IJETS@R

(ISSN: 2587-0238)

Çetinkaya, E. & Suna, G. (2024). Examination of Warm-Up Habits and Knowledge Levels of Students in the Faculty of Sports Sciences According to Various Variables: A Case Study of a Public University, *International Journal of Education Technology and Scientific Researches, 9(28), 532-542.*

DOI: http://dx.doi.org/10.35826/ijetsar.751

Article Type (Makale Türü): Research Article

EXAMINATION OF WARM-UP HABITS AND KNOWLEDGE LEVELS OF STUDENTS IN THE FACULTY OF SPORTS SCIENCES ACCORDING TO VARIOUS VARIABLES: A CASE STUDY OF A PUBLIC

Erkan ÇETİNKAYA
Ass. Prof., Aydın Adnan Menderes University, Aydın, Turkey, erkancetinkaya@adu.edu.tr
ORCID: 0000-0001-8441-6510

Gürhan SUNA
Ass. Prof., Süleyman Demirel Uiversity, Isparta, Turkey, gurhansuna@sdu.edu.tr
ORCID: 0000-0002-2125-9105

Received: 11.06.2024 *Accepted: 25.08.2024* *Published: 15.09.2024*

ABSTRACT

This study aims to determine the warm-up habits and knowledge levels of students in the Faculty of Sports Sciences. The sample group consists of 468 students, including 287 males and 181 females, enrolled in the 2023-2024 academic year. Of these students, 314 are in regular normal education, while 154 are in evening education. Analyzing their undergraduate programs, 44 students are in Department of Physical Education, 120 students in Coaching Education, 183 students in Sports Management, and 121 in Recreation. Demographic data were collected using a "Personal Information Form" developed by the researcher, while warm-up habits and knowledge levels were assessed using the "Warm-Up Habits for Athletes" questionnaire developed by Arslan et al. (2010). The questionnaire compromises a total of 20 items, with 10 positive and 10 negative statements. The warm-up habits and knowledge levels of the students were examined using descriptive statistical methods according to different variables. The variance and homogeneity of the obtained data were tested, and the results demonstrated a normal distribution. Accordingly, Independent Samples T-test was used for binary comparisons, One Way ANOVA was used for multiple comparisons, and the Tukey HSD test was used for determining within-group differences. The findings indicate no statistically significant differences in warm-up habits and knowledge levels concerning gender, licensing status, sports discipline, or type of education. However, a statistically significant difference was found based on the undergraduate program factor ($p<0.05$). It can be concluded that this difference may be attributed to the practical courses and specialized knowledge courses included in the curricula of the Department of Physical Education and Sport Training and Coaching Education.

Keywords: Sports sciences, warm-up knowledge level, warm-up and cool-down habits

INTRODUCTION

Sport is a biological and pedagogical social phenomenon that improves an individual's physiological and psychological health, regulate social behaviors, and bring them to a certain mental and motor level. In general, sport is an educational and entertaining competitive field based on movement and struggle, governed by specific rules (Güler, 2022). In other words, sport is defined as a phenomenon that ensures the intellectual, spiritual, and physical development of an individual and the coordination and socialization among these elements (Lloret et al., 2021; Çimen et al., 2023).

Sport is an integral part of modern life (Altınışık et al, 2020), not only positively influences our health and quality of life but also improves physical fitness, reduces stress, and plays a significant role in weight control (Bayındır, 2023). Therefore, it can be said that sport is of great importance to human life (Altınışık and Çelik, 2021). Warm-up preparation requires the body to be ready for adaptation before transitioning to movements that intensify during sports training. Warm-up generally consists of gradually increasing the intensity of physical activity (heart rate elevation), joint mobility exercises, and stretching movements, followed by the performance of the activity. Warm up brings the body to a state where it can safely respond to nerve signals for fast and effective movement. For instance, before transitioning to maximal sprinting or an intense activity, the athlete may jog at a low pace to warm up the muscles and increase heart rate. It is important for the warm-up to be specific to the activity. This ensures that the muscles to be used are properly prepared. In general, warm up is considered the process of preparing the body, both mentally and physically, through exercises before engaging in a sporting activity. During warm-up, the body's organs must gradually increase their efforts and movements until they reach the high level of exertion and superior performance required by the sport, while also adapting to the changing external conditions of the environment (Alanazi, 2016).

In the study conducted by Sevim (Sevim, 1997), warm-up as activities were aimed at preparing an individual optimally, both psychologically and physically, for specific tasks required in competitions and training. In a similar study, the term “warm-up” was defined as the physical and mental activities performed before training or competition with the objective of achieving the optimal performance level required for that particular session (Karatosun, 1993; Bozgüney and Çimen, 2024). Warm-up refers to activities designed to achieve the highest efficiency in physical activity, as well as practices that prepare the individual both mentally and physically in an optimal way for training and competitions (Akgün, 1994). One of the primary findings from studies related to warm-up is the increase in body temperature. Furthermore, an increase in muscle tissue temperature has been observed which is reported to be accompanied by improvements in muscle metabolism and muscle fiber conduction speed. The performance enhancements observed due to warm-up before exercise are generally attributed to temperature-related mechanisms. More recently, a strong relationship has been established between power production and muscle function; it has been demonstrated that a 1°C increase in muscle temperature can enhance subsequent exercise performance by 2-5%, depending on the type and speed of contraction, and that there is a positive relationship between the intensity of muscle reaction and movement

speed. Additionally, changes in muscle are directly related to changes in relative work rate; at the beginning of moderate exercise, the internal muscle temperature rapidly rises from 35-37°C and reaches relative equilibrium after 10-20 minutes (McGowan et al, 2015).

Although warm-up is considered essential for achieving optimal performance, this idea was not widely held until recently. Coaches often resorted to a trial-and-error approach when designing warm-up strategies for their athletes. Readiness for sport refers to the body's capacity to adapt to the specific demands of a sport or activity. When training is ongoing, it may appear that a warm-up may seem like a waste of time. Nevertheless, the pre-training routine can form the most beneficial aspect of increasing overall fitness levels. The benefits of warm-up include an elevated heart rate, increased blood flow, enhanced synovial fluid movement, and, generally, a focus of the mind on 100% effort throughout the exercise, aiming for victory. Often, this short but significant part of training may be ignored. Yet, few realize how important this time truly is. While warm-up may take an extra 5-10 minutes of training, the rewards will be worth it. Elite athletes know that injuries often arise from repetitive movements, biomechanical imbalances, or, in many cases, both. A good warm-up serves as a tool for preventing injuries. The pre-exercise warm-up process prepares athletes for the stress to come and boosts their performance levels. The value of warm-up remains a significant research problem. Due to this, it has become necessary to update recent developments in designing and thoroughly examining athletes' warm-up strategies. The practice of "warm-up" has been universally accepted for a long time. While the general principles surrounding the necessity for a warm-up remain valid, recent years have seen a growing body of evidence questioning the utility of warm-up methods and revealing potential areas for future development. In this regard, it is evident that more well-conducted studies are needed to determine the role of a warm-up in performance improvement (Alanazi, 2016).

For this reason, obtaining accurate knowledge and habits regarding warm-up is essential for all athletes. Furthermore, warm-up is a critical requirement for injury prevention and achieving high training and match performance. Having sufficient knowledge and habits related to warm-up will positively impact athletes' sporting careers (Arslan et al, 2011). In recent years, there has been a noticeable lack of well-conducted, randomized, and controlled trials on the physiological mechanisms of warm-up and the factors influencing physical performance. Further research is required to determine the relationship between warm-up practices and performance.
Since success in sports is only possible through well-trained and qualified individuals at every level of the sport, this study is expected to contribute to the existing literature by increasing knowledge and habit levels regarding warm-up and cool-down exercises. Moreover, it is considered essential for instilling these behaviors, particularly in athletes, and will provide valuable insights through fieldwork.

METHOD

Research Model

This scientific research; It is a cross-sectional survey application using the survey model, one of the quantitative research methods.

Participants

The population of the research consists of students enrolled in the Department of Physical Education and Sports Training, Coaching Training, Recreation, and Sports Management at the Faculty of Sports Sciences at Aydın Adnan Menderes University during the 2023-2024 academic year. The study sample was randomly selected from the population and consists of 468 students (181 females and 287 males). Students participated in the research on a voluntary basis. Data were collected through face-to-face interviews conducted by the researcher.

Questionnaire of Athlete Warm-Up Habit

To obtain demographic data, a personal information form was constructed by the researcher was used. For data related to warm-up habits and knowledge levels, the "Athlete Warm-Up Habit" questionnaire as developed by Arslan et al. (2011), was utilized. The questionnaires were completed by the participants themselves. The questionnaire is a 5-point Likert scale with the following options: "Undecided," "Strongly Disagree," "Disagree," "Strongly Agree," and "Agree." The questionnaire includes a total of 20 questions, with 10 positive and 10 negative statements.

Data Analysis

The data analysis was conducted using the SPSS 25 software. The warm-up habits and knowledge levels of the students in the Faculty of Sports Sciences were examined using descriptive statistical methods according to different variables. The variance and homogeneity of the data were tested, and normal distribution was confirmed. It was found that the data showed a normal distribution since the skewness and kurtosis values were between -1.00 and +1.00. Consequently, for pairwise comparisons, an independent samples t-test was used; for comparisons involving three or more groups, one-way ANOVA was used, and Tukey HSD test was used to determine intra-group differences. A significance level of 0.05 was utilized as the reference for identifying differences between variables.

Research Publication Ethics

The research has been approved by the Ethics Committee of Social and Human Sciences Research at Aydın Adnan Menderes University with the decision dated April 29, 2024, and numbered 31906847/050.04.04-10.

FINDINGS

Table 1. Demographic characteristics of the participants

Demographic characteristics		f	%
Gender	Male	287	61,3
	Female	181	38,7
Type of education	1st education	314	67,1
	2nd education	154	32,9
Age	18-20	109	23,3
	21-23	275	58,8
	24 and over	84	17,9
Warm-up exercises	I never do it	6	1,3
	I do it occasionally	150	32,1
	I do it all the time	312	66,7
Cool-down exercises	I never do it	30	6,4
	I do it occasionally	197	42,1
	I do it all the time	241	51,5
Undergraduate Program	Physical Education	44	9,4
	Coaching Education	120	25,6
	Sport Management	183	39,1
	Recreation	121	25,9

Table 2. Warming Habit Knowledge Level Scale Normal Distribution Table

Scale	N	min	max	skewness	kurtosis
Warming Habit Knowledge Level Scale	468	44,00	94,00	-,093	-,038

When Table 2 is examined, Hair et al. (2013) reported that the data showed a normal distribution when the skewness and kurtosis values were between -1.00 and +1.00. Accordingly, parametric tests were preferred in the analyses.

Table 3. Changes in Warming Habits and Knowledge Levels Depending on Gender Factor

Gender	n	X	Sd	t	p
Male	287	71,8990	8,89843	-1,755	,074
Female	181	73,3315	8,10011		

Analysis of Table 3 reveals that gender does not have a statistically significant effect on changes in warm-up knowledge levels.

Table 4. Changes in Warm-Up Habits and Knowledge Level Depending on Being a Licensed Athlete

Licensed Athlete	n	x	Sd	t	p
Yes	270	71,9963	8,52266	-1,306	,190
No	195	73,0615	8,79587		

Table 4 shows that being a licensed athlete does not create a statistically significant difference in changes in warm-up knowledge levels.

Table 5. Changes in Warm-Up Habits and Knowledge Level Depending on sports branch factor

Sports branch	n	x	Sd	t	p
Team Sports	313	72,5751	8,52266	-,030	,976
Individual Sports	150	72,6000	8,27221		

Analysis of Table 5 indicates that participating in team sports versus individual sports does not result in a statistically significant difference in changes in warm-up knowledge levels (p>0.05).

Table 6. Changes in Warm-Up Habits and Knowledge Level Depending on the Type of Education Factor

Type of Education	n	x	Sd	t	p
1st education	307	72,4137	8,20180	-,578	,551
2nd education	153	72,9150	9,03134		

Table 6 shows that there is no statistically significant difference in changes in warm-up habits and knowledge levels based on the type of education (p>0.05).

Table 7. Changes in Warm-Up Habits and Knowledge Level Depending on Undergraduate Program Studied

Department	n	x	Sd	f	p	tukey
Physical education	44	73,3719	10,18463	2,898	,035*	A>C
Coaching education	120	73,1917	8,98392			
Sport management	183	72,1311	7,76327			
Recreation	121	69,2500	8,66615			A>D

Analysis of Table 7 reveals a statistically significant difference in changes in warm-up habits and knowledge levels based on the type of undergraduate program (p<0,05). Analysis of intergroup differences revealed that students in the Physical Education and Sports Teaching program exhibit higher average knowledge levels compared to those in the Coaching Education program. Furthermore, students in the Recreation program demonstrate lower average knowledge levels compared to their counterparts in the Physical Education and Sports Teaching program.

Table 8. Changes in Warm-Up Habits and Knowledge Level Depending on the Grade Level Factor

Grade Level	N	x	Sd	f	p
1. class	41	72,0732	8,98719	,494	,687
2. class	158	72,9114	8,73559		
3. class	113	71,6903	8,48116		
4. class	156	72,6410	8,54057		

Table 8 demonstrates that the academic year does not have a statistically significant effect on changes in warm-up knowledge levels (p>0.05).

Table 9. Changes in Warm-Up Habits and Knowledge Level Depending on Warm-up Exercises Practice Habit Factor

Warm-up Exercises	N	x	Sd	f	p	tukey
I never do it	6	68,8333	8,10967			
I do it occasionally	150	70,3000	9,48524	8,007	,000*	B<C
I do it all the time	312	73,5577	7,97806			

Analysis of Table 9 reveals a statistically significant difference in changes in warm-up habits and knowledge levels based on the habitual practice of warm-up exercises (p<0,05). Examination of intergroup differences reveals that students who engage in warm-up exercises regularly have higher average knowledge levels compared to those who practice warm-up exercises occasionally.

Table 10. Changes in Warm-Up Habits and Knowledge Level Depending on Cooling down Exercises Application Habit Factor

Cooling down Exercises	n	x	Sd	f	p	tukey
I never do it	30	71,0667	11,26463			
I do it occasionally	197	71,1168	8,40806	5,454	,005*	B<C
I do it all the time	241	73,7178	8,25450			

Table 10 reveals a statistically significant difference in changes in warm-up habits and knowledge levels associated with the habitual practice of cool-down exercises (p<0,05). Analysis of intergroup differences reveals that students who regularly perform cool-down exercises have higher average knowledge levels compared to those who engage in cool-down exercises occasionally.

CONCLUSION and DISCUSSION

The objective of this study was to examine the warm-up habits and knowledge levels of students from Faculty of Sports Sciences based on different variables. According to the research results, no statistically significant relationship was found between gender, being a licensed athlete, sports branch, type of education, and the total score of the research group's warm-up knowledge level. The students of the Faculty of Sports Sciences who are enrolled in the Physical Education and Sports Teaching and Coaching Education programs exhibited higher total scores for their warm-up habits before competitions and cool-down exercises after competitions, compared to students in other departments. This result is thought to be due to the fieldwork courses and specialized knowledge courses included in the current curriculum content of the Department of Physical Education and Sports Training and Coaching Education.

A review of existing literature on this topic reveals that athletes who regularly engage in sports and prepare for competitions generally have sufficient knowledge about the benefits, importance, and necessity of warm-up and cool-down exercises in sports. Conversely, some studies have indicated that athletes do not give enough importance to warm-up and cool-down exercises. In their study on amateur athletes, Aslan et al. (2011) found that the rate of warm-up before training or competition was 47.8%, while the habit of performing regular cool-

down exercises after activities was 17.3% (Arslan et al, 2011). While similarities were found between this study and the relevant literature with regard to changes in knowledge levels related to warm-up habits before competitions, differences were observed with respect to the values of cool-down exercise habits.

In the study conducted by Çobanoğlu (2021) on athletes, participants were asked about their habits regarding cool-down exercises. The responses indicated that 57.14% of amateur football players and 67.47% of professional football players consistently included cool-down exercises during training and matches. Çobanoğlu noted that compared to warm-up exercises, cool-down exercises, which are important components of training, were given less importance (Çobanoğlu, 2021). Similarities were found between our research and the relevant literature in terms of pre-competition warm-up and cool-down exercise habits and knowledge levels.

In the research conducted by Hekim (2015) on boxers, it was found that majority of them had the habit of performing warm-up and cool-down exercises before training and competitions. Hekim suggested that the high level of these habits among boxers could be beneficial for gaining maximum efficiency from training, exhibiting high performance in competitions, and preventing injuries after heavy exertions (Hekim, 2015).

A review of similar research findings on this topic indicates that, athletes who regularly engage in sports and prepare for competitions generally do not neglect warm-up exercises, but they tend to neglect cool-down exercises. In a study conducted by Ünver et al, (2018) examined on athletes involving 59 participants from university sports league winter sports, 140 from team sports, and 81 from football teams, found that warm-up has a positive effect on athletic performance, reduces the risk of injury, increases joint range of motion and muscle strength, and that there is a common belief that the duration of warm-up should be longer in cold weather and that adequate warm-up should still be done in hot weather. Consequently, it was determined that university student-athletes have a high level of knowledge about warm-up exercises due to their conscious approach to sports and the training they receive (Ünver et al., 2018). However, our research findings indicated that there is no significant difference in knowledge levels regarding warm-up exercises when comparing athletes engaged in team sports versus individual sports.

In the study on the warm-up habits and behaviors of amateur golfers, Fradkin et al. (2003) collected data through verbally administered surveys with 1,040 randomly selected golfers regarding their usual warm-up habits and the reasons behind these behaviors. According to the results of the study, more than 70% of the golfers reported that they never or rarely performing warm-up exercises with only 3.8% indicating that they always engaged in such exercises. Despite the widespread recommendation to warm up before playing or training to enhance physical performance and prevent injuries, the study found that only a small percentage of the participants practiced these recommendations (Fradkin et al., 2003).

In their study, Çelik and Hekim (2014) examined the knowledge and habits related to warm-up and cool-down exercises among 150 students enrolled in the Faculty of Physical Education and Sports Sciences. The researchers collected primary data through a face-to-face questionnaire consisting of 22 questions. According to the results,

students in the sports department generally had sufficient knowledge about warm-up and cool-down exercises and typically applied both warm-up and cool-down exercises during training and competitions. Additionally, they found that the general knowledge and habit levels regarding warm-up and cool-down exercises did not show significant differences based on gender or years of experience as an athlete (Çelik and Hekim, 2014). The data obtained from this study also support the findings of our research.

Kirişçi (2011) found that most athletes (89.2%) performed cool-down exercises, while a relatively small percentage (10.8%) did not. Additionally, nearly half of the athletes surveyed (45.6%) reported allocating sufficient time for general warm-up exercises (Kirişçi, 2011).

Erdoğan et al. (2024) conducted a study to determine the warm-up knowledge levels of judokas participating in a generational exam. The researchers found a significant difference ($p<0.05$) in warm-up knowledge levels based on athletic level, age, height, body weight, years of experience, and weekly physical activity, while no significant difference was observed based on gender or income. Judo is considered an individual sport. According to the research results, the average knowledge level of warm-up habits among judokas was determined to be at a good level, with a score of 73.80±10.52. In the present study, while there were differences between the results for individual sports, similarities were observed regarding the findings related to the gender variable (Erdoğan et al, 2024).

Ehlert and Wilson (2019) conducted a systematic review of warm-up practices before golf and, like our research findings, reported that golfers (an individual sport) generally did not warm up regularly or only engaged in brief warm-up sessions. They noted mixed and inconclusive results regarding the relationship between warm-up behaviors and injuries among golfers. Additionally, the review highlighted that various warm-up protocols (excluding static stretching) could enhance golf performance, but observational data suggested that many golfers did not regularly follow these protocols (Ehlert and Wilson, 2019).

Usta et al. (2022) investigated the warm-up habits of amateur football players playing on synthetic football field using an "Athlete Warm-Up Habit" survey form to collect data from participants. According to the results, 3.5% (n:4) of the participants were female, while 96.5% (n:110) were male. The average age of the participants was 25.15±7.46 years. It was found that 63.2% of the participants had obtained a university degree. Furthermore, 29.8% (n=34) of the participants had not experienced any sports-related injuries before. The proportion of those who regularly performed warm-up exercises before football was determined to be 36.8%. The study concluded that, according to the responses to the "Athlete Warm-Up Habit" form, participants had a lack of knowledge regarding warm-up exercises. They reported that the injury rate among individuals playing football on synthetic football field was high, while their knowledge and habit levels regarding warm-up exercises were low. In this study, no significant effect of gender or team sports participation on changes in warm-up knowledge levels was observed (Usta et al, 2019). In this regard, the results of our study align with those of the aforementioned research.

SUGGESTIONS

It is recommended to increase the knowledge and habitual practices of students in the Faculty of Sports Sciences regarding warm-up and cool-down exercises, and to especially support these behaviors among athletes.

ETHICAL TEXT

This article, the journal writing rules, publication principles, research and publication ethics, and journal ethical rules were followed. The responsibility belongs to the author (s) for any violations that may arise regarding the article.

"The article's ethics committee approval was obtained by the Aydın Adnan Menderes University/Social and Human Sciences Research Publication Ethics Committee with the decision numbered 31906847/050.04.04-10 dated 29.04.2024."

Author(s) Contribution Rate: The first author's contribution rate is 60%, second author's contribution rate is 40%.

REFERENCES

Akgün, N., (1994). *Egzersiz fizyolojisi* (2 Baskı.). Ege Üniversitesi Basımevi.

Alanazi, H.M. (2016) Role of warming-up in promoting athletes health and skills. *International Journal of Scientific and Research Publications,* 6(1), 156.

Altınışık, Ü. & Çelik, A. (2021). Investigation of service quality perceived by fitness center consumers. *Pakistan Journal of Medical & Health Sciences*, 10(15), 3225-3229.

Altınışık, Ü., Turhal, S., Çelik, A., & Yetim, A.A. (2020). Employability perceptions of sports manager candidates. *Ambient Science*, (3).

Arslan, C., Gökhan, İ. & Aysan, H.A. (2011). Amatör sporcularda ısınma alışkanlığı ve bilgi düzeylerinin değerlendirilmesi. *Journal of Clinical and Experimental Investigations*, 2(2), 181-186.

Bayındır, M. (2023) Egzersiz ve psikolojik iyi oluş. *Beden Eğitimi ve Spor Araştırmaları* I, 93.

Bozgüney, R., & Çimen, E. (2024). Spor bilimleri fakültesinde öğrenim gören öğrencilerin geleceğe yönelik tutum ve içsel motivasyonları arasındaki ilişkinin incelenmesi. *Socıal Scıences Studİes Journal*, 9(117), 9288-9294.

Çelik, D. & Hekim, M. (2014). Spor bölümlerinde öğrenim gören üniversite öğrencilerinin sportif aktivitelerde ısınma ve soğuma egzersizleri hakkındaki bilgi ve alışkanlık düzeylerinin incelenmesi. *I. Uluslararası Spor Bilimleri Turizm ve Rekreasyon Öğrenci Kongresi*, Akdeniz Üniversitesi, Antalya, 1-7.

Çimen, E., Bozgüney, R. & Çiçeksöğüt, R. (2023). *Spor bilimleri fakültesinde öğrenim gören öğrencilerin zihinsel antrenman becerisi ile bilinçli farkındalık düzeyleri arasındaki ilişkinin incelenmesi*. Çanakkale Onsekiz Mart Üniversitesi Spor Bilimleri Dergisi, 6(4), 42-52.

Çobanoğlu, H. (2021). *Amatör ve profesyonel futbolcularda ısınma alışkanlığı ve bilgi düzeyinin değerlendirilmesi*. Yüksek Lisans Tezi, Sakarya Uygulamalı Bilimler Üniversitesi.

Ehlert, A. & Wilson, P.B.A. (2019). Systematic review of golf warm-ups: Behaviors, injury, and performance. *The Journal of Strength & Conditioning Research*, 33(12), 3444-3462. Doi:10.1519/JSC.0000000000003329

Erdoğan, R., Selçuk, M. & Yıldırak, A. (2024). Kuşak sınavına katılan judocuların ısınma bilgi düzeylerinin incelenmesi. *Gaziantep Üniversitesi Spor Bilimleri Dergisi,* 9(1), 29-39. https://doi.org/10.31680/gaunjss.1433695

Fradkin, A.J., Finch, C.F. & Sherman, C.A. (2003). Warm-up attitudes and behaviours of amateur golfers. *Journal of Science and Medicine in Sport,* 6(2), 210-215. DOI: 10.1016/s1440-2440(03)80256-6

Güler, H. (2022). *Dijital oyun e-spor ve geleneksel sporların karşılaştırılması.* Niğde Üniversitesi Beden Eğitimi ve Spor Bilimleri Dergisi, 16 (3).

Hekim, M. (2015). Boks sporcularının sporda ısınma ve soğuma çalışmaları konusundaki bilgi ve alışkanlık düzeylerinin incelenmesi [Examining the knowledge and habit levels of boxers on warming up and cooling down in sports]. *Uluslararası Spor Bilimleri Dergisi*, 1(1), 52-63.

Karatosun, H. (1993). *Futbol-Fizyolojik Temeller*, (1. Baskı.). Kokla Matbaası.

Kirişçi. İ., (2011). *Takım sporu yapan bireylerde görülen sakatlık türleri ve bu sakatlıkların çeşitli değişkenlere göre incelenmesi (Bursa örneği).* Yüksek Lisans Tezi, Sakarya Üniversitesi.

Lloret, J., Gómez, S., Rocher, M., Carreño, A., San, J. & Inglés, E. (2021). The potential benefits of water sports for health and well-being in marine protected areas: A case study in the Mediterranean. *Annals of Leisure Research,* 1-27.

McGowan, C.J., Pyne, D.B., Thompson, K.G. & Rattray, B. (2015). Warm-up strategies for sport and exercise: mechanisms and applications. *Sports medicine*, 45, 1523-1546.

Sevim, Y. (1997). *Antrenman bilgisi: Sporda ısınma*, (Geliştirilmiş Baskı.). Tutibay Ltd. Sti.

Usta, M., Ercan, S., Parpucu, T.İ., Başkurt, Z., & Başkurt, F. (2022). Halı sahada amatör futbol oynayanların ısınma alışkanlıkları: Isparta ilinde kesitsel bir araştırma. *Herkes için Spor ve Rekreasyon Dergisi*, 4(2), 42-46. https://doi.org/10.56639/jsar.1200918

Ünver, Ş., İslamoğlu, İ., Arslan, H. & Atan, T. (2018). Üniversiteli sporcuların ısınma alışkanlığı ve ısınma bilgi düzeylerinin incelenmesi. *Uluslararası Hakemli Akademik Spor Sağlık ve Tıp Dergisi,* 28, 48-66.