EXAMINING THE WARM-UP KNOWLEDGE LEVELS AND SPORTIVE PERFORMANCE OF TENNIS PLAYERS

EXAMEN DE LOS NIVELES DE CONOCIMIENTOS DE CALENTAMIENTO Y RENDIMIENTO DEPORTIVO DE LOS TENISTAS

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ABSTRACT

This study was carried out to determine the knowledge levels and sportive performances of the athletes playing tennis in the Eastern Anatolia Region. The research group consists of 167 volunteer athletes in licensed national/international tournaments in the Eastern Anatolia Region, Malatya. “Personal Information Form” and “Athlete Warm-up Habit” scale form, which determines the warming habits of athletes, were used as data collection tools. The data were analyzed using the SPSS statistical package program. The significance level was accepted as $p<0.05$. Of the athletes in the study, 54.5% had muscle-joint injuries, 79% did warm-up exercises, 58.1% did warm-up exercises between 11-20 minutes, and 42.5% had continuous warm-up exercises. It was determined that they did cool-down exercises, and 41.9% of them did cool-down exercises between 11-20 minutes. 91% of the research group stated that warm-up exercises reduce the risk of athlete injury, and 85% stated that warm-up exercises positively affect the joint areas and improve the athlete's range of motion. It was determined that the mean score of the knowledge level of warming habits of the research group was at a reasonable level of 73.80±10.52.

Keywords: Tennis; Warm-up Habits; Knowledge Levels; Exercise; Cool-down Exercises.

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RESUMEN

Este estudio se llevó a cabo para determinar los niveles de conocimiento y el rendimiento deportivo de los atletas que juegan al tenis en la Región de Anatolia Oriental. El grupo de investigación consta de 167 atletas voluntarios en torneos nacionales/internacionales autorizados en la Región de Anatolia Oriental, Malatya. Se utilizaron como herramientas de recolección de datos el "Formulario de información personal" y el formulario de escala "Hábito de calentamiento del atleta", que determina los hábitos de calentamiento de los atletas. Los datos se analizaron utilizando el paquete estadístico SPSS. El nivel de significación fue aceptado como $p<0,05$. De los deportistas del estudio, el 54,5 % presentaba lesiones musculoarticulares, el 79 % realizaba ejercicios de calentamiento, el 58,1 % realizaba ejercicios de calentamiento entre 11-20 minutos y el 42,5 % realizaba ejercicios de calentamiento continuo. Se determinó que realizaban ejercicios de enfriamiento, y el 41,9% de ellos realizó ejercicios de enfriamiento entre 11-20 minutos. El 91 % del grupo de investigación afirmó que los ejercicios de calentamiento reducen el riesgo de lesión del atleta, y el 85 % afirmó que los ejercicios de calentamiento afectan positivamente las áreas articulares y mejoran el rango de movimiento del atleta. Se determinó que la puntuación media del nivel de conocimiento de hábitos de calentamiento del grupo de investigación se encontraba en un nivel razonable de 73,80±10,52.

Palabras clave: Tenis; Hábitos de Calentamiento; Niveles de Conocimiento; Ejercicio; Ejercicios de Enfriamiento.

INTRODUCTION

Sport is a biological, pedagogical social phenomenon that improves the physiological and psychological health of the individual, regulates social behaviors, and brings it to a certain mental and motoric level. In other words, sport is defined as a phenomenon that ensures the intellectual, spiritual and physical development of the individual and the coordination and socialization among these elements (Lloret et al., 2021).

Today, tennis sport; It is an olympic sport that is embraced by the world and that at the same time arouses excitement and admiration to do and watch. In this sport, it is known as a sport that includes aerobic and anaerobic loads and sudden changes of direction, as well as requiring a high level of basic motor features such as strength, speed, endurance, flexibility and coordination, and athletic performance (Przybylski et al., 2021).

Warm-up is generally referred to as the practice of preparing the athlete for performance and increasing the performance of the athlete (Silva et al., 2022). The warm-up, which is shaped according to the type of exercise to be performed and the energy system used, is used to increase muscle temperature and provide adaptation to exercise (Jordan et al., 2021). It is seen that warming up, which is defined as getting good efficiency from the athlete, protecting from injuries and preparing the athlete for the loads physiologically and psychologically, increases performance and is used to reduce the risk of muscle damage with neurological, biomechanical and psychological mechanisms (Reeves et al., 2021).

Warming up by Akgün (1994); It is a work that aims to prepare and adapt the athletes to certain tasks

envisaged in training and matches, both mentally and physically, in the most appropriate way", it is also stated that the better and correctly the warm-up is done, the risk of injury will decrease and the performance will increase in every aspect. expressed as a sign. In this context, it is thought that the level of warm-up knowledge and warm-up habits are important for the performance of athletes and athletes. In line with this information, the aim of the research is; In the Eastern Anatolia Region (Elazığ, Van, Bingöl, Malatya) tennis players' knowledge levels of warming habits and determination of their sportive performances were investigated.

METHODS

The research group consists of 167 (66 women, 101 men) volunteer athletes who took part in licensed national/international tournaments in the Eastern Anatolia Region (Elazig, Van, Bingol, Malatya) tennis branch. While the scale was preferred as the data collection tool in data collection, the scanning model was used to determine the "Warm-up Habits" of the athletes. The scale used in the study consists of two parts. In the first part of the scale, "Personal Information Form" containing the demographic information of the athletes, and in the second part, the "Athlete Warming Habit Information Form", which includes the knowledge levels of tennis players' warming habits and used by Arslan et al., (2011).

1. Warming Habit Information Form

Ranking and score limits of a five-point Likert-type questionnaire;

2. Rating

No idea: 1.00–1.79,
Strongly Disagree: 1.80–2.59,
Disagree: 2.60–3.39,
Partially Agree: 3.40–4.19,
Agree: 4.20–5.00

3. Point limits

0–29 Very inadequate,
30–49 Insufficient
50–69 Medium
70–89-Good
90–100 Very Good" was evaluated.

The validity and reliability studies of the scale were performed by the researchers, and the KMO (Kaiser-Meyer-Olkin Measure of Sampling Adequacy) value was 0.715, Bartlett Test 1968.711 and (Cronbach Alpha) $\alpha = 0.647$

4. Analysis of Data

The data were analyzed using the SPSS statistical program. Demographic information of the research group and knowledge levels of warming habits were summarized as descriptive statistics with percentage, frequency, arithmetic mean and standard deviation statistics. After it was determined that the data showed normal distribution, Paired Samples t and One-Way ANOVA tests were applied for in-group comparisons. The significance level was accepted as $p < 0.05$.

RESULTS AND DISCUSSION

Table 1. Characteristics of Tennis Players Regarding Demographic Information

		Frequency	Percent (%)
Gender	Female	66	39.5
	Male	101	60.5
Age	12-17 Ages	67	40.1
	18-23 Ages	53	31.7
	24 Years and Older	47	28.1
Educational Status	Secondary Education	80	47.9
	High School	30	18
	University	57	34.1
Sports Year	1-5 Years	49	29.3
	6-11 Years	62	37.1
	12 Years and above	56	33.5
Sporting Degree	Provincial Championship	66	39.5
	Regional Championship	81	48.5
	Turkey Championship	20	12
Injury Status	I've Never Been Injured	50	29.9
	Muscle-Joint Injuries	91	54.5
	Bone Injuries	26	15.6
The Habit of Warming Up	Sometimes	35	21
	Continually	132	79
The Habit of Cooling Down	None	46	27.5
	Sometimes	50	29.9
	Continually	71	42.5
Warm-up Time	1-10 Minutes	35	21
	11-20 Minutes	97	58.1
	21-30 Minutes	35	21
Cooldown Time	1-10 Minutes	69	41.3
	11-20 Minutes	70	41.9
	21-30 Minutes	28	16.8

When Table 1 is evaluated, the research group's gender, age, education level, year of sport, sportive degree and injury status are respectively; 60.5% male, 39.5% female, 40.1% 12-17 years old, 31.7% 18-23 years old, 28.1% 24 years old and over , 47.9% of them were secondary school graduates, 34.1% were university graduates, 18% were high school graduates, 37.1% were 6-11 years, 33.5% were 12 years and above, 29%, 3 of them had sports years between 1-5 years, 48.5% were regional, 39.5% provincial, 12% Turkey championship, 54.5% muscle-joint injuries, 15% It was determined that 0.6 of them had bone injuries and 29.9% had no disability. It was determined that 79% of the athletes did warm-up exercises, 21% occasionally, 42.5% did a continuous, 29.9% occasional cool-down exercise, and 27.5% did not do any cooling exercises. 58.1% of the participants did warm-up

exercises for 11-20 minutes, 21% between 1-10 minutes and 21-30 minutes, 41.9% 11-20 minutes, 41.3% 1-10 minutes and 16.8% did 21-30 minutes of cool-down exercise.

Table 2. Tennis Players' Warm-up Habit Information Form Percentage Frequency Values

	No idea	Never Agree	I do not agree	Partially Agree	I agree
Warming up is only possible with physical activities	15 (%9)	10 (%6)	42(%25)	75(%44.9)	25 (%15)
Warming up reduces the risk of injury for athletes	5(%3)	-	5 (%3)	5 (%3)	152(%91)
Warming up has no effect on athlete performance.	5(%3)	45 (%26.9)	97 (%58.1)	-	20 (%12)
Warming up plays an important role in better contraction and relaxation of the muscle.	-	5(%3)	5 (%3)	30 (%18)	127 (%76)
Warm-up increases the muscle strength of athletes	10 (%6)	5 (%3)	41 (%24.6)	56 (%33.5)	55 (%32.9)
In cold weather, it is necessary to extend the warm-up time	25 (%15)	-	10 (%6)	51 (%30.5)	81 (%48.5)
In hot weather, there is no need to warm up as body temperature is high.	-	41 (%24.6)	106 (%63.5)	5 (%3)	15 (%9)
The warm-up time is fixed and each workout should be done at the same time.	10 (%6)	26 (%15.6)	76 (%45.5)	35 (%21)	20 (%12)
Warming up should begin with a general warm-up and continue with a special warm-up.	25 (%15)	-	-	50 (%29,9)	92 (%55.1)
When general warm-up and special warm-up are done together, it is sufficient to do a special warm-up because it will tire the athlete.	20 (%12)	22 (%13.2)	65 (%38.9)	35 (%21)	25 (%15)
Warming up positively affects the athlete's neuromuscular system and reduces the athlete's reaction time.	-	-	31 (%18.6)	20 (%12)	116(%69.5)
The warm-up increases the athlete's angle of motion by creating positive effects in the joint areas.	10 (%6)	-	10 (%6)	5 (%3)	142 (%85)
Motivation, adaptation etc. It is considered as a part of warming up in some mental activities such as	25 (%15)	5 (%3)	5 (%3)	30 (%18)	102(%61.1)
Cream, gel, etc. to the muscles. Warming can be achieved by applying substances	20 (%12)	15 (%9)	15 (%9)	20 (%12)	97 (%58.1)
Exhausting and heavy warm-up movements are beneficial in training or competition.	15 (%9)	-	15 (%9)	71 (%42.5)	66 (%39.5)
Warm-up has no effect on the oxygen uptake capacity of athletes	71 (%42,5)	26 (%15,6)	25 (%15)	30 (%18)	15 (%9)
Warm-up is the phase of physiological, psychological and mental readiness for training.	25 (%15)	-	15 (%9)	20 (%12)	107(%64.1)
Warming up is a purely psychological phase and has no performance benefit.	20 (%12)	51 (%30,5)	66 (%39,5)	25 (%15)	5 (%3)

Athletes can also be warmed up by massaging them.	25 (%15)	25 (%15)	-	26 (%15.6)	91 (%54.5)
Warm-up time should be half the training time	5 (%3)	97 (%58.1)	30 (%18)	25 (%15)	10 (%6)

When Table 2 is evaluated, the research group; It was determined that 91% of them gave a positive opinion on the item "warm-up reduces the risk of injury in athletes". 85% of the participants stated that they agree with the item "Warming up increases the athlete's angle of motion by creating positive effects in the joint areas". It was determined that 76% of the athletes gave a positive opinion on the item "Warming has an important role in better contraction and relaxation of the muscle". It was determined that 69.5% of the research group stated that they agree with the item "Warm-up affects the neuromuscular system of the athlete positively and reduces the reaction time of the athlete". 42.5% of the participants stated that they do not have an opinion on the item "Warming up does not have an effect on the oxygen intake capacity of the athletes". It was determined that 63.5% of the athletes disagreed and 24.6% strongly disagreed with the item "There is no need to warm up because the body temperature is high in hot weather". In addition, 58.1% of the research group stated that "Warm-up time should be half the duration of the training" item, and 18% disagreed.

Table 3. Item Averages of Tennis Players' Warm-Up Habits Form

	X	ss
Warming up is only possible with physical activities	3.50	1.10
Warming up reduces the risk of injury for athletes	4.79	vv
Warming up has no effect on athlete performance.	2.91	0.93
Warming up plays an important role in better contraction and relaxation of the muscle.	4.67	0.68
Warm-up increases the muscle strength of athletes	3.84	1.10
In cold weather, it is necessary to extend the warm-up time	3.97	1.37
In hot weather, there is no need to warm up as body temperature is high.	2.96	0.79
The warm-up time is fixed and each workout should be done at the same time.	3.17	1.02
Warming up should begin with a general warm-up and continue with a special warm-up.	4.10	1.37
When general warm-up and special warm-up are done together, it is sufficient to do a special warm-up because it will tire the athlete.	3.13	1.18
Warming up positively affects the athlete's neuromuscular system and reduces the athlete's reaction time.	4.50	0.79
The warm-up increases the athlete's angle of motion by creating positive effects in the joint areas.	4.61	1.04
Motivation, adaptation etc. It is considered as a part of warming up in some mental activities such as	4.07	1.45
Cream, gel, etc. to the muscles. Warming can be achieved by applying substances	3.95	1.45
Exhausting and heavy warm-up movements are beneficial in training or competition.	4.03	1.14
Warm-up has no effect on the oxygen uptake capacity of athletes	2.35	1.41
Warm-up is the phase of physiological, psychological and mental readiness for training.	4.10	1.44
Warming up is a purely psychological phase and has no performance benefit.	2.66	0.97
Athletes can also be warmed up by massaging them.	3.79	1.56
Warm-up time should be half the training time	2.62	0.97
Warming habit knowledge level total score average	73.80	10.52

When Table 3 is evaluated, the research group; The statement “Warming reduces the risk of injury in athletes” has an average of 4.79±0.76 items, and the statement “Warming has an important role in better contraction and relaxation of the muscle” has an average of 4.67±0.68 items, “Warming is positive in joint areas”. They reported that they have an average of 4.61±1.01 items and that the athletes largely agree with the statement “it increases the angle of movement of the athlete by creating effects”. They stated that the research group did not agree with the statement "Warming up does not have an effect on the oxygen intake capacity of the athletes" with an average of 2.35±1.41 points. In addition, it was determined that the total mean score of the participants from the knowledge level of warming habits was 73.80±10.52.

Table 4. t-Test Analysis of Tennis Players' Warm-Up Knowledge Levels According to Demographic Information

		Warm-up Habits		t	p
		$\overline{X}$	Ss		
Gender	Female	71.92	10.49	-1.879	0.76
	Male	75.02	10.40		
The Habit of Warming Up	None	65.42	9.75	-5.792	0.20
	Sometimes	76.02	9.58		

When Table 4 is examined, it has been determined that there is no statistically significant difference between the research group's gender and the habit of doing warm-up exercises and the total score averages of knowledge levels of warming habits (p>0.05).

Table 5. Variance Analysis of Reasons for Preferring Tennis Branch According to Demographic Information.

		Warm-up Habits		F	Sig
		$\overline{X}$	Ss		
Age	12-17 Yaş	72.68	11.06	3.245	**0.04**
	18-23 Yaş	72.32	11.23		
	24 Yaş ve Üzeri	77.06	8.11		
Education	Ortaöğretim	68.37	12.38	26.913	**0.00**
	Lise	79.12	2.96		
	Üniversite	11.23	5.11		
Sports Year	1-5 Yıl	66.20	12.07	24.090	**0.00**
	6-11 Yıl	78.09	3.87		
	11 Yıl ve Üzeri	75.69	10.69		

Sporting Degree	İl Şampiyonluğu	71.62	9.20	4.054	**0.01**
	Bölge Şampiyonluğu	76.14	11.38		
	Türkiye Şampiyonluğu	71.50	9.30		
Injury Status	Hiç Sakatlanmadım	71.90	10.98	2.051	0.13
	Kas-Eklem Yaralanmaları	75.29	9.53		
	Kemik Yaralanmaları	72.23	12.36		
The Habit of Cooling Down	Hiç	65.82	10.96	23.182	**0.00**
	Ara Sıra	77.20	6.62		
	Sürekli	76.57	9.83		
Warm-up Exercise Time	1-10 Dakika	63.42	11.08	48.537	**0.00**
	11-20 Dakika	74.17	8.08		
	21-30 Dakika	83.14	5.64		
Cool Down Exercise Time	1-10 Dakika	69.95	11.71	18.305	**0.00**
	11-20 Dakika	73.94	8.38		
	21-30 Dakika	82.92	5.59		

$p<0.05$

When Table 5 is examined, the athletes in the research group; While it was determined that there was a statistically significant difference according to age, education status, year of sport, sportive degree, habit of doing cool-down exercise, duration of warm-up exercise and cool-down exercise ($p<0.05$), there was no statistically significant difference according to injury status. ($p>0.05$).

DISCUSSION

Araştırmada Doğu Anadolu Bölgesinde (Elazığ, Van, Bingöl, Malatya) tenis branşında lisanslı ulusal/uluslararası turnuvalarda yer almış 167 (66 kadın 101 erkek) gönüllü sporcunun ısınma bilgi düzeylerini ve sportif performanslarını belirlenmesi amacıyla yapılmıştır.

In line with the findings obtained from the research, if it is necessary to evaluate the tennis players' warming habit information form percentage frequency values according to the study group; While 91% of them gave a positive opinion on the item "warm-up reduces the risk of injury for athletes", it was the most preferred item; It can be said that the athletes are very sensitive on this issue and this item explains the reason why they give the most importance to the subject of warming up. On the positive side, if it is necessary to rank the items that they pay more attention to, according to their percentage values; 85% for the article "Warm-up increases the athlete's angle of motion by creating positive effects in the joint areas"; It was determined that 76% of them gave a positive opinion on the item "Warming has an important role in better contraction and relaxation of the muscle". It can be interpreted that the items in which the athletes gave positive opinions were actually informed about these issues. In addition to these; The fact that 42.5% of them gave an opinion on the item "Warming up does not have an effect on the oxygen intake capacity of the athletes" can be expressed as an indication that the athletes are not aware of this issue. Özbar et al. (2017) conducted a study on the

evaluation of warming habits and knowledge level of female football players at the 1st and 2nd league level. 94.3% of the 1st League athletes participating in the research think that the risk of injury after warming up is less, and 82.8% think that sweating is a symptom of warming up. The results obtained from the research show parallelism with the findings of our study.

Aslan et al., (2011) in their study on the evaluation of warm-up habits and knowledge levels in amateur athletes, concluded that warming up has a positive effect on athlete performance and reduces the risk of injury among amateur athletes, another finding that supports the research.

In line with the findings obtained from the research, as a result of the evaluation of the item averages of the tennis players' warming habit form; The statement “Warming reduces the risk of injury in athletes” has an average of 4.79±0.76 items, and the statement “Warming has an important role in better contraction and relaxation of the muscle” has an average of 4.67±0.68 items; it was determined that the total mean score of the participants from the knowledge level of warming habits was 73.80±10.52. It can be interpreted that the average score determined as a result of the research is that the participants' knowledge of warming is good and that they participate by understanding the items and identifying them with themselves. Letafatkar et al. (2021) conducted a study on a comprehensive warm-up program to prevent injuries in young female football players. The research examined the effect of warming up in terms of static and dynamic movements in a total of 1892 female football players, whose average age was between 13-17, 1055 in the experimental group and 837 in the control group. As a result of the research, it was determined that in addition to the level of knowledge about the warming habit in the experimental and control groups, applying this habit is a necessary behavior for an athlete.

In line with the findings obtained from the research, it was determined that there was no statistically significant difference between the demographic information of tennis players, gender, warming knowledge levels and total score averages of the habit of doing warm-up exercise ($p>0.05$). Studies supporting the study are also included in the literature. In the study conducted by Sánchez-Díaz et al. (2021), on the examination of warming habits and warming knowledge levels of university athletes, a comparison was made according to gender. In the research, “Warm-up increases the athlete's range of motion by creating positive effects in the joint areas”; It was stated that women did not agree with the statement "Warm-up time should be half of the training time" with an average of 3.42 points, while men "disagree" with an average of 3.12 points. In other articles; It was determined that the knowledge of warming habits did not differ between genders. Choi et al. (2018) in the study on the examination of the knowledge and habit levels of university students studying in sports departments about warming up and cooling down exercises in sports activities; While it is concluded that the general knowledge and habit levels of the participants about warming up and cooling down in sports do not differ significantly according to their gender and sports age, it supports the results of the research.

In line with the findings obtained from the research, as a result of the analysis made in order to determine the reasons for the athletes to prefer the tennis branch according to the demographic information; of the athletes in the research group; While it was determined that there was a statistically significant difference according to age, education status, year of sport, sportive degree, habit of doing cool-down exercise, duration of warm-up exercise and cool-down exercise ($p<0.05$), there was no statistically significant difference according to injury status. ($p>0.05$). In this context, it can be said that warming up and cooling down exercises in sports are very important in both sports performance

and reducing the risk of injury, while the increase in age and experience of sports years contributes to the improvement of the athlete's degree positively. There are studies in the literature that support the research results.Kirişçi (2011) found in his study that the majority of the athletes (89.2%) were doing cool-down exercises, while only a few (10.8%) did, and nearly half of the athletes (45.6%) spent enough time on general warm-up for exercise. . In his study with boxers, Hekim (2015) evaluated the findings regarding warm-up and cool-down exercises, and as a result, he determined that warming up and cooling down is important in sports. Woods et al., (2007) stated that 40.7% of the athletes participating in the study had never been injured, and more than 30% of the injuries were skeletal muscle injuries. From this point of view, the fact that insufficient warm-up and over-training cause injuries emphasizes the importance of warm-up knowledge level. Contrary to our research findings, there are studies that found a significant relationship between warm-up exercises and injury frequency (Fernandes et al., 2015; Grooms et al., 2013; Turki et al., 2019).

As a result; Tokgöz et al. (2015) in the study; It was stated that the university sports department students who are interested in team and individual sports have a high level of knowledge about the importance of warming up and cooling down in sports, whereas the level of cooling off exercises after training and competition is low.

CONCLUSION

Considering that warming up is an important element for sports activities, it is thought to be effective on all sports activities and performance. In the light of this information; In the research conducted to determine the warming knowledge levels and sportive performance of tennis players, it was determined that the total average score of the participants from the knowledge level of warming habits was at a good level (73.80±10.52). It is thought that the sports performance of the athletes with a good warm-up knowledge level will also increase positively.

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