generalizability of the findings to different age groups or genders may be limited.

5. Conclusions

In conclusion, the findings of this study show that muscular endurance, flexibility and jumping performance increased in both groups of training methods. However, this increase was more pronounced in the pyramidal pair training group. In the light of the points mentioned above, it can be said that these findings are explainable. However, there are some unexpected results of this study. For example, body fat percentage increased in the pyramidal paired group, while it decreased in the pyramidal speed groups. Finally, in the light of the findings of this study, it can be concluded that both pyramidal resistance training and pyramidal speed training are reliable and effective methods of inducing physical changes. In future studies, applying similar protocols to larger samples that include different age groups and genders will enhance the generalizability of the findings.

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Research Article

Bosuball Exercises and Aerobic Endurance: A Study on Yo-Yo Running Performance of Soccer Referees

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Abstract: The aim of the study was to investigate the effect of 8-week bosuball exercises on Yo-Yo running performance of soccer referees. A total of 40 active soccer referees between the ages of 19-48 participated in the study voluntarily. In the study, Yo-Yo test and maximum oxygen capacity (VO2max) obtained from running distances were used to determine the aerobic capacity of the participants. The normality of the data was tested by Kolmogorov Smirnov test and homogeneity by Levene's test. Paired samples t test was used for pairwise comparisons. Descriptive data were presented as mean and standard deviation. The results of the Pretest were evaluated, and the participants were homogenously divided into control and experimental groups. During 8 weeks, the experimental group performed bosuball exercises in the last 30 minutes of their routine training while the control group continued their routine training. The results of the study showed a significant increase in Yo-Yo running distances and VO2max parameters of the experimental group after the intervention. The change between pre and post aerobic performance test results was not significant in the control group. Bosuball exercises significantly improve aerobic performance of soccer referees. It is recommended to include bosuball exercises in the scientifically based training programs of soccer referees.

Keywords: Aerobic endurance; bosuball exercises; soccer; referee; VO2max.

1. Introduction

Soccer, including combinations of short-term and high-intensity movements (running, sprinting, jumping, etc.) and specific actions (passing, dribbling, goal kicking, assisting, etc.), is considered the most popular sports in the world (Abraham et al., 2022; Devi & Pandey, 2019). Soccer is played on a larger field in terms of the area where it is played among team sports, and aerobic performance during the competition is critical not only for soccer players but also for soccer referees to successfully manage the match (Bogibekov, 2023).

Soccer referees spend approximately 90% of their total energy consumption as aerobic energy (Gomes et al., 2024; Paes et al., 2024) and travelling an average distance of 9 km to 12 km per match (Castillo et al., 2018). They also need to make quick and accurate decisions and manage the match impartially (Samuel et al., 2020) while performing short-term and high-intensity movements such as sudden changes of direction, side and forward sprints (Castillo et al., 2018). Studies in the literature have reported that the percentage of moderate-intensity running for soccer referees is higher than for other activities, in addition, heart rate (HR) measurements during a soccer match showed a maximum mean exercise intensity (HRmax) of approximately 89%, and ~95% of matches exceeded ≥80% of HRmax (Costa et al., 2013; Castillo et al., 2017). This results in high levels of psychological and physiological stress on soccer referees (Parpa &

Michaelides, 2022). The performance of referees in modern soccer depends on strategies to cope with cognitive and physiological demands and the correct interaction of these factors (Tiama et al., 2023). In order to manage this critical process efficiently, referees need to improve their fitness levels and have high aerobic endurance (Baydemir et al., 2021). Aerobic endurance is expressed as the capacity of the heart and lungs to transport oxygen to the muscles, the efficiency of the muscles to use this oxygen, and the capacity of the body to sustain long-term activities using oxygen (Sun et al., 2024). Similarly, accurate assessment of VO_2max through exercise testing protocols such as Bruce protocol has been shown to be a reliable indicator of aerobic fitness in soccer players (Demirhan et al., 2014). To increase aerobic endurance, many different types of exercises are usually applied with high intensity and short duration / low intensity and long duration training (Anhê et al., 2022). These exercises are critical for referees to maximise their performance and alleviate their physiological and psychological loads (Franceschi et al., 2024). In addition, having high aerobic endurance helps soccer referees to concentrate better on the match, to be able to change places quickly in a fast-paced match, and to make more accurate decisions in stressful conditions (Syamsudar & Nurcahya, 2024). Therefore, it is thought that training methods such as bosuball exercises, which involve high-intensity repetitive efforts and show significant effects on aerobic capacity in a short time, should be used in the training of referees (Loh & Chong, 2018). In addition, it has been shown that multicomponent training programs, including agility, are important especially in sports disciplines that require change of direction and movement coordination (Demirhan et al., 2017).

Bosuball exercises contribute to the burning of body fat, improvement of blood circulation, weight control, increase in growth hormone and muscle building by accelerating blood circulation in the body (Saeterbakken et al., 2014). Bosu exercises are also widely used by people who want to do cardio exercises and increase the strength of the muscles in the lower body and core (Sawant et al., 2020). Bosuball exercises significantly increase the heart rate (Bayrakdar et al., 2020). Therefore, these dynamic movements improve aerobic capacity by challenging the cardiovascular and respiratory systems (Turgut et al., 2018). In the literature, bosuball training is mostly focused on balance and strength development (Bouzas-Rico et al., 2022; Kurtoğlu et al., 2024; Zemková et al., 2021; Tura et al., 2024), but studies on its effects on aerobic performance are very limited. It is an important deficiency that there are not enough studies in the literature for soccer where aerobic capacity is so critical in terms of time and distance run. Therefore, the present study is important in terms of filling an important gap in the literature.

In the light of this informations, the aim of this study was to investigate the effect of 8-week bosuball exercises on Yo-Yo running performance of soccer referees. The study hypothesised that bosuball exercises would significantly improve the aerobic performance of soccer referees.

2. Materials and Methods

2.1. Research Group

Forty active soccer referees between the ages of 19-48 years participated in the study voluntarily. G*Power 3.1 software was used to determine the number of subjects to participate in the study and the results showed that it would be appropriate to conduct the study with at least 32 subjects (effect size r: 0.87, lower and upper critical p: 0.55, true power: 0.91). The exclusion criteria were as follows; not having an active refereeing history for the last three years, having a history of lower extremity injury or surgery, any having injury that restricts their participation in physical activity or cardiovascular disease. Participants were included in the study after written informed consent forms were obtained.

2.2. Research Model

This single-blind, randomised controlled study examined the effects of 8 weeks of bosuball exercises on Yo-Yo running performance of soccer referees. During the first visit, anthropometric measurements of the participants were taken and Yo-Yo running test was introduced and detailed information about the study flow was provided. On the following day, Yo-Yo running test was performed with all participants. After the completion of the pre-tests, the participants were randomised into one of two groups with equal proportions (1:1) using computer-approved software (www.random.org) and divided into experimental (n=20) and control (n=20) groups. Participants in the experimental group performed bosuball training in the last 30 minutes of their training 2 days a week for 8 weeks. Meanwhile, the control group continued their routine training. After the 8-week training period, Yo-Yo running test was performed again with all participants for the post-test. All measurements were performed at the same time of day (13.00-15.00) and

under similar environmental conditions (temperature ranged from 19 to 22 °C and the humidity from 52 to 60 per cent) on an artificial grass field. From the beginning to the end of the study, the investigators responsible for data collection were blinded to group assignment. In addition, the researcher responsible for the data analysis completed the analyses blind to group assignment on the anonymised data file. Finally, the researchers who applied the training program were not included in the data collection and analysis processes. The primary endpoint of the study was the successful completion of the post-tests following the 8-week training program; the secondary endpoint was the participants' unwillingness to continue the study for various reasons, failure to complete the 8-week training program and the occurrence of any injury limiting physical activity during the relevant period.

2.3. Data Collection

The training sessions were performed according to the program presented in Table 1. The exercises included in the training programs are presented in Figure 1. All exercises were performed in 2 sets with 40 seconds intervals and 20 seconds rest between repetitions.

Figure 1. Bosuball Exercises

Table 1. Bosuball Training Program

Exercise *	1-3 Weeks	3-6 Weeks	6-8 Weeks
(A) Bridge	8 Rep	10 Rep	12 Rep
(B) Single Leg Stance	30 s Each Side	40 s Each Side	12 s Each Side
(C) Mountain Climbers	16 Rep	18 Rep	20 Rep
(D) Lunge	8 Rep For Each L	10 Rep For Each L	12 Rep For Each L
(E) V Squat	10 Rep	12 Rep	14 Rep
(F) Side Squat	8 Rep Each Side	10 Rep Each Side	12 Rep Each Side

** All exercises are 2 sets with 20 seconds rest between each reps and 40s between each sets.*

2.3.1.Anthropometric measurements

The body weight of the participants was measured with an accuracy of 0.1 kg using a body composition analyser (Jawon Body Composition Analyser Model X-Scanplus II, Seoul, Korea). Height was measured with a Stadiometer (Holtain Ltd. Crymych, UK) with an accuracy of 0.1 cm. Both measurements were performed barefoot and in anatomical posture.

2.3.2. Yo-Yo Running Test and Aerobic Power Calculation

The Yo-Yo Intermittent Recovery Test Level 1 is a field test for assessing high-intensity exercise performance with short duration runs (Krustrup et al., 2015). In the test, each participant performed a series of 20-metre shuttle runs at a pace determined by a calibrated audible metronome. There was a standardised rest interval of 5 seconds between shuttles (Bradley et al., 2014). The time given for the shuttles was gradually reduced, while the speed was increased. The test was terminated when subjects failed to reach the start line twice or when the participant felt unable to complete another

shuttle at the specified speed (Castagna et al., 2020). The total running distance obtained was recorded in metres and estimated VO2max values were calculated by the following formula (Bangsbo et al., 2008):

$$VO2max\ (ml/kg/min) = Yo\text{-}Yo\ IR1\ distance\ (m) \times 0.0084 + 36.4$$

2.4. Statistical Analysis Methods

SPSS 27.0 package program was used for statistical analysis of the data. Due to the sample size (n=40), normality of the values was tested by Kolmogorov Smirnov test and homogeneity was tested by Levene's test. It was determined that the data had normal and homogeneous distribution. Paired samples t test was used for pairwise comparisons. Descriptive data were presented as mean and standard deviation. In all tests, significance level was accepted as $p<0.05$.

2.5. Ethics Committee Permission

Ethics committee approval was obtained from Giresun University Social Sciences, Science and Engineering Sciences Research Publication Ethics Committee (protocol no: 2025-03/97). Before data collection, participants were thoroughly informed about the study through a detailed presentation and subsequently provided written consent. The research was carried out in accordance with the ethical guidelines of the Declaration of Helsinki.

3. Results

Demographic information of the referees participating in the study is presented in Table 2.

Table 2. Demographic information of the participants

Variables	Mean	SD	Min.	Max.
Age (year)	27.88	6.69	19.00	48.00
Height (cm)	179.43	5.54	166.00	191.00
Weight (kg)	71.08	7.24	54.00	83.00
Training Age (year)	10.18	6.17	5.00	26.00
BMI (kg/m^2)	22.03	1.40	17.04	25.34

SD: standart deviation; Min: minimum; Max: maximum; BMI body mass index

Demographic information, anthropometric measurements and aerobic performance parameters obtained from the pre-test of the control and experimental groups were compared. The results showed that there was no significant difference in all parameters of the control and experimental groups ($p>0.05$) (Table 3).

Table 3. Comparison of the pre-test results of the control and experimental groups

Variables	Experimental Mean ± SD	Control Mean ± SD	t	p
Age (year)	27.90 ± 6.07	27.85 ± 7.42	0.024	0.981
Height (cm)	178.15 ± 6.78	179.95 ± 5.39	-0.931	0.363
Weight (kg)	69.90 ± 7.94	72.25 ± 6.45	-0.982	0.338
BMI (kg/m^2)	21.95 ± 1.18	22.28 ± 1.18	-0.927	0.365
Training Age (year)	10.05 ± 5.88	10.30 ± 6.60	-0.138	0.892
Yo-Yo (m)	1172.00 ± 142.81	1248.00 ± 146.02	-1.358	0.190
VO_{2max} (ml/kg/min)	46.02 ± 1.00	46.55 ± 1.10	-1.310	0.206

SD: standart deviation; BMI: body mass index

Pre and posttest aerobic performance parameters of control and experimental groups were compared. According to the results; pre and posttest Yo-Yo running distance (P=0.000; e.s=.73; change 9.21%) and VO2max parameter (p=0.012; e.s: .99; change 2.47%) of the experimental group differed significantly, but there was no significant difference in the control group ($p>0.05$) (Figure 2).

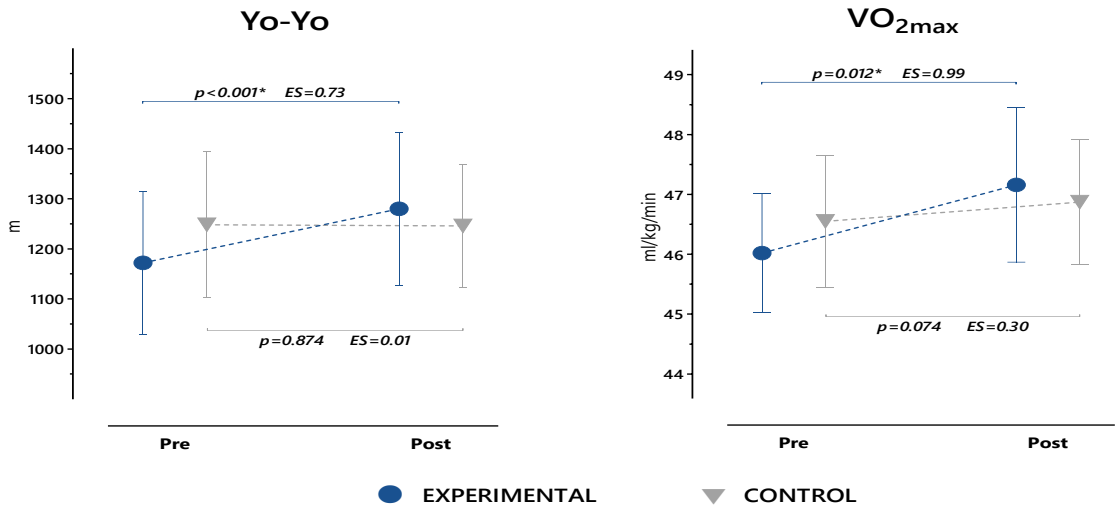

Figure 2. Differences in veriables between control and experimental groups in pre and post test

4. Discussion

This single-blind, randomised controlled study examined the effect of 8 weeks of bosuball exercises on Yo-Yo running performance of soccer referees. The results of the study showed that there was a significant increase in the Yo-Yo test running distances and VO2max parameters of the experimental group in which bosuball exercises were included in the last 30 minutes of their routine training program for two days a week for eight weeks. In the control group, there was no significant difference between the pre-post test results.

The increasing physical performance level of soccer players (Gonaus et al., 2019; Milanovic et al., 2017) causes an increase in internal and external loads not only for themselves but also for the referees during the match (Ai et al., 2020). Some studies have suggested that referees are exposed to physiological stress equal to that of a midfielder (D'Ottavio & Castagna, 2002) and even higher than some players (Castillo et al., 2016; Yanci et al., 2016) during highly competitive competitions. In addition to physiological processes, referees also have decision-making processes that create extra load and stress (Bouzas-Rico et al., 2022). This suggests that it is critical for referees to have good physical fitness and aerobic endurance similar to soccer players. However, the results of the present study showed that the Yo-Yo running distances and VO2max parameters of the participants (Table 2), although all of them were actively refereeing soccer, were considerably lower than some studies in the literature. A study of 45 Spanish referees found that they ran 1591.30 ± 592.43 metres and had a VO2max of 49.77 ± 4.98 ml/kg/min in the Yo-Yo test (Castillo et al., 2016). It can be said that this result may be due to the fact that the participants in the current study are mostly at the beginning of their careers and their physical fitness levels are low. However, the results of the present study showed that the Yo-Yo running distances and VO_2max parameters of the participants (Table 2), although all of them were actively refereeing soccer, were considerably lower than some studies in the literature. A study of 45 Spanish referees found that they ran 1591.30 ± 592.43 metres and had a VO_2max of 49.77 ± 4.98 ml/kg/min in the Yo-Yo test (Castillo et al., 2016). It can be said that this result may be due to the fact that the participants in the current study are mostly at the beginning of their careers and their physical fitness levels are low. A similar trend was observed in a previous study on U-23 national football players from Kyrgyzstan, where VO_2max levels measured in the pre-season period were also found to be relatively low compared to international standards (Demirhan et al., 2019).

On the other hand, Federation Internationale de Football Association (FIFA), Union of European Football Associations (UEFA) and national federations systematically evaluate the physical fitness levels of referees within their organisations and monitor their training programs (Weston et al., 2012). Of course, it is thought that the development of referees with scientific-based training methods will make a significant contribution to the development of soccer. Bosuball training is one of these methods, and it is recognised to have outstanding performance in a short time due to high-intensity exercises (Prasetyo et al. 2023). In the present study, in order to investigate the effect of bosuball exercises on the aerobic endurance of referees, the participants were divided into two groups as control and experimental. Comparison analysis

showed that these groups were homogeneous (Table 3). This demonstrated that the effects of bosuball exercises applied to the experimental group in the study could be objectively evaluated.

When the pre-post test results obtained in the study were compared, it was shown that there was a significant increase in the running distance and VO2max values of the experimental group, but a similar increase was not observed in the control group (Figure 2). This result suggested that bosuball exercises improved core muscles, efficiency of the neuromuscular system and running mechanics. This was confirmed by the increase in running distances of the experimental group. This result is similar to many studies in the literature (Demir, 2019; Kalra et al., 2021; Prasetyo et al. 2023). Turgut et al. (2018) found that bosuball exercises applied to 60 sedentary individuals reduced the percentage of fat around the waist and hips and increased lean muscle mass. A similar study on swimmers suggested that bosuball exercises had significant improvements in the physical fitness parameters of subjects (Nasr, 2023). The results of this study explain and support the significant improvement of running distances in the present study.

VO2max represents the maximum amount of oxygen that the organism can use during an exercise and is one of the important determinants of cardiorespiratory fitness level (Smirmaul et al., 2013). One of the most important methods used to improve VO2max is high-intensity interval training (Castillo et al., 2017). In this exercise method, which was also used in the current study, short-term high-intensity exercise loads are followed by recovery periods of low intensity or passive rest (Oliveira-Nunes et al., 2021). These exercises increase the number and function of mitochondria in skeletal muscles, improve the oxygen utilisation capacity of muscle cells and therefore increase the VO2max of the organism. Furthermore, intermittent high-intensity exercise increases maximum oxygen capacity through not only central (cardiovascular system) but also peripheral (muscle tissue) adaptations (O'Reilly & Wong 2012). Festiawan et al (2021) suggested that high-intensity interval training caused a 40% increase in VO2max. Similarly, in a study conducted on men and women, it was found that high-intensity interval training provided a significant increase in VO2max (Astorino et al., 2017). Therefore, it can be said that the intermittent and high-intensity character of bosuball exercises affected the increase in VO2max levels of the experimental group in our study.

Although the results of the current research provide important contributions to the literature, it has some limitations. The important limitations of the study are that the measurements applied to the participants were not clinical applications and the estimated calculation of VO2max values. In addition, external factors such as dietary habits, psychological status and sleep patterns of the participants in their daily lives could not be controlled. These individual factors have the potential to influence participants' VO2max levels and thus their aerobic capacity. Finally, although the bosuball exercises applied to the experimental group seem to contribute to their aerobic capacity, further research is needed to understand exactly how they affect the aerobic demands specific to soccer refereeing in the competition environment.

5. Conclusions

In the study, the effect of bosuball exercises on Yo-Yo running performance and VO2max levels of soccer referees was examined and significant increases were observed in both parameters. The findings showed that the intervention had a complex effect on the cardiovascular capacity of the soccer referees and improved their fitness levels. The results revealed that bosuball exercises would be an effective method to improve the on-field performance of soccer referees. In future studies, increasing the sample group and long-term follow-up of the training processes will increase the generalizability of the results. It is recommended that bosuball exercises be added to the scientifically based training of soccer referees to increase their aerobic capacity.

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Research Article

Evaluation of Menus for Athlete Nutrition in Coastal Beach Cafés Operated by Municipalities and Proposal of Alternative Menus: The Case of Trabzon Province

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Abstract: This study assesses the nutritional suitability of menus in coastal beach cafés operated by Trabzon municipality for athletes. Athlete nutrition strategically manages nutrient intake to optimize performance and recovery. A survey with 175 randomly selected students from Trabzon University's Faculty of Sports Sciences evaluated demographic data, food preferences, and menu suitability perceptions. Analysis used SPSS 21.0. Findings indicated 63.4% male participants, mainly football players (42.9%). Fruits were popular snacks. Males preferred protein shakes and sports drinks; females favored herbal teas. Protein bars and carbohydrate gels were widely consumed, especially by males and athletes aged 21–23. Fatty foods were largely avoided; females were less restrictive with caffeine. The study concluded that current café offerings inadequately address athletes' nutritional requirements, recommending increased menu variety with protein bars, sports drinks, and healthy snacks for enhanced athlete performance and recovery.

Keywords: Snack, healthy nutrition, athlete nutrition, athlete menu.

1. Introduction

Athlete nutrition is a discipline that ensures the energy and nutrient requirements of individuals are met based on scientific principles to enhance physical performance, improve training adaptation, accelerate recovery, and support overall health (Akay & Öksüz, 2024). Scientific research demonstrates that athletes who correctly implement nutritional strategies experience increased training capacity, reduced injury risks, and faster recovery processes (Filiz, 2023). Athletes' daily energy and nutrient requirements vary depending on factors such as the type, intensity, duration, and frequency of the sport, environmental conditions, and individual physiological characteristics (Akay & Öksüz, 2024).

Macronutrients (carbohydrates, proteins, and fats), micronutrients (vitamins and minerals), and fluid balance are the fundamental components of athlete nutrition. Adequate and balanced intake of these components plays a critical role in maintaining and enhancing athletes' performance (Kizen, 2019). Inadequate or imbalanced nutrition can reduce training motivation, negatively affect decision-making processes, and lead to cognitive fatigue. Therefore, personalized optimal nutrition plans are of great importance for performance sustainability and overall health (Baykara, 2019). This study aims to propose snack and athlete-health-oriented menu options suitable for the nutritional needs of active athletes before and after recreational sports activities in coastal beach parks during their leisure time.

1.1. Fundamental Principles of Athlete Nutrition

Nutrition is of paramount importance for athletes to achieve optimal performance, sustain training processes efficiently, and accelerate recovery (Bayrakdar & Zorba, 2020). In the context of athlete nutrition, macronutrients and micronutrients, energy balance, performance effects, fluid intake, and hydration are considered fundamental principles (Akay & Öksüz, 2024). Nutrients are essential components for maintaining the body's physiological functions and

meeting athletes' physical requirements. Nutrients for athletes are divided into two groups: macronutrients (carbohydrates, proteins, and fats) and micronutrients (vitamins and minerals) (Bilgiç et al., 2011). Carbohydrates are the primary energy source for athletes, critical for maintaining muscle glycogen stores and providing energy during exercise (Yaman & Uğur, 2022). Daily carbohydrate needs vary based on the type of sport and individual metabolism, with pre- and post-training carbohydrate intake directly impacting performance (Şener, 2015).

Proteins are essential for muscle repair and growth, particularly for athletes engaged in resistance exercises, where protein needs increase (Kizen, 2019). Adequate protein intake is crucial for enhancing muscle protein synthesis, preventing muscle loss, and accelerating recovery. Optimal protein intake depends on the protein source, digestibility, and timing of consumption (Kafkas et al., 2017).

Fats provide energy, support hormone production, and maintain cellular functions. In endurance sports, efficient fat metabolism during prolonged training sessions enhances performance (Güner, 2002). Unsaturated fatty acids should be prioritized, while trans fats should be avoided (Filiz, 2023). Vitamins and minerals are vital for reducing oxidative stress, maintaining bone health, regulating muscle contractions, and strengthening the immune system (Güneşliol, 2019). B vitamins support energy production, while minerals such as iron, calcium, magnesium, and zinc are critical for muscle contraction, bone health, and oxygen transport capacity (Uzundiz et al., 2022). Antioxidant vitamins (e.g., C and E) can reduce exercise-induced oxidative stress, helping to prevent muscle fatigue and damage (Acar & Pepe, 2011).

1.2. Studies on Athlete-Friendly Menu Models in Cafés and Buffets

Today, offering healthy and balanced menus that meet athletes' nutritional needs is of great importance for supporting sports performance. In fast-service cafés and buffets, developing athlete-friendly nutritional alternatives plays a critical role in promoting healthy food consumption (Yılmaz, 2022). Creating athlete-friendly menus in cafés and buffets requires the balanced provision of healthy nutrients (Dunford & Dolye, 2008). Developing nutritional alternatives that meet athletes' needs before and after training supports performance while encouraging sustainable healthy lifestyle habits. In this context, healthy menu planning in fast-service settings and the implementation of athlete-friendly food and beverage alternatives should be approached systematically, based on nutritional science and athletes' requirements (Akay, 2024).

Healthy menu planning in fast-service cafés and buffets requires the balanced provision of macronutrients and micronutrients to meet the energy and nutritional needs of athletes. Menus should feature appropriate distributions of carbohydrates, proteins and fats, along with nutrient-dense food rich in vitamins and minerals (Benerdot, 2011). Offering nutrient-rich food and beverage options enhances performance and supports recovery (Acar & Pepe, 2011). Whole-grain meals such as whole-wheat pasta and quinoa salad, and protein-rich choices like chicken sandwiches, tuna salad, or peanut butter on whole-grain toast help sustain energy levels (Colombani et al., 2013). Additionally, foods free from additives and low in refined sugars and trans fats should be prioritized to promote healthy eating habits (Altundağ, 2021).

Considering athletes' limited time, menus should include quick-to-consume yet nutrient-dense options such as natural protein bars, unsweetened granola, and yogurt with fruit (Altundağ, 2021). Maintaining hydration is also crucial; thus, healthy beverages like water, natural mineral drinks, freshly squeezed juices, and additive-free protein smoothies are preferable. Instead of sugary sodas or commercial energy drinks, natural beverages with high electrolyte content, such as coconut water, are recommended (Ersoy, 2014). To support post-exercise recovery, foods rich in omega-3 fatty acids, probiotics, and essential vitamins and minerals should be included. Smoothies with flaxseeds, probiotic yogurts, and almond milk-based drinks are effective components of an athlete-focused menu (Filiz, 2023).

1.3. Current Studies and Trends in Athlete Nutrition

With increasing awareness of sustainability, environmental concerns, and health, plant-based nutrition is becoming a more popular approach among athletes (Akay, 2024). Plant-based athlete nutrition involves prioritizing plant-based protein sources over animal-based proteins, with macro- and micronutrients derived from plant-based foods. Literature suggests that plant-based diets, when ensuring adequate protein intake, can positively impact muscle mass and performance in endurance and strength athletes (Altundağ, 2021). Proper combinations of protein-rich plant-based foods such as legumes, grains, nuts, and soy-based products can meet essential amino acid requirements. However,

potential challenges include deficiencies in micronutrients like iron, vitamin B12, omega-3 fatty acids, zinc, and calcium, which can negatively affect performance if not adequately addressed (Karabudak, 2012). Recent studies indicate that plant-based athletes can maintain optimal performance with well-planned, individualized nutrition programs (Öztürk, 2017).

Recent research highlights that plant-based diets, due to their high antioxidant capacity, anti-inflammatory effects, and gut microbiota support, may accelerate athletes' recovery processes (Filiz, 2023). Additionally, new-generation plant-based protein supplements and functional foods are becoming significant supports for this nutritional model (Yaman, 2022).

In recent years, individualized approaches have gained prominence in athlete nutrition (Akay, 2024). Since each athlete's genetic makeup, metabolism, training intensity, lifestyle, and food tolerances differ, a one-size-fits-all nutrition program is unlikely to yield optimal results. Individualized nutrition strategies involve designing personalized nutrition plans tailored to an athlete's physiological needs, sport type, and goals (Dunford & Dolye, 2008). Research on the impact of genetic and metabolic differences on sports performance shows that an athlete's carbohydrate, protein, and fat metabolism, micronutrient needs, and food tolerances are unique (Yaman, 2022).

Advancements in nutrigenetics and nutrigenomics enable the determination of the most suitable nutrition model based on an athlete's genetic profile, optimizing performance and recovery (Filiz, 2023). Individualized strategies also consider gut health and microbiota balance. Recent studies on the gut microbiota's impact on nutrient absorption, immune function, and inflammation levels highlight the importance of gut-friendly foods and probiotics in athlete nutrition (Gençoğlu, 2021). Additionally, individualized hydration strategies are critical, particularly for endurance athletes, as electrolyte loss through sweat varies individually. Hydration plans should be tailored to individual sweat rates and electrolyte losses (Ersoy, 2014). Individualized nutrition strategies play a significant role in enhancing performance, accelerating recovery, and improving overall health by addressing athletes' specific needs (Benardot, 2011).

1.4. Athlete Menus Based on Meal Timing

In athlete nutrition, not only the type and quantity of nutrients but also the timing of consumption significantly impact performance. Nutrition programs planned for before, during, and after training ensure energy needs are met, optimal performance is sustained, and recovery is accelerated (Ersoy, 2014). Therefore, meal timing in athlete nutrition programs must be tailored to individual training schedules and physiological needs.

Pre-training nutrition should be carefully planned to provide sufficient energy, replenish glycogen stores, and delay muscle fatigue during exercise. Approximately 2–3 hours before training, a meal rich in carbohydrates, low in fat, and moderate in protein is recommended (Colombani et al., 2013). Carbohydrates support glycogen replenishment for sustained energy, while moderate protein intake prevents muscle breakdown and supports muscle health. Suitable pre-training foods include whole-grain bread, oats, bananas, dairy products, nuts, and peanut butter. Choosing low-glycemic-index carbohydrate sources helps maintain stable blood sugar levels, preventing energy fluctuations (Yaman & Uğur, 2022).

Post-training nutrition is critical for preventing muscle breakdown, enhancing protein synthesis, and rapidly replenishing glycogen stores. Consuming a meal combining carbohydrates and protein within 30–60 minutes post-exercise supports muscle repair and accelerates recovery (Yılmaz, 2022). Post-training foods include yogurt-oat mixtures, protein smoothies, turkey or cheese sandwiches on whole-grain bread, and boiled eggs with avocado on whole-grain toast (Bilgiç et al., 2011). Adequate fluid intake post-exercise is also essential to reduce muscle fatigue and maintain electrolyte balance (Ersoy, 2014).

1.5. Meals Containing Antioxidant and Anti-Inflammatory Foods

Intense training increases oxidative stress and inflammation in the body, potentially leading to muscle damage and prolonged recovery (Acar & Pepe, 2011). This can negatively affect performance, increase post-training muscle soreness, and elevate injury risks (Çelebi, 2019). Therefore, including antioxidant and anti-inflammatory foods in athletes' diets is crucial.

Antioxidant components such as vitamin C (oranges, strawberries, kiwis), vitamin E (almonds, hazelnuts, sunflower seeds), beta-carotene (carrots, sweet potatoes), and polyphenols (green tea, dark-colored fruits) support muscle cell regeneration post-training (Filiz, 2023). Anti-inflammatory components like omega-3 fatty acids (salmon, flaxseeds, walnuts) reduce inflammation, minimizing muscle stiffness and fatigue (Yaman, 2022). Foods rich in anti-inflammatory properties, such as turmeric, ginger, garlic, leafy greens, and tomatoes, also help control inflammation (Güneş, 2021). Notably, curcumin in turmeric is effective in alleviating post-training muscle soreness due to its strong anti-inflammatory properties. In planning functional food-based meals for athletes, a balanced combination of antioxidant and anti-inflammatory components is essential. A meal combining grilled salmon, olive oil-dressed spinach salad, almonds, and sweet potatoes synergistically enhances muscle recovery and reduces inflammation. Similarly, a post-training snack like a smoothie with green tea, dark-colored fruits, and walnuts supports recovery and sustains performance.

1.6. Customized Menu Alternatives

The importance of individualized nutrition approaches is increasing, and customized menu alternatives are being developed to meet athletes' nutritional needs, considering dietary preferences and allergen sensitivities (Filiz, 2023; Yücel, 2015). Personalized nutrition plans tailored to individual needs are essential for optimizing performance and meeting energy requirements during training and competitions. For athletes following vegan and vegetarian diets, ensuring adequate intake of protein, iron, vitamin B12, and omega-3 fatty acids is critical. Balanced menus for vegan athletes should include protein-rich plant-based foods such as legumes, whole grains, nuts, and plant-based protein supplements (Yücel, 2015; Akıl, 2007). Foods like lentils, chickpeas, beans, quinoa, chia seeds, flaxseeds, tofu, tempeh, and almond milk are ideal options. Combining different protein sources (e.g., legumes and grains) ensures balanced essential amino acid intake. To ensure sufficient iron intake, dark leafy greens, dried fruits, and iron-fortified foods should be prioritized, with vitamin C-rich foods consumed concurrently to enhance absorption (Öztürk, 2018). For vitamin B12 and omega-3 fatty acids, supplements or fortified foods are recommended. In conclusion, menu planning for vegan and vegetarian athletes should consider protein quality, energy balance, and micronutrient adequacy. Developing scientifically grounded, individualized nutrition programs by dietitians ensures optimal performance and health outcomes for athletes.

2. Materials and Methods

2.1. Research Model

The study was conducted within the framework of the descriptive scanning model. Descriptive scanning research is among the methods that aim to systematically and objectively reveal the current situation in a certain universe (Karasar, 2012).

2.2. Research Group

The sample of the study consists of a total of 684 undergraduate students enrolled in the Faculty of Sports Sciences at Trabzon University during the 2024–2025 spring semester. These students are distributed across the following departments: Coaching Education (n=217), Physical Education and Sports Teaching (n=164), Recreation (n=107), and Sports Management (n=196). Due to the difficulty of reaching the entire population, a simple random sampling method was employed, and a total of 175 students were selected as the study sample. This method enhances the representativeness of the sample by providing equal selection probability for all individuals in the population.

2.3. Data Collection

A survey developed by the researcher was used to collect data on participants' menu preferences. In the preparation of the survey study, the relevant protection in the literature was used. This ability was based on the studies "Eating Habits According to Gender in the University" (Akyol & İmamoğlu, 2020), "Evaluation of Nutritional Behaviors and Status of Volleyball Federation Players of the Turkish Republic of Northern Cyprus" (Gökensel, 2019) and the study on the level of nutrition knowledge and nutrition rate of students of the Faculty of Sports Sciences of Aksaray University (Gönenç Solsun, 2021). The survey design was shortened from 10 questions, which initially consisted of 20 questions, as a result of the preliminary evaluation process carried out with expert academicians of the Faculty of Sports Sciences and the

Department of Nutrition and Dietetics of the university. This process was carried out in order to increase the increase in the survey and to ensure ease of application. The survey consists of two main sections. The first section includes five items designed to determine participants' demographic characteristics, with independent variables including gender, age, department, and sports branch. The second section comprises ten questions aimed at assessing preferences and opinions regarding athlete nutrition, covering topics such as the nutritional value, variety, and adequacy of food and beverages offered in cafés. All questions in the survey form were structured as single-answer and closed-ended. However, in some questions, the option "Other" was given to the participants to express their own statements, thus providing a semi-open-ended structure, albeit limited. The questions in question were prepared in accordance with direct quantitative analysis methods (frequency, percentage distribution, cross tables and Chi-square test when necessary).

2.4. Statistical Analysis Methods

Data analysis was conducted using the SPSS 21.0 software package. Frequency and percentage distributions were calculated to determine participants' demographic characteristics and personal information. In this study, non-parametric tests were preferred over parametric tests. This preference is due to the fact that the majority of the survey questions are measured at nominal and ordinal levels. Moreover, since the data related to participants' preferences are neither interval nor continuous, parametric tests are not suitable. In such cases, non-parametric tests, which require less stringent assumptions, are more appropriate for data analysis (Field, 2013; Siegel & Castellan, 1988).

2.5. Ethics Committee Permission

The study received ethical approval from the Trabzon University Social and Human Sciences Research and Publication Ethics Committee (Approval No: E-81614018-050.04-2500000482). Before data collection, participants were thoroughly informed about the study through a detailed presentation and subsequently provided written consent. The research was carried out in accordance with the ethical guidelines of the Declaration of Helsinki.

3. Results

Table 1. Distribution of Some Variables of Participants and Their Preferred Secondary Sports

Variables	Group	n	%
Gender	Female	64	36,6
	Male	111	63,4
Age	18-20	72	41,1
	21-23	81	46,3
	24-26	13	7,4
	27 and older	9	5,1
Department	Phys. Ed. Sports Teach.	57	32,6
	Coaching	29	16,6
	Management	42	24
	Recreation	47	26,9
Sport	Football	75	42,9
	Basketball	6	3,4
	Volleyball	19	10,9
	Athletics	5	2,9
	Swimming	7	4
	Other	63	36

Variables	Group	n	%
Other Sports	Boxing	9	5,1
	Handball	7	4,0
	Taekwondo	1	0,6
	Darts	2	1,1
	Field Hockey	2	1,1
	Kickboxing	1	0,6
	Karate	1	0,6
	Judo	6	3,4
	Wrestling	1	0,6
	Fitness	2	1,1
	Curling	3	1,7
	Archery	1	0,6
	Weightlifting	2	1,1
	Badminton	1	0,6
	Cycling	1	0,6
	Rugby	1	0,6
	Tennis	9	5,1
	None	7	4,0

Of the participants, 63.4% were male, and 36.6% were female (Table 1). Age distribution was as follows: 18–20 years (41.1%), 21–23 years (46.3%), 24–26 years (7.4%), and 27 years and older (5.1%). Participants were distributed across departments: Physical Education and Sports Teaching (32.6%), Recreation (26.9%), Management (24%), and Coaching (16.6%). The most preferred sport was football (42.9%), with 36% choosing other secondary sports. Among those selecting "other," 11.4% did not specify a sport, with boxing (5.1%) and handball (4%) being the most selected secondary sports.

Table 2. Participants' Snack Preferences During Sports

Variables	Group	*F		*N		*P. B		*E. G		*S		*O	
		N	%	N	%	N	%	N	%	N	%	N	%
Gender	Female	27	15,4	10	5,7	14	8	3	1,7	9	5,1	1	0,6
	Male	40	22,9	26	14,9	31	17,7	3	1,7	6	3,4	5	2,9
Age	18-20	31	17,7	17	9,7	16	9,1	2	1,1	4	2,3	2	1,1
	21-23	29	16,6	14	8	25	14,3	3	1,7	8	4,6	2	1,1
	24-26	4	2,3	3	1,7	3	1,7	0	0	3	1,7	0	0
	27 and older	3	1,7	2	1,1	1	0,6	1	0,6	0	0	2	1,1
Department	Physical Education Sports Teaching	19	10,9	13	7,4	11	6,3	3	1,7	7	4	4	2,3
	Coaching	13	7,4	7	4	8	4,6	0	0	1	0,6	0	0
	Management	21	12	6	3,4	8	4,6	2	1,1	4	2,3	1	0,6
	Recreation	14	8	10	5,7	18	10,3	1	0,6	3	1,7	1	0,6
Sport	Football	34	19,4	15	8,6	16	9,1	1	0,6	5	2,9	4	2,3
	Basketball	2	1,1	2	1,1	2	1,1	0	0	0	0	0	0
	Volleyball	7	4	1	0,6	5	2,9	1	0,6	5	2,9	0	0
	Athletics	2	1,1	0	0	2	1,1	1	0,6	0	0	0	0
	Swimming	0	0	3	1,7	3	1,7	0	0	1	0,6	0	0
	Other	22	12,6	15	8,6	17	9,7	3	1,7	4	2,3	2	1,1

**F: Fruit *N: Nuts *P. B: Protein Bar *E. G: Energy Gel *S: Sandwich *O: Other*

Table 2 shows the snacks preferred by the participants while doing sports. It was seen that most of the female and male participants preferred fruit as a snack while doing sports. At the same time, participants in all age groups preferred fruit the most as a snack. When the snack preferences of the participants according to their departments were examined, the majority chose fruit in other departments except the Recreation department, while the students of the Recreation department chose protein bar (10.3%) the most. When analyzed by branch, the most common snack preference in football, volleyball and other second branches were chosen as fruit. It was observed that the participants whose branch was basketball did not consume energy gel, sandwich or other options as snacks; they preferred fruit (1.1%), nuts (1.1%) and protein bar (1.1%). Participants whose branch of sport was swimming preferred nuts and protein bars instead of fruit as snacks. Three of the six participants who selected the other option did not specify their snack preference.

Table 3. Which beverages do you prefer in the café?

Variables	Group	*W		*S.D.		*P. S		*F. J		*H. T		*O	
		N	%	N	%	N	%	N	%	N	%	N	%
Gender	Female	27,00	15,40	10,00	5,70	14,00	8,00	3,00	1,70	9,00	5,10	1,00	0,60
	Male	40,00	22,90	26,00	14,90	31,00	17,70	3,00	1,70	6,00	3,40	5,00	2,90
Age	18–20	31,00	17,70	17,00	9,70	16,00	9,10	2,00	1,10	4,00	2,30	2,00	1,10
	21–23	29,00	16,60	14,00	8,00	25,00	14,30	3,00	1,70	8,00	4,60	2,00	1,10
	24–26	4,00	2,30	3,00	1,70	3,00	1,70	0,00	0,00	3,00	1,70	0,00	0,00
	27+	3,00	1,70	2,00	1,10	1,00	0,60	1,00	0,60	0,00	0,00	2,00	1,10
Department	Phys. Ed. & Sports Teach.	19,00	10,90	13,00	7,40	11,00	6,30	3,00	1,70	7,00	4,00	4,00	2,30
	Coaching	13,00	7,40	7,00	4,00	8,00	4,60	0,00	0,00	1,00	0,60	0,00	0,00
	Management	21,00	12,00	6,00	3,40	8,00	4,60	2,00	1,10	4,00	2,30	1,00	0,60
	Recreation	14,00	8,00	10,00	5,70	18,00	10,30	1,00	0,60	3,00	1,70	1,00	0,60
Sport	Football	34,00	19,40	15,00	8,60	16,00	9,10	1,00	0,60	5,00	2,90	4,00	2,30
	Basketball	2,00	1,10	2,00	1,10	2,00	1,10	0,00	0,00	0,00	0,00	0,00	0,00
	Volleyball	7,00	4,00	1,00	0,60	5,00	2,90	1,00	0,60	5,00	2,90	0,00	0,00
	Athletics	2,00	1,10	0,00	0,00	2,00	1,10	1,00	0,60	0,00	0,00	0,00	0,00
	Swimming	0,00	0,00	3,00	1,70	3,00	1,70	0,00	0,00	1,00	0,60	0,00	0,00
	Other	22,00	12,60	15,00	8,60	17,00	9,70	3,00	1,70	4,00	2,30	2,00	1,10

**W: Water *S. D: Sports Drink*P. S: Protein Shake *F. J: Fruit Juice*H. T: Herbal Tea * O: Other*

As seen in Table 3, most of the male and female participants chose water as their beverage preference. The fact that the most preferred beverage is water shows that participants generally prefer a healthy beverage. Male participants preferred protein shakes (6.3%) more than female participants (0.6%). At the same time, male participants prefer sports drinks more than female participants. Female participants prefer herbal tea at buffets (3.4%) more than male participants (1.1%). The fact that female participants preferred herbal tea more may indicate that they prefer digestive or relaxing

drinks. The most preferred beverage in all age groups was water. Participants aged 24 and over did not prefer protein shake as a beverage preference. Participants between the ages of 21 and 23 prefer sports drinks more than other age groups (5.1%). When the beverage preferences of the participants according to their departments were analyzed, it was seen that the most preferred beverage in all branches was water. Participants studying in the management department do not prefer herbal tea at all. Participants whose sport is football do not prefer herbal tea. Participants whose branches are basketball and volleyball do not consume sports drinks and protein shakes. Participants whose branch is athletics prefer only water and do not prefer any other beverage. Participants who chose the other option stated that they drink coffee, cola, kefir and soda as beverage preferences. Of these, (53.8%) consisted of coffee. The preference for beverages such as kefir and soda indicates that participants are also inclined towards health-oriented alternative drink options.

Table 4. Participants' Attention to Nutritional Content

Variables	Group	*A.		*M.		*R.		*D.	
		N	%	N	%	N	%	N	%
Gender	Female	7,00	4,00	21,00	12,00	33,00	18,90	3,00	1,70
	Male	16,00	9,10	38,00	21,70	43,00	24,60	14,00	8,00
Age	18–20	12,00	6,90	23,00	13,10	34,00	19,40	3,00	1,70
	21–23	9,00	5,10	30,00	17,10	31,00	17,70	11,00	6,30
	24–26	2,00	1,10	5,00	2,90	4,00	2,30	2,00	1,10
	27+	0,00	0,00	1,00	0,60	7,00	4,00	1,00	0,60
Department	Phys. Ed. & Sports Teach.	9,00	5,10	13,00	7,40	30,00	17,10	5,00	2,90
	Coaching	3,00	1,70	14,00	8,00	10,00	5,70	2,00	1,10
	Management	6,00	3,40	14,00	8,00	14,00	8,00	8,00	4,60
	Recreation	5,00	2,90	18,00	10,30	22,00	12,60	2,00	1,10
Sport	Football	12,00	6,90	21,00	12,00	32,00	18,30	10,00	5,70
	Basketball	0,00	0,00	4,00	2,30	1,00	0,60	1,00	0,60
	Volleyball	0,00	0,00	10,00	5,70	7,00	4,00	2,00	1,10
	Athletics	1,00	0,60	2,00	1,10	2,00	1,10	0,00	0,00
	Swimming	1,00	0,60	1,00	0,60	4,00	2,30	1,00	0,60
	Other	9,00	5,10	21,00	12,00	30,00	17,10	3,00	1,70

**A: I always pay attention*M: I mostly pay attention *R: I rarely pay attention *D: I don't pay attention*

Table 4 shows that (24.6%) of the male and (18.9%) of the female participants rarely pay attention to the nutritional content of the snacks offered at the buffet. This finding may indicate that male respondents are less interested in nutrition labels, perhaps prioritizing factors such as practicality or taste. Participants who do not pay attention to nutritional content have the lowest percentage. When analyzed by age group, participants aged 27 years and over do not always pay attention to the nutritional content. (2.9%) of the participants aged 24- 26 years mostly pay attention. According to the departments, students of physical education and sports teaching department (17,1%) rarely pay attention. This rate is considerably higher than the rate of ticking other options. (8%) of the students of the coaching department state that they mostly pay attention. The students of the management department selected the options, 'I mostly pay attention' and 'I rarely pay attention' equally. (12,6%) of the recreation department students rarely pay attention. Participants who chose basketball and volleyball branches stated that they do not always pay attention to the nutritional content. Participants in the athletics branch did not mark the option of not paying attention at all. Based on these data, it was seen that the rate of paying attention to the nutrient content of the athletics branch as a branch was higher than the other branches.

Table 5 shows that (21.1%) of male and (18.3%) of female participants prefer fruit and yoghurt before or after training to keep energy levels high. Male participants consumed more protein bars or shakes than female participants. Female participants do not prefer carbohydrate gel to keep their energy levels high. When analyzed by age group, the most preferred foods are fruit and yoghurt. The most preferred age group for carbohydrate gel is 21-23 age group participants. The most preferred foods in all departments in the Faculty of Sport Sciences are fruit and yoghurt. Coaching and Management students do not prefer carbohydrate gel. Protein bars and shakes are mostly preferred by students in the Recreation department (6.3%). Participants who choose basketball, volleyball, athletics and swimming branches do not consume carbohydrate gel to keep the energy level high. It was observed that the participants in the athletics branch also did not prefer protein bars and shakes. It was observed that the participants who chose the other

option preferred food options such as chocolate, nuts, rice flour, sports drink, salad, chicken rice. (12.5%) of the participants who selected the other option stated that they did not prefer any food to keep their energy level high.

Table 5. Participants' Food Preferences Before or After Training

Variables	Group	*F. Y		*P.B. S		*S. W		*O. G		*C. G		*O.	
		N	%	N	%	N	%	N	%	N	%	N	%
Gender	Female	32,00	18,30	7,00	4,00	9,00	5,10	12,00	6,90	1,00	0,60	3,00	1,70
	Male	37,00	21,10	28,00	16,00	11,00	6,30	23,00	13,10	3,00	1,70	9,00	5,10
Age	18–20	34,00	19,40	10,00	5,70	7,00	4,00	15,00	8,60	1,00	0,60	5,00	2,90
	21–23	26,00	14,90	21,00	12,00	9,00	5,10	16,00	9,10	3,00	1,70	6,00	3,40
	24–26	6,00	3,40	3,00	1,70	2,00	1,10	2,00	1,10	0,00	0,00	0,00	0,00
	27+	3,00	1,70	1,00	0,60	2,00	1,10	2,00	1,10	0,00	0,00	1,00	0,60
Department	PE & ST	23,00	13,10	10,00	5,70	10,00	5,70	8,00	4,60	3,00	1,70	3,00	1,70
	Coaching	10,00	5,70	7,00	4,00	1,00	0,60	8,00	4,60	0,00	0,00	3,00	1,70
	Management	19,00	10,90	7,00	4,00	6,00	3,40	6,00	3,40	0,00	0,00	4,00	2,30
	Recreation	17,00	9,70	11,00	6,30	3,00	1,70	13,00	7,40	1,00	0,60	2,00	1,10
Sport	Football	28,00	16,00	18,00	10,30	8,00	4,60	13,00	7,40	3,00	1,70	5,00	2,90
	Basketball	2,00	1,10	2,00	1,10	1,00	0,60	1,00	0,60	0,00	0,00	0,00	0,00
	Volleyball	4,00	2,30	2,00	1,10	4,00	2,30	7,00	4,00	0,00	0,00	2,00	1,10
	Athletics	3,00	1,70	0,00	0,00	1,00	0,60	1,00	0,60	0,00	0,00	0,00	0,00
	Swimming	4,00	2,30	3,00	1,70	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
	Other	28,00	16,00	10,00	5,70	6,00	3,40	13,00	7,40	1,00	0,60	5,00	2,90

**F. Y: Fruit and yoghurt *P.B. S: Protein bars and shakes *S. W: Sandwich or wrap *O. G: Oatmeal or granola *C. G: Carbohydrate gel * O: Other*

Table 6. Participants' Snack Preferences During Training

Variables	Group	*F. Y		*P. B		*O. B		*N.		*E. G		*O.	
		N	%	N	%	N	%	N	%	N	%	N	%
Gender	Female	14	8	17	9,7	10	5,7	21	12	1	0,6	1	0,6
	Male	27	15,4	37	21,1	8	4,6	26	14,9	11	6,3	2	1,1
Age	18–20	18	10,3	21	12	9	5,1	19	10,9	3	1,7	2	1,1
	21–23	20	11,4	24	13,7	8	4,6	21	12	7	4	1	0,6
	24–26	2	1,1	6	3,4	1	0,6	4	2,3	0	0	0	0
	27+	1	0,6	3	1,7	0	0	3	1,7	2	1,1	0	0
Department	PE & ST	16	9,1	15	8,6	4	2,3	17	9,7	4	2,3	1	0,6
	Coaching	5	2,9	7	4	5	2,9	8	4,6	3	1,7	1	0,6
	Management	13	7,4	13	7,4	3	1,7	9	5,1	3	1,7	1	0,6
	Recreation	7	4	19	10,9	6	3,4	13	7,4	2	1,1	0	0
Sport	Football	24	13,7	24	13,7	4	2,3	16	9,1	5	2,9	2	1,1
	Basketball	2	1,1	1	0,6	0	0	3	1,7	0	0	0	0
	Volleyball	2	1,1	6	3,4	7	4	4	2,3	0	0	0	0
	Athletics	0	0	4	2,3	0	0	0	0	1	0,6	0	0
	Swimming	0	0	3	1,7	1	0,6	3	1,7	0	0	0	0
	Other	13	7,4	16	9,1	6	3,4	21	12	6	3,4	1	0,6

**F. Y: Fruit and yoghurt, *P. B: Protein Bar, *O. B: Oatmeal biscuits, * N: Nut mix, *E. J: Energy Gel, *O: Other*

Both female and male participants primarily check the ingredient list when evaluating the healthiness of café foods, though checking energy values has a lower percentage. This situation shows that especially students have a conscious approach to focusing on the components of food. Males (26%) rely more on brand reliability than females (5.7%). Females (7%) are less likely to assess healthiness by taste compared to males (10.3%). Participants aged 24 and older do not evaluate foods based on energy values. All age groups primarily check ingredient lists. The 18–20 age group (6.3%) places more emphasis on taste. Physical Education and Management students prioritize taste more than other departments. Physical Education students (6.9%) value brand reliability more. Ingredient list checking is the most common evaluation method across departments, though Physical Education students equally consider label information (9.1%). Football players (9.7%) emphasize taste, while swimmers do not evaluate by taste. Athletics participants focus most on taste. Football, volleyball, swimming, and secondary sport participants generally check ingredient lists. The majority of the participants do not avoid heavy fatty foods while doing sports, and female participants do not avoid consuming caffeinated beverages while doing sports. On the other hand, 4% of the male

participants do not consume caffeinated beverages while doing sports. The most avoided food in all age groups is heavy fatty foods. The second most avoided food group is carbonated drinks. None of the participants in the 24- 26 age range stated that they avoid caffeinated beverages. Participants aged 27 and over did not indicate that they avoided very salty foods. When analysed according to the departments of the participants, the most avoided food group is heavy fatty foods. Participants whose branches are basketball and volleyball do not avoid sugary foods while doing sports.

Most participants believe café foods positively impact sports performance. The 24–26 age group does not view café foods as highly positive. Participants aged 24 and older do not believe café foods have a negative impact. Physical Education students (6.9%) are unsure of the impact, compared to Recreation and Management (5.1%) and Coaching (1.1%). Basketball, athletics, and swimming participants do not view café foods as ineffective. Basketball participants (2.9% positive, 0.6% highly positive) and volleyball (5.7%) and football (18.3%) participants view foods as positive. Secondary sport participants (10.3% positive, 7.4% negative) have mixed views.

As seen in Table 6, male participants prefer energy gel (6.3%) more than female participants (0.6%) as a practical snack that can be consumed quickly between training. While (5.7%) of the female participants preferred oat biscuits, this rate was (4.6%) in men. It was observed that the most preferred practical snack of all participants was protein bar. Participants aged 27 and over do not prefer oat biscuits as a snack preference. Participants between the ages of 24- 26 do not prefer energy gel. Participants aged 21-23 years consume energy gel as a practical snack the most (4%). Participants in all age groups consider protein bars as a practical snack during training the most. The percentages of the participants studying in the management department to prefer fruit bars and protein bars are the same (7.4%). It was seen that the most preferred practical snacks (9,7%) of the participants studying in the department of Physical Education and Sports Teaching were nut mix (9,1%), fruit bar (9,1%) and protein bar (8,6%). The most preferred snacks of the participants studying in the recreation department were protein bar (10.9%) and nut mix (7.4%). The most preferred snacks of the participants studying in the coaching department were nut mix (4.6%) and protein bar (4%). Recreation department students chose energy gel as a snack preference the least. Participants in basketball and athletics did not prefer oat biscuits. Participants in athletics did not prefer any snack except protein bar (2.3%) and energy gel (0.6%). Participants in basketball consumed nut mix (1.7%), fruit bar (1.1%) and protein bar (0.6%) as snack preferences. Participants in swimming chose nut mix (1.7%), protein bar (1.7%) and oat biscuit (0.6%) as snacks. It was observed that the snack preferences of the participants who chose football and other secondary branches were more diverse than the other branches. The percentage (13.7%) of the participants who chose the football branch to tick the fruit bar and protein bar options were equal. Participants in other secondary branches preferred the nut mixture the most.

Table 7. Evaluation of the Absence of Desired Foods in Municipal Coastal Beach Cafés

Variables	Group	*Y		*N		*N. B		*M		*N. I		*O	
		N	%	N	%	N	%	N	%	N	%	N	%
Gender	Female	2	1,1	16	9,2	20	11,5	16	9,2	10	5,7	0	0
	Male	7	4	22	12,6	35	20,1	25	14,4	21	12,1	0	0
Age	18–20	5	2,9	17	9,8	18	10,3	16	9,2	16	9,2	0	0
	21–23	2	1,1	17	9,8	31	17,8	18	10,3	12	6,9	0	0
	24–26	0	0	2	1,1	4	2,3	5	2,9	2	1,1	0	0
	27+	2	1,1	2	1,1	2	1,1	2	1,1	1	0,6	0	0
Department	PE & ST	5	2,9	15	8,6	15	8,6	13	7,5	9	5,2	0	0
	Coaching	2	1,1	6	3,4	8	4,6	5	2,9	8	4,6	0	0
	Management	0	0	11	6,3	13	7,5	8	4,6	10	5,7	0	0
	Recreation	2	1,1	6	3,4	19	10,9	15	8,6	4	2,3	0	0
Sport	Football	4	2,3	18	10,3	19	10,9	16	9,2	18	10,3	0	0
	Basketball	1	0,6	0	0	2	1,1	2	1,1	0	0	0	0
	Volleyball	0	0	3	1,7	10	5,7	3	1,7	3	1,7	0	0
	Athletics	0	0	2	1,1	1	0,6	2	1,1	0	0	0	0
	Swimming	0	0	2	1,1	2	1,1	3	1,7	0	0	0	0
	Other	4	2,3	13	7,5	21	12,1	15	8,6	10	5,7	0	0

**Y: Yes, *N: No, the current options are sufficient, *N. B: No, but the variety in the menu can be increased, *M: Maybe there should be more options, *N. I: I have no idea, * O: Other*

Twelve percent of the female participants thought that the Mediterranean diet-style foods offered at the buffet were beneficial, while 17.7% of the male participants had no opinion. A small proportion—2.3% of the female participants and 7.4% of the male participants—thought that these foods were not useful. Among participants aged 18 to 20, the

majority (14.3%) selected the option of having no opinion about Mediterranean diet-style foods. In contrast, the majority of participants aged 21 to 23 (17.7%) considered these foods beneficial. A small percentage (1.7%) of participants aged 27 and older believed that Mediterranean-style foods were not useful. Most students enrolled in the departments of Physical Education and Sports Teaching and Recreation stated that they considered Mediterranean diet-style foods beneficial. Among participants from the Sports Management department, 6.9% indicated they would not prefer such foods. It was observed that participants whose branches were athletics and basketball did not find Mediterranean diet-style foods to be useless. On the other hand, participants involved in swimming appeared to prefer this type of diet. Among football players, 12% reported having no opinion, while 10.9% of those who selected other secondary branches stated that they would not prefer it.

In Table 7, (11.5%) of the female participants and (20.1%) of the male participants stated that there is no food that is not generally available in the buffets and that they would like to be served, but the variety in the menu could be increased. (9, 2%) of women and (12, 6%) of men find the current options sufficient. Participants between the ages of 24- 26 do not have any food they would like to add to the menus in the buffets. Participants between the ages of 18-20 (10,3%) and 21-23 (17,8%) did not have any food they would like to add to the menus, but the variety in the menu could be increased. (8,6%) of the participants studying in the department of Physical Education and Sports Teaching found the current options sufficient.

4. Conclusion

They stated that the variety of menus offered in the lists could be increased. The research includes the preference for foods such as fruits, nuts, protein bars, and fiber blends, and the inclusion of these foods in their varieties. This result is parallel to the studies in the literature on the nutritional preferences of athletes (Gill, 2023). Looking at the beverage preferences of the participants, it was seen that the buffet menus generally met expectations. However, it was observed that the protein shakes and sports drink preferred by the participants were missing in the menus of Trabzon municipality-affiliated coastal beach buffets.

In the study, athletes avoided heavy fatty foods and preferred healthier cooking methods such as grilling and boiling, which is similarly supported in the literature (Martínez-González et al., 2022). It has been observed that there are suitable options in Trabzon province municipality-affiliated coastal beach buffets. Various fruits and fruit yoghurt mixtures should be added to the menus since the participants prefer fruit - yoghurt duo before or after training to keep their energy levels high. Practical snacks such as protein bars should also be included in the menus since they are a food that the athlete can consume quickly.

The menus of the kiosks located along the coastal strip affiliated with Trabzon Municipality have been reviewed, and a menu suitable for athlete nutrition has been selected. The breakfast plate in this menu includes black olives, grilled green olives, honey, clotted cream, jam, acuka (a spicy spread), Nutella, kaygana (a type of savory pancake), sigara böreği (cheese rolls), kashar cheese, white cheese, Ezine cheese, Kars kashar, boiled eggs, tomatoes, cucumbers, various greens, and bread. However, since the portion sizes of these foods are not specified, an exact calorie calculation cannot be made. The fact that menus do not provide information about portion sizes makes it difficult for athletes to accurately track their energy and macronutrient intake, and it is emphasized in various studies that portion control is an important requirement in athlete nutrition (Rolls, 2014). For this reason, portion sizes should be specified in grams or units on menus. snacks, natural pomegranate juice, atom juice, orange juice, and boiled potatoes—already present on the menu—can be suitable options. However, based on survey results from the athletes, adding fruit and nut alternatives to the menu would also be beneficial. When evaluating lunch and dinner options, it has been observed that the soup category includes only fish and cabbage soup. While the inclusion of traditional flavors is culturally positive, the limited number of alternatives may negatively affect athletes' preferences.

The presence of protein-rich foods such as lamb tandır and steamed sea bass in the main course section is a significant advantage. However, the lack of vegetables and legume dishes in the menu is a notable shortcoming. Increasing the variety of soups and main dishes would support dietary diversity and allow athletes to meet their nutritional needs more effectively. Moreover, the absence of portion size information in the menus makes it difficult for athletes to calculate the amount of energy, protein, carbohydrates, and fats they consume. This situation hinders their ability to track their daily dietary goals and assess their nutrient intake adequately.

Table 8. 4000-Calorie Athlete Menu Examples

Meals	Example Menu	Proposed Menu 1	Proposed Menu 2
Breakfast	1 glass of milk, 2 matchbox-sized cheese, 1 tbsp honey, 2 medium peeled apples or peaches, 3 thin slices of bread	1 glass of milk, 1 boiled egg, 10–12 raw hazelnuts, 1 banana, 1 tbsp unsweetened peanut butter, 2 slices of whole-grain bread	5 tbsp oatmeal, 1 glass milk or yoğurt, 1 banana, 1 tbsp peanut butter, 1 tsp honey, 10 raw almonds, 1 boiled egg
Snack	1 banana, 1 glass of milk, 1 slice of low-fat cake	500 ml sports drink, 3 medium dates, 4 walnuts, Unsweetened cookie	1 glass fruit smoothie, 1 protein bar, 2 walnuts
Lunch	1 bowl of noodle soup, Grilled or boiled chicken thigh (120 g), 8 tbsp pasta, 1 portion salad, 1 thin slice bread, 1 bowl pudding	1 bowl lentil noodle soup, Grilled salmon (120 g), 10 tbsp rice pilaf, 1 portion salad, 1 slice whole-grain bread, 1 bowl yogurt muesli	1 bowl lentil soup, 4 grilled meatballs (120 g), 8 tbsp turmeric basmati rice, 1 portion salad, 1 bowl yogurt, 1 small Trabzon persimmon, 1 slice whole-grain bread
Snack	1 medium apple, 1 glass fruit juice, 1 slice low-fat cake	1 glass pomegranate juice, 1 protein bar, 7 medium cashews	1 glass kefir, 1 banana, 5 raw almonds, 2 walnuts, 4 raw hazelnuts
Dinner	4 tbsp meaty vegetable dish, 12 tbsp rice pilaf, 2 pears, 1 glass fruit juice, 1 bowl of pudding, 3 thin slices bread	6 tbsp meaty chickpea dish, 8 tbsp pasta, 1 bowl yogurt, 2 apples, 1 glass sports drink (yogurt, milk, fruit smoothie), 2 slices whole-grain bread	6 tbsp minced cauliflower dish, 12 tbsp bulgur pilaf, 1 bowl cacic, 2 pears, 1 glass fruit juice, 2 slices of whole-grain bread

Based on the 4000-calorie menu example in Table 8, two sample menu plans were developed by evaluating the survey data. Since the percentage of oat preference of the participants was found to be significant, oat bowls can be added to the menus as an alternative for breakfast.

Electrolyte sports drinks should be included in the menus in order to replace the minerals and fluid lost with sweat during training. Trabzon province municipality coastal kiosks have Churchill accordingly. However, alternatives for athletes can be increased in terms of diversity. Fruity protein shake recipes can also be included in the menus to meet energy needs and ensure fruit consumption. Since the percentage of participants preferring nuts is high, mixed nut plates can be added to the extra section of the menus. The addition of various fruit plates will be alternative choices for athletes. This study has shown that menus for athlete health can also be given as a separate list in menus

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Review Article

The Effect of Country Population, Economy and Scientific Research on Country's Olympic Success

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Abstract: This study aimed to examine the relationship between the number of gold/total medals obtained by the top 20 countries in the gold medal rankings at the Athens 2004, Beijing 2008, London 2012, Rio 2016, Tokyo 2020, and Paris 2024 Summer Olympic Games, and the population, economy, and scientific research of these countries. The descriptive survey model, one of the quantitative research methods, was used in the study. Data were obtained through scientific studies and document analysis. To evaluate the quantity of research in the field of sports sciences, scientific research published in Web of Science (WOS) over the four years between the two most recent Olympics was analyzed, and documents suitable for the purpose of the research were identified. For data on population and economy, the latest available data for all the Olympics were used. There are many variables that affect the Olympic success of countries. Many variables, such as economy, population, socio-cultural structure, science and technology, facilities, club development, athlete incentive policies, and extraordinary talents, can influence outcomes. In this study, scientific research, population, and the economy were examined as factors affecting Olympic success (gold medals and total medals). Pearson correlation analysis, chi-squared (χ^2) analysis, and regression analysis were used to evaluate the data obtained. As a result, economic factors were found to be the factors that most influenced gold and total medal rankings. The number of gold medals was found to be influenced by population, while the total number of medals was influenced by scientific research. Scientific research influenced the number of gold medals, while population influenced the total number of medals overall. These results may shed light on future research and the development of Olympic strategies.

Keywords: Olympic games, medal, success.

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1. Introduction

The Olympic Games, which have a long history, are analyzed in two periods: the Ancient Olympic Games and the Modern Olympic Games. Although there are different dates in the sources, the Ancient Olympic Games are reported to have been held 292 times at four-year intervals, from 776 BC until they were terminated by the Roman Emperor Theodosius I in 396 AD. After the Olympic Games were interrupted for a long time, Baron Pierre De Coubertin, who was interested in the ancient Olympic Games when he was studying in London, started to work to revive the Olympics (Seçilmiş, 2004). There is no sporting event as exciting as the Olympic Games. This is what Coubertin had in mind when he set out to establish the modern Olympic movement 2,500 years after the first sports festival started in ancient Greece (Payne, 2013). In 1894, the basic principles of the Olympics were determined in a meeting with 2,000 guests at the Sorbonne. The principle is that the Olympics will be held every four years. 2. Only adults will take part in the competitions. 3. Amateurism rules are essential. 4. Each Olympics will be held in a different country. 5. The Olympics will be open to everyone. 6. The president of this committee will be Baron Pierre de Coubertin. Under these rules, the International Olympic Committee (IOC) was founded, and subsequently, the first Olympics were held in Athens in

1896. The modern Olympic Games, which are held in a different country or city every four years, could not be held in 1916 due to World War I and in 1940 and 1944 due to World War II (Seçilmiş, 2004). Due to the COVID-19 pandemic affecting the whole world, the Tokyo 2020 Olympic Games were held in 2021.

The Olympic Games, which are the most important and meaningful events in the world of sports, have been organized by various entities throughout history, with modern iterations organized by countries, to meet economic, political, and social expectations beyond sporting success (Karaküçük, 1989). In our era, many large-scale sports events such as the Olympic Games, Continental Cups, and World Cups are organized. While being successful in the Olympic Games and hosting the Games are considered displays of propaganda, power, and image for countries, over time, the great financial contribution, country promotion, and tourism mobility provided by the Games have been added to these perceptions. We can see that the prestige and power of countries increase in parallel with the successes and medals they win from major sports organizations, especially the Olympics (Akgül, 2016). After the 2000 Sydney Olympics, John Morse, director of the Australian Tourism Commission, said "The Olympics are the best thing that has ever happened to the Australian tourism industry" and "The Olympics changed the world's view of Australia forever" (Payne, 2013). In summary, it is understood that both hosting the Olympics and achieving success in the Olympics are important for the promotion and prestige of the country. Olympic hosting was analyzed by Knott and Tinaz (2022). In their study, the hosting of large-scale and mega sports events by developing countries was evaluated in five main areas related to sports heritage. These are categorized as 1. social development, 2. politics, soft power and sport for peace, 3. tourism economy, image and branding, 4. infrastructure and urban development, and finally, 5. sport development (Knott & Tinaz, 2012). Table 1, (IOC, 2025) shows the continents where the host cities of the Olympic Games have been located since the beginning of the modern Olympic Games, the number of Olympic Games held in these continents, and the countries that have hosted them.

Table 1. Distribution of Geographical Continents and Countries in Olympic Hosting since 1896

Geographic Continent	Number of Olympiads	Countries
Africa	0	-
America	7	USA (4), Brazil, Canada, Mexico
Asia	5	China, South Korea, Japan (2), Russia
Europe	16	Germany (2), Belgium, Finland, France (3), Netherlands, Greece (2), Italy, Greece (3), Spain, Sweden, Italy, UK (2)
Australia	2	Australia (2)

There are many variables affecting the Olympic success of countries. Many variables such as economy, population, socio-cultural structure, science and technology, facilities, club development, athlete incentive policies, and extraordinary talents can be identified. For this reason, many studies have been conducted to explore factors that affect Olympic success. Karakuş and Işık (2017) compared the success of Turkey and other European Union (EU) countries in the Rio 2016 Olympics in terms of population and economic factors. In this study, Gross Domestic Product (GDP) per capita, the participation rate in relation to the population, and medal success were analyzed (Karakuş & Işık, 2017). The economy affects many other factors. However, even the most developed and richest countries in the world cannot afford to use their resources inefficiently and without control. Success is possible through the efficient use of resources, not merely having abundant resources. When the medals won by the successful countries are examined, it is seen that they determine priority sports branches, invest in these sports branches and win more than half of their medals in the sports branches they have determined (Tümen, 2022)

A new method of calculating Olympic success based on country populations and the number of medals won has been proposed in studies. It is argued that the current method is advantageous for countries with larger populations. Therefore, it is argued that it would be useful to publish the number of medals, probability rankings, and medals per capita rankings, while highlighting the achievements of countries with small populations. Sports media and public information sources should use probability rankings adjusted for population size when reporting country achievements at the Olympics. It is argued that this would make the Olympics more entertaining, while recognizing the determined efforts of athletes from different countries to achieve Olympic excellence (Parece, 2024).

The aim of this study is to examine the relationship between Olympic medal success (gold/total) and the amount of scientific research, population, and economic status of countries in the field of sports sciences. For this reason, the relationship between the amount of scientific research, population, and economy of the countries, and their Olympic medal success was analyzed.

2. Materials and Methods

2.1. Research Model

This study was conducted using the descriptive survey model, one of the quantitative research methods.

2.2. Data Collection

Data were obtained through scientific studies and document analysis. The medal distributions of the countries in the Athens 2004, Beijing 2008, London 2012, Rio 2016, Tokyo 2020, and London 2024 Summer Olympic Games, organized by the International Olympic Committee (IOC) between 2004 and 2024 (TMOK, 2024), as well as the scientific research in the field of sports sciences produced by the countries within four-year Olympic cycles and published in Web of Science (WOS), were analyzed. For the Athens 2004 Olympics, studies conducted in 2001, 2002, 2003, and 2004 were evaluated. The same method was applied for six Olympics, including the Paris 2024 Olympics. Studies with more than one author and authors from different countries were evaluated separately for each country. Scientific studies conducted prior to 2001 were excluded, and studies planned for 2025 will be excluded. Scientific research data published in Web of Science (WOS) were examined between 10.03.2025- 13.03.2025 and the search criteria with the keywords sport* or training were as follows (Web of Science, 2001-2024). The results obtained according to the specified criteria are shown in Figure 1.

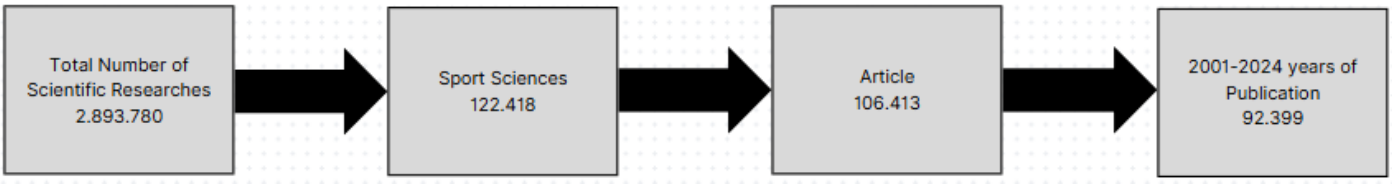

Figure 1. Data Collection Flow Chart.

In this study, the top 20 countries in each Olympics were taken into consideration. Thus, a total of 34 countries appeared in the top 20 performers over the six Olympics analyzed. Olympic success is ranked according to the number of gold medals won by the countries. In case of equality, the number of silver medals and then the number of bronze medals are taken into consideration. Table 2 shows the amount of scientific research, as retrieved from the Web of Science database, from the countries ranked in the top 20 at the Olympics during the Olympic period.

Table 2. Number of Scientific Researches Scanned in Web of Science during the Olympic Period

Athens 2004	2001	2002	2003	2004
(2001,2002,2003,2004)	1.254	1.276	1.444	1.572
Beijing 2008	2005	2006	2007	2008
(2005, 2006, 2007,2008)	1.715	1.874	2.233	2.428
London	2009	2010	2011	2012
(2009, 2010, 2011, 2012)	2.799	3.148	3.153	3.435
Rio 2016	2013	2014	2015	2016
(2013, 2014, 2015, 2016)	3.703	3.843	4.240	4.392
Tokyo 2020	2017	2018	2019	2020
(2017, 2018, 2019, 2020)	4.732	5.224	6.176	6.591
Paris 2024	2021	2022	2023	2024
(2021,2022, 2023, 2024)	7.192	7.167	6.220	6.588

From 2001-2024, there have been differences in country names, participation status, and the years of the Olympics. China's research numbers were collectively evaluated. Survey numbers for Brazil were evaluated as a whole. Belarus

was evaluated together with other countries. The Czech Republic, also known as Czechia, has undergone a name standardization process. Great Britain (England, Scotland, Wales) and the United Kingdom (which includes Northern Ireland and Great Britain) are considered together in terms of their scientific research output. The Russian Olympic Committee was evaluated based on data about the volume of scientific research in Russia. Although the Tokyo 2020 Olympics were held in 2021, due to the Covid-19 pandemic, which affected the whole world, scientific research from 2021 was evaluated for the upcoming 2024 Olympics.

The populations (United Nations Population Fund, 2024) and economic sizes (World Bank Group, 2023) of the countries ranked in the top 20 in the six Olympic Games were assessed within the scope of the research based on current data. The populations, economies, the scientific research output in the field of sports sciences of the countries, and the gold and total medals count in the Olympic Games were categorized. Gold medals 0-5, 6-10, 11 and above; Total medals 0-20, 21-40, 41 and above; Scientific research 0-100, 101-500, 501 and above; Population 20 million and below, 20.000.001-70.000.000, 70.000.001 and above; Economy (million $) 0-500.000, 500.000-2.000.000, 2.000.000 and above. The country's data were analyzed by regression analysis, χ^2 (chi-square) analysis, and correlation analysis. For χ^2 analysis, all data were transformed into categorical form. Then, the relationships between gold medals and other parameters, and between total medals and the same parameters, were analyzed. Pearson correlation analysis was performed, and the results were evaluated. In this study, the effects of countries' economic levels, population, and scientific research activities on gold medals and total medals in the six Olympics held between 2004 and 2020 were analyzed. In the regression analysis, the effect of the independent variable on the variance of the dependent variable was examined. The number of gold medals and the total number of medals were considered dependent variables, while scientific research, population, and the economy were considered independent variables. The total number of gold medals won by the top 20 countries in the last six Olympics is shown in Table 3.

Table 3. Top 20 Countries by Total Gold Medals in the Last Six Olympics

	Country Name	Number of Gold Medals	Number of Scientific Researches	Population	Economy (Million $)
1	USA	243	26.183	341.237.743	27.360.935
2	China	225	5.092	1.409.670.000	17.794.782
3	Australia	160	9.131	26.707.556	1.723.827
4	United Kingdom	120	11.322	67.026.292	3.340.032
5	Russia	114	485	146.150.789	2.021.421
6	Japan	91	2.626	123.590.000	4.212.945
7	Germany	79	5.159	84.607.016	4.456.081
8	France	65	3.529	68.226.000	3.030.904
9	South Korea	63	1.092	51.439.038	1.712.793
10	Italy	56	4.160	58.919.345	2.254.851
11	Netherlands	55	2.468	17.947.684	1.118.125
12	Hungary	36	291	9.678.000	212.389
13	New Zealand	27	1.760	5.199.100	253.466
14	Cuba	26	12	11.089.511	147.193
15	Canada	23	4.971	41.012.563	2.140.086
16	Brazil	22	6.323	212.583.750	2.173.666
17	Ukraine	21	17	41.130.432	178.757
18	Spain	20	4.453	48.345.223	1.580.695
19	Kenya	20	37	51.526.000	107.441
20	Jamaica	16	8	2.734.093	19.423

2.3. Ethics Committee Permission

This study is a literature review based on previously published research and does not involve the collection of new data from human or animal subjects. Therefore, ethical approval was not required. In general, ethical committee approval is not mandatory for review articles, as long as no experimental procedures or direct involvement of participants are

present. Nonetheless, all sources used in this study are publicly available and scientifically valid, and the study was conducted in accordance with the principles of research ethics.

3. Results

In the study, continuous numerical data were observed, and the VIF value was below 10 in all comparisons. It was determined that the data obtained were in accordance with the normal distribution criteria and that there was a linear relationship between dependent and independent variables

Table 4. Correlation Table

	Gold Medal	Total Medals
Scientific Research	0.551*	0.630*
Population	0.571*	0.450*
Economy	0.857*	0.838*

** p < 0,01*

Analyzing the table above reveals that the highest correlation is between the number of gold medals and the economy. When all parameters are analyzed, significant correlations with gold medals are observed. However, it is recognized that the correlation with the economy is high, while it is medium with both scientific research and population. The highest correlation between the total number of medals, scientific research, population, and economy is with the economy (r=0.838), and the second highest correlation is with scientific research (r=0.630). Accordingly, the correlations between the total number of medals and factors such as the economy and scientific research are at a high level, while the relationship with the population parameter (r=0.450) is at a medium level.

Table 5. Chi-Square Table

	Gold Medal	Total Medals
Scientific Research	12,300**	21,985*
Population	40,770*	58,407*
Economy	43,327*	69,894*

**p < 0.01, **p<0.05*

When Table 5 is analyzed, all parameters associated with chi-squared (χ^2) values are related to gold medals and the total number of medals. Among these relationships, the strongest for gold medals is the economy (italicxitalic2=43.327), the second strongest is the population (italicxitalic2=40.770), and the third strongest is scientific research (italicxitalic2=12.300). When the total number of medals is analyzed, it becomes evident that the strongest relationship is with the economy (χ^2=69.894), the second strongest relationship is with population (χ^2=58.407), and the third strongest relationship is with scientific research (χ^2=12.300).

Table 6. Regression Table

	Gold Medal		Total Medals	
	Beta	p	Beta	p
Scientific Research	0.093	0.174	0.195	0.009
Population	0.212	0.001	0.101	0.125
Economy	0.686	0.000	0.658	0.000

Regression modeling shows that at least one of the three independent variables (scientific research, population, or economy) explains the dependent variable. Scientific research, population, and economy explain 71% of the variance of the dependent variable: the total number of medals. The levels of variance explained for all parameters were significant (p<0.001). Upon analysis of each parameter, it was determined that the economy (p<0.001) had the most significant effect on the total number of medals, while the amount of scientific research (p=0.009) had a secondary impact. The population parameter (p=0.125) was not sufficient to explain the variance in the total number of medals.

It is understood that variables related to scientific research, population, and economy account for 75% of the number of gold medals. This level of explanation was found to be significant ($p<0.01$). It was determined that economy ($p<0.001$) was the most influential parameter on the number of gold medals, with population ($p=0.09$) being influential at a secondary level. It was determined that the volume of scientific research ($p=0.174$) was not sufficient to explain the variance in the number of gold medals.

4. Discussion

In this study, the aim is to examine the relationship between Olympic medal success (gold medals, total medals) and the number of scientific research articles, population size, and economic size of countries in the field of sport sciences. For this reason, the relationship between scientific research output, populations, countries' economies, and Olympic medal success was examined. The scientific research output, populations, and economies of the countries were analyzed in the context of the last six Olympic Games. The statistical methods used in this study include correlation analysis, chi-squared (χ^2) analysis, and regression analysis.

As a result of the correlation analysis, a significant relationship exists between all parameters and gold medal success, with the highest correlation existing in the economic parameter. When all parameters are analyzed, significant correlations with the number of gold medals are observed. It is understood that the correlation between gold medal success and the economy is high, while the correlations with scientific research and with the population are medium (Table 4).

As a result of the chi-squared (χ^2) analysis, it had been found that all parameters are associated with the number of gold medals and the total number of medals. The strongest relationships for both gold medals and the total number of medals are found with the economy, and these are followed by relationships with population and scientific research (Table 5).

The regression analysis determined that the most influential parameter on the number of gold medals is primarily the economy, followed by population. The volume of scientific research is not sufficient to explain the number of gold medals. It was observed that the parameter that most affected the total number of medals was the economy, followed by scientific research. It was determined that the population parameter was not sufficient to explain the variance of the total number of medals (Table 6).

As a result, countries want to show the promotion and prestige in the global competitive environment through sports. For this reason, it is important for countries to achieve favorable outcomes in the Olympics, the pinnacle of international sporting events. In his study, Tümen (2022) examined the sporting structuring of countries by analyzing the Australian Olympic success system, the United States (USA) swimming system, and the East German talent identification system. He provided examples such as the Spartak tennis club, Bollettieri tennis academy, and Australian basketball, in the context of sports club development. He emphasized the impact of family, coaches, science and technology on sporting success (Tümen, 2022). In order to prepare for the Olympic Games for Turkey, sports organization managers and academicians from different universities working in the field of sports sciences came together at an evaluation meeting on new scientific methods and projects for the development of sports and athletes and expressed their views on the country's Olympic goals with a wide participation (GSGM, 2000).

5. Conclusions

As a result of the research, the most prominent parameter was found to be the economy. The most effective factor influencing both gold and total medal success is the economy; the secondary factor affecting gold medals is the population while scientific research influences the success in total medals. The scientific research can explain 19.5% of the total medal success variance ($p=0.009$). It is understood that the economic scale and welfare levels are very important factors influencing individuals, families, sports clubs, sports federations, and the country's sports organization. The efficient use of limited resources can be ensured through scientific research, and supporting these efforts can contribute to the success of countries in the Olympic Games.

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