

Examining the warm-up knowledge levels of amateur football players

Serkan Kızılcıca^{ABCDE}

School of Physical Education and Sports, Department of Physical Education and Sports, Bitlis Eren University, Turkey

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Abstract

Background and Study Aim Warm-up exercises are critical for performance and injury prevention. This study aimed to determine the warm-up knowledge levels of amateur football players.

Material and Methods The research group in this study consists of 209 male university students from Bitlis province who play football. The "Personal Information Form" and the "Athlete Warm-Up Habit Information Form," which determine the warm-up habits of the athletes, were used as data collection tools. The SPSS statistical program was used for data analysis. The Independent Samples T-test was used to compare two independent groups, and the One-Way ANOVA test was used for three or more groups. The Bonferroni Post Hoc test was used for multiple comparisons within groups.

Results A significant difference was found between the warm-up habit knowledge scale scores of amateur football players in terms of sports history and family income level variables ($p < 0.05$), while no significant difference was found in the variables of weekly training frequency and receiving nutrition education ($p > 0.05$). It was determined that the warm-up habit knowledge level scores of football players with a sports history of 11 years and above were higher than those of football players with 1–5 years and 6–10 years. It was also determined that the warm-up habit knowledge level scores of football players with high family income levels were higher than those of football players with low- and medium-income levels. Additionally, it was determined that the warm-up habit knowledge level scores of football players with a medium family income level were higher than those of football players with a low-income level.

Conclusions Amateur football players have a good level of warm-up knowledge, and the duration of participation in sports and a high family income level increase their warm-up knowledge.

Keywords: warm-up, warm-up information, sports, amateur athletes, football

Introduction

Football is one of the most popular sports globally and requires high levels of athletic performance when played at a competitive level. Among the various factors influencing success in football, endurance, strength, flexibility, and speed are particularly critical for a player's performance [1]. The pace and complexity of modern football continue to escalate, requiring athletes to consistently enhance their physical and physiological capabilities to meet the demands of the game [2]. Football is characterized as a highly physically demanding sport, involving activities such as acceleration, deceleration, changes in direction, shoulder-to-shoulder challenges, and ball striking [3].

Warm-up is defined as the combination of physical and mental activities most suitable for the forthcoming task, aimed at enabling the athlete to achieve optimal performance before training and competitions [4]. Warm-up exercises constitute a critical component of the preparatory phase before engaging in sports activities. Although warm-up

routines have evolved due to advancements in technology and scientific research, the consensus regarding their importance and necessity has remained unchanged [5]. Warm-up exercises are designed to prepare athletes for and help them adapt to the physical demands they will encounter during competitions and training across all sports disciplines [6].

When examining the benefits of warm-up, two key aspects emerge: the enhancement of athletic performance and the reduction of injury risk [7]. In contemporary sports practice, warm-up protocols are typically the first activities implemented, whether during pre-season training or in the competition period [8]. These exercises are conducted to prepare athletes for the physical loads encountered in training and competitions, to safeguard them against potential injuries, and to optimize their athletic performance [9].

In essence, warming up serves to prepare athletes for peak performance. Beyond merely enhancing physical capacity, warm-up exercises performed during pre-season preparation and before competitions also play a pivotal role in injury prevention. A warm-up session lasting up

to 15 minutes can improve oxygen utilization, reduce muscle stiffness, enhance muscle flexibility, increase blood flow to tissues, and psychologically prepare the athlete for the physical exertion ahead [10]. Furthermore, warming up has been shown to improve performance while reducing the risk of muscle damage from both neurological and psychological perspectives [11].

Warm-up exercises represent one of the most critical components of training and sports competitions. These exercises are frequently employed not only to enhance athletic performance but also to prevent injuries [12]. According to Güler [13], who defines warm-up as a means of reducing injuries across all sports disciplines and preparing the muscles according to the specific demands of each sport, it can be concluded that a thorough and high-quality warm-up is essential for athletes. This is particularly significant given the role of warm-up in minimizing injury risks and its positive impact on performance.

From this perspective, it is evident that the warm-up knowledge levels of athletes participating in physically demanding sports, such as football, which is characterized by intense physical contact and challenging field conditions, are of great importance. Correct and adequate warm-up routines are expected to contribute to improved athletic performance while simultaneously reducing the risk of injury.

The purpose of this study is to examine the warm-up habits, knowledge levels, and perspectives of football players regarding warm-up practices.

Material and Methods

Participants

The research group consists of 209 male university students studying in different departments at Bitlis Eren University (Turkey) who have a background in football, do not engage in any other sports disciplines, and participate in regular football training. Prior to the study, detailed information regarding the research was provided to the athletes and their parents. A voluntary consent form was obtained from all participants. Before completing the questionnaires, all participants were informed about the content of the questionnaire and the procedure for filling it out. Participants who did not submit the voluntary consent form were not included in the study. Additionally, athletes who provided incomplete answers to the questionnaire or did not attend the briefing on how to complete it were excluded from the study. The ethics committee approval for the study was granted by the decision of the Bitlis Eren University Ethical Principles and Ethics Committee (Decision No. 2023/09-21, E.4356).

Study Design

Data Collection. In this research, a cross-

sectional survey design was employed following the recommendations of Karasar [14]. A two-part scale was used to obtain the data. In the first part, the "Personal Information Form" was prepared by the researchers, and in the second part, the "Athlete Warm-Up Habit Information Form," a 20-question scale developed by Arslan et al. [7], was used to assess athletes' knowledge levels regarding their warm-up habits.

Data Collection Tools

Personal Information Form. This form contains descriptive questions regarding students' gender, age, height, body weight, income status, and warm-up knowledge levels. **Athlete Warm-Up Habit Information Form.** Grading and score limits of the five-point Likert-type survey form:

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.

Score limits:

- 0–29: Very inadequate.
- 30–49: Insufficient.
- 50–69: Moderate.
- 70–89: Good.
- 90–100: Very good.

Statistical Analysis

The SPSS statistical software program was used for data analysis. Descriptive statistics, including percentage, frequency, arithmetic mean, and standard deviation, were used to summarize the demographic information and warm-up knowledge levels of the research group. To assess the normality of the data distribution, skewness and kurtosis values were examined. Data were considered to follow a normal distribution when skewness and kurtosis values fell within the range of -2 to +2, which is deemed acceptable for normality [15]. It was observed that the skewness and kurtosis values for the responses to the warm-up knowledge scale were within this acceptable range. Parametric tests were employed to analyze the normally distributed data. An Independent Samples T-test was conducted to compare the means between two independent groups and evaluate the significance of differences. For comparisons involving three or more groups, a One-Way ANOVA test was applied to determine the significance of mean differences. When significant differences were identified, the Bonferroni Post Hoc test was used for multiple comparisons within groups. The level of statistical significance was set at $p < 0.05$.

Results

Information on the demographic characteristics of amateur football players participating in the

study is presented in Table 1.

Table 1. Demographic characteristics of amateur football players (n = 209)

Demographic Characteristics	Value
Age (years)	22.40 ± 4.30
Height (cm)	175.63 ± 7.48
Body Weight (kg)	70.77 ± 9.51
BMI (kg/m ²)	22.89 ± 2.34

The mean, standard deviation, skewness, and kurtosis values obtained from the warm-up habit information scale of the amateur football players participating in the study are presented in Table 2. According to Table 2, the data showed a normal distribution, as the skewness and kurtosis values of the warm-up knowledge scale were within the acceptable range of -2 to +2.

Table 2. Descriptive Statistics of the Athlete Warm-Up Habit Information Scale (n = 209)

Scale	Value
Warm-up Knowledge Level	81.70 ± 7.33
Skewness	-0.961
Kurtosis	1.942

According to the findings in Table 3, a significant difference was found in the warm-up habit knowledge scale scores of amateur football players with respect to sports history and family income level variables ($p < 0.05$), while no significant difference was observed for the weekly training frequency variable ($p > 0.05$). Based on the eta squared value, the effect size was medium for athletic background and high for family income level.

Table 4 presents the results of the Bonferroni post hoc test for athletic background. Table 5 presents the results of the Bonferroni post hoc test for family income level.

It was determined that the warm-up habit knowledge level scores of football players with a sports background of 11 years or more were higher than those of players with 1–5 years and 6–10 years of experience (Table 4). According to Cohen's d value, there was a highly significant difference between players with an athletic background of 11 years or more and those with 1–5 years. Additionally, Cohen's d value indicated a moderately significant difference between players with an athletic background of 11 years or more and those with 6–10 years.

It was determined that the warm-up habit knowledge level scores of football players with high family income levels were higher than those of

Table 3. Warm-up Habit Information Scale Anova test results of amateur football players according to demographic variables

Variables		N	Mean ± SD	F	p	η ²
Sports History (Athletic Background)	1-5 Years	71	78.82 ± 8.51	12.225	.000	.106
	6-10 Years	60	81.52 ± 7.06			
	11 Years and Above	78	84.46 ± 5.09			
Weekly Training Frequency	Minimum 2 Days	35	81.40 ± 7.93	.046	.987	.001
	3 days	56	81.79 ± 6.94			
	4 Days	53	81.55 ± 7.95			
	5 Days and above	65	81.91 ± 6.96			
Family Income Level	Low	44	76.25 ± 8.96	26.851	.000	.207
	Moderate	126	82.04 ± 6.09			
	High	39	86.74 ± 4.52			

Table 4. Results of Bonferroni post hoc test for athletic background

Athletic Background		Mean Difference	Cohen's d	p	95% Confidence Interval	
					Lower Bound	Upper Bound
1-5 Years	6-10 Years	-2.70	.35	.085	-5.65	0.25
	11 Years and Above	-5.64*	.80	.000	-8.40	-2.89
6-10 Years	1-5 Years	2.70	.35	.085	-0.25	5.65
	11 Years and Above	-2.94*	.48	.044	-5.83	-0.06
11 Years and Above	1-5 Years	5.64*	.80	.000	2.89	8.40
	6-10 Years	2.94*	.48	.044	0.06	5.83

* The mean difference is significant at the 0.05 level.

Table 5. Results of Bonferroni post hoc test for family income level

Family Income Level		Mean Difference	Cohen's d	p	95% Confidence Interval	
					Lower Bound	Upper Bound
Low	Moderate	-5.79*	.76	.000	-8.56	-3.02
	High	-10.49*	1.48	.000	-13.98	-7.01
Moderate	Low	5.79*	.76	.000	3.02	8.56
	High	-4.70*	.88	.000	-7.61	-1.80
High	Low	10.49*	1.48	.000	7.01	13.98
	Moderate	4.70*	.88	.000	1.80	7.61

* The mean difference is significant at the 0.05 level.

Table 6. Amateur Warm-up Habit Knowledge Scale independent samples t test results of football players according to their nutrition education status

Variables		N	Mean $\pm$ SD	t	p	Cohen's d
Nutrition Education Status	Yes	56	82.36 $\pm$ 7.61	.785	.434	.12
	No	153	81.46 $\pm$ 7.24			

players with low- and medium-income levels (Table 5). Additionally, the warm-up habit knowledge level scores of football players with a medium family income level were higher than those of players with a low-income level. According to Cohen's *d* value, there was a highly significant difference between players with high family income levels and those with low- and medium-income levels. Furthermore, Cohen's *d* value indicated a moderately significant difference between players with medium and low family income levels.

An examination of Table 6 revealed no statistically significant difference in the warm-up habit knowledge levels of amateur football players based on their nutritional training status ($p > 0.05$).

Discussion

Football is a sport characterized by intense physical contact and played under challenging field conditions. It is often played in cold weather, which can further impact performance and injury risk. This study focuses specifically on athletes in Bitlis province, a region known for its cold climate, to assess how these environmental factors influence their warm-up routines and understanding. The purpose of this study was to examine the warm-up habits, knowledge levels, and perspectives of football players regarding warm-up practices. According to the results, the participants achieved a warm-up knowledge score of 81.7%, indicating a good level of knowledge. A significant difference was observed in warm-up knowledge levels based on sports history and family income level. The findings revealed that as the number of years football players have been involved in sports increases, their warm-up knowledge levels also improve. Additionally, it

was determined that higher family income levels are associated with increased warm-up knowledge among the athletes.

A review of the literature reveals several studies supporting our findings. Arslanoğlu et al. [16] conducted a study on 94 amateur football players and found that 84.8% of them had knowledge about warming up, which is consistent with our results. Similarly, Çobanoğlu [17] examined the warm-up habits of amateur and professional football players and concluded that both groups had high levels of warm-up knowledge. Ünver et al. [18], in their study on university athletes, found that warm-up knowledge levels were high across all disciplines. Çelik and Hekim [19] investigated the warm-up knowledge levels of university athletes and reported that a sample of 150 participants demonstrated a high level of warm-up knowledge. Likewise, Tokgöz et al. [20] examined the warm-up knowledge levels of university students studying sports sciences and licensed athletes, concluding that they possessed a good level of warm-up knowledge and prioritized warming up before training and competitions. Hekim et al. [21] conducted a study with three groups of athletes: professional, national, and amateur. They determined that 90.9% of participants across all groups had high levels of warm-up knowledge and consistently warmed up before competitions and training. Additionally, Hekim [22], in a study with boxers, investigated both warm-up and cool-down knowledge levels and found that athletes had a good understanding of warm-up practices. Overall, these findings align with our results and further emphasize the importance of warm-up knowledge among athletes.

A study by Arslan et al. [7] does not fully

support our findings. They examined the warm-up knowledge levels of 360 athletes from various sports and concluded that warm-up reduces the risk of injury and enhances performance. However, their study also found that athletes' warm-up knowledge levels were inadequate. The discrepancy between their results and ours may be attributed to differences in the sample groups. While our study focused exclusively on football players, their study included a much larger and more diverse group of athletes from different sports. Additionally, an important detail highlighted in their study is that, despite the widespread recognition of warm-up benefits and its role in injury prevention, inadequate warm-up practices remain prevalent among athletes. However, one of their findings aligns with ours. Their study identified a statistically significant relationship between sports history and warm-up knowledge level, concluding that warm-up knowledge improves as sports experience increases. This result is consistent with our findings.

Several studies in the literature indicate that warming up significantly reduces the risk of injury [23, 24, 25, 26]. Usta et al. [27] examined the warm-up knowledge levels of amateur football players who play on astroturf and found that their warm-up knowledge levels were low, while injury rates were high. Although their findings differ from ours, this discrepancy may be attributed to the fact that astroturf football players often lack a coach or trainer to provide guidance and do not follow a structured training regimen.

Winwood et al. [28] examined the pre-competition warm-up knowledge levels of weightlifting athletes and found that 90% of them performed their own pre-competition warm-ups, did not require assistance from a coach or others, and possessed good warm-up knowledge. Ozbar et al. [29] investigated the warm-up knowledge levels of female football players in the 1st and 2nd leagues and found that 92.9% consistently warmed up before training sessions and matches. Erdoğan et al. [30] examined the warm-up knowledge levels of judokas and found that their knowledge increased with the length of their sports history. These findings support the conclusion of our study that warm-up knowledge improves as sports experience increases.

Som et al. [31] analyzed the injury status of amateur football players and found that 79.3% of them believed that specific warm-up methods were effective in preventing injuries. Studies on warm-up suggest that as athletes' knowledge of warm-up increases or as they perform proper warm-up routines, the risk of injury decreases while performance improves [32, 33]. In their study on the warm-up routines and injury prevention practices of high school basketball players and their coaches, Munoz et al. [34] concluded that warm-up exercises are an effective method for preventing injuries.

They also found that both coaches and athletes consistently performed warm-ups before training sessions and competitions and demonstrated considerable awareness of their importance.

The findings of this study reveal the impact of family income level and sports background on athletes' knowledge of pre-training warm-up routines. The literature indicates that socioeconomic status directly affects individuals' access to sports and their level of education [35]. Families with higher income levels can encourage their children to engage in sports from an early age and provide access to higher-quality coaches or training programs [36]. This factor may contribute to individuals acquiring more knowledge about training processes.

The effect of sports background on warm-up knowledge is also consistent with previous research. Studies suggest that individuals with long-term sports experience develop more advanced motor learning processes and greater awareness of training and warm-up practices [37]. In particular, experienced athletes have been shown to place greater importance on warm-up routines to enhance training efficiency and minimize the risk of injury [38]. It appears that warm-up practices are primarily based on trial-and-error methods and the personal experiences of coaches and athletes rather than on exercise science principles [39].

However, variables such as athletes' education level, coaches' guidance on warm-up practices, and the information sources available to athletes were not controlled in this study. Yet, the literature indicates that coaches and educational materials can significantly influence athletes' warm-up habits [40].

Overall, the findings of this study align with previous research and confirm the impact of socioeconomic factors and sports experience on training habits. However, investigating additional factors that may influence warm-up knowledge could provide more comprehensive insights.

This study had certain limitations. Variables such as athletes' education level, coaches' guidance on warm-up practices, and access to informational resources were not controlled. Given that the literature highlights the significant role of coaches and educational materials in shaping athletes' warm-up habits, future research should take these factors into account. Therefore, it is recommended that future studies consider not only family income level and sports background but also coach education and athletes' access to reliable information sources.

Conclusions

An analysis of the study results indicates that the warm-up knowledge level of football players is at a satisfactory level of 81.7% and that this knowledge increases proportionally with the duration of their

involvement in sports. Given that properly warmed-up muscles enhance athletic performance and well-structured warm-up routines significantly reduce the risk of injury, it is essential to improve the warm-up knowledge of both athletes and coaches through evidence-based approaches. Furthermore, educating athletes and coaches on this subject is crucial for optimizing performance and minimizing injury risks.

Recommendations for Coaches and Football Players Regarding Warm-Up Training

To improve warm-up practices among football players and coaches, the following measures are recommended:

- Educational seminars can be organized through agreements between football clubs and universities, allowing expert academics

to provide warm-up training to coaches and athletes.

- The Football Federation can organize seminars that include warm-up training specifically designed for amateur sports.
- It can be made mandatory for coaches to attend regularly held educational seminars. This will ensure that coaches maintain an up-to-date and scientifically accurate level of knowledge regarding warm-up practices.
- Sports health and warm-up training can be included in school curricula to ensure that young athletes are more informed.

Conflict of interest

The author declare that there is no conflict of interests.

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Information about the author:

Serkan Kızılca; <https://orcid.org/0000-0002-0030-7999>; serkankizilca@hotmail.com; School of Physical Education and Sports, Department of Physical Education and Sports, Bitlis Eren University; Bitlis, Turkey.

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