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Gender disparities in long passing performance among senior football players: implications for inclusive training strategies

Disparidades de género en el desempeño de pases largos entre jugadores de fútbol de alto nivel: implicaciones para estrategias de entrenamiento inclusivo

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Abstract. Background: Football, as the most popular sport globally, encompasses fundamental skills like the lofted pass, a cornerstone technique mastered early in player development. Purpose study: This study aimed to analyze long passing performance disparities between senior male and female football players. Method and material: A total of 74 football players, comprising 35 boys and 39 girls (ages 15-18 years), were randomly selected as subjects. Personal information including academic details, age, Body height (cm), Body weight (kg), BMI (kg/m²), training age, and level played, alongside football performance metrics such as: Ball speed (km), Kicked ball distance (m) and Approach run distance (m), were recorded. Data collection involved the use of a Bushnell Radar gun for speed tests and long pass (Model 101911, USA), a digital weighing scale for body weight (BEURER Typ 35, Germany), Stadiometer for body height measurement (SECA 206, Germany) and a measuring tape for distance measurements. Statistical analysis: The data analysis employed descriptive statistics, Mean, SD, and the Mann-Whitney U Test for independent samples ($p<0.05$). Results: Indicate significant discrepancies in performance metrics between senior boys and girls. Boys exhibited greater ball speed (Mean=79.00±9.36km) vs. to girls (Mean=51.62±7.92km), with a significant inferential statistic of $p<0.00$. Similarly, kicked ball distance favored boys (Mean=46.53±51.11m) vs. over girls (Mean=17.47±9.73m), again with a significant inferential statistic of $p<0.00$. Notably, gender differences were less pronounced in approach run distance. Surprisingly, age, training age, and BMI showed no significant correlations with performance metrics, suggesting other influential factors. Conclusions: These results highlight the notable differences in football performance between genders, highlighting the greater speed and strength of boys in kicks and ball distance covering. Improving overall performance and inclusivity in the sport may depend on addressing these gaps.
Keywords: Football, Long Pass, Gender Differences, Performance Metrics, Kinematics.

Resumen. Antecedentes: El fútbol, como el deporte más popular a nivel mundial, abarca habilidades fundamentales como el pase elevado, una técnica fundamental que se domina temprano en el desarrollo del jugador. Objetivo del estudio: Este estudio tuvo como objetivo analizar las disparidades en el rendimiento de pases largos entre jugadores de fútbol senior masculinos y femeninos. Método y material: Se seleccionó aleatoriamente como sujetos a un total de 74 jugadores de fútbol, incluidos 35 niños y 39 niñas (de 15 a 18 años). Se registró información personal que incluía detalles académicos, edad, altura corporal (cm), peso corporal (kg), IMC (kg/m²), edad de entrenamiento y nivel jugado, junto con métricas de rendimiento futbolístico como: velocidad del balón (km), distancia del balón pateado (m) y distancia de carrera de aproximación (m). La recolección de datos implicó el uso de una pistola de radar Bushnell para pruebas de velocidad y pase largo (Modelo 101911, EE. UU.), una báscula digital para el peso corporal (BEURER Typ 35, Alemania), un estadiómetro para la medición de la altura corporal (SECA 206, Alemania) y una cinta métrica para mediciones de distancia. Análisis estadístico: El análisis de datos empleó estadísticas descriptivas, Media, DE y la Prueba U de Mann-Whitney para muestras independientes ($p < 0,05$). Resultados: Indican discrepancias significativas en las métricas de rendimiento entre niños y niñas mayores. Los niños exhibieron mayor velocidad de la pelota (Media = 79,00 ± 9,36 km) frente a las niñas (Media = 51,62 ± 7,92 km), con una estadística inferencial significativa de $p < 0,00$. De manera similar, la distancia recorrida por el balón con la patada favoreció a los niños (media = 46,53 ± 51,11 m) frente a las niñas (media = 17,47 ± 9,73 m), nuevamente con una estadística inferencial significativa de $p < 0,00$. Cabe destacar que las diferencias de género fueron menos pronunciadas en la distancia de carrera de aproximación. Sorprendentemente, la edad, la edad de entrenamiento y el IMC no mostraron correlaciones significativas con las métricas de rendimiento, lo que sugiere otros factores influyentes. Conclusiones: Estos resultados resaltan las notables diferencias en el rendimiento futbolístico entre géneros, destacando la mayor velocidad y fuerza de los niños en las patadas y en la cobertura de la distancia del balón. Mejorar el rendimiento general y la inclusión en el deporte puede depender de abordar estas brechas.
Palabras clave: Fútbol, Pase largo, Diferencias de género, Métricas de rendimiento, Cinemática.

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Introduction

Football is the highly competitive game and the most popular sports in the world, which is seen as one of the primitive sports with the first set of formal rules was established in 1848 in England (Worsey et al., 2020). This type of ball game sports that has been characterized by a various complex movement (walking, kicking, dribbling, jumping or falling) or techniques like (pass, throwing, penalty kick , etc.) these is well co-ordinate and its depends on the ability of players

(Preljević et al., 2020). When a player kicks the ball to another teammate that is known as a pass. Passing is one of the first learning techniques in football which is a part of technical element with the ball (Sokoli et al., 2020). Mainly various types of passes in football such as (long pass, short pass, throwing pass, diagonal pass, cross pass,) etc. In addition, the majority of passing and kicking maneuvers involve moving the ball (Barfield, 1998; Lees et al., 2010). The term lofted kick means long pass. In soccer, a lofted pass is preferably a long, powerful kick meant to put the ball over the heads of opponents and into the path of a teammate. Lofted pass is a multipurpose skill used for deep attack, defensive, clearance, corner kick, goal kick, and free kicks. One of the long-distance kicks in football is the long pass. Lofted passes are crucial in defense because players can feed the ball to a teammate who is in the opposing area, or throw the ball away from their own defensive zone (Cordón-Carmona et al., 2020). It can therefore be viewed as the component that links individual potential to group play. It is the technical kick gesture applied to game development (Izzo et al., 2020). In this instance, long passing is done by kicking. A method of passing the ball to the team is called passing. It will be simpler for our buddies to accept a good pass. In football, one of the most important aspects of a team's tactical approach is their passing pattern (Khaustov et al., 2019). The study of sports biomechanics and the quality of the muscles have an impact on the growth of long pass football. Sports biomechanics research frequently focuses on object velocity before and after impact, as well as limb or movement implementation before and after impact. The primary goal is to maximize impulse transfer in order to modify the momentum of the item. In a football kick, the amount of momentum transferred from the foot to the ball can be increased by engaging all of the ankle joint's muscles. The amount of force used to kick the ball is influenced by speed, resulting in the best kick results (Kapidžić et al., 2014). To kick the ball as far as feasible from the result of the kick, the front swing action must be performed as quickly as possible because doing so will increase foot speed and increase the impact of the foot. Lofted passes require players with strong fundamental football skills and the ability to maintain teamwork so that a team may play the ball in the appropriate location and circumstance without expending a lot of energy. Each player on the team and individually must have sound technique. The goal of a football game is for players to kick as many balls into their opponent's goal as possible while maintaining their own goal, therefore mastering certain methods required continuous practice and programming. The kicking method is the most common technique utilized in football games because it is an inherent part of the game. A football player who can kick the ball well and is useful for performing various kicks and passing the ball to friends nearby or far away, shooting it toward the goal, or clearing or sweeping it from the defense area to the front (Bonney et al., 2020; Putra and Sepriadi, 2022; Nicholls & Worsfold, 2016). This is typically done by defenders to stop an opponent's attack. The ability to kick the ball accurately and properly is a skill that every football player must possess (Rumi et al., 2022). Coaches should prepare his or her training from all possible angles. It is identical that man and woman are different in physique, physical abilities, biomechanically, physiologically and psychologically. In soccer, long pass is analysis of the vital technique that enable players to pass long distance in shorten possible time and become game changing method in counter attack. It is not clear how different in Bangladesh District to Division level soccer players perform the kick. The research aims to examine the relationship between physical attributes and long pass performance in football, focusing on the criterion measure of long pass, assessed via radar gun measurements in kilometers between young male and female football players.

Method and Materials

Participants

A total of seventy (74) respondents aged 15 to 18 (35 male soccer players and 39 female soccer players) were selected for this study. All subjects were selected from 4 football academies in Khulna Division, Bangladesh. Some personal data such as: academic name and address, name, age (years), body height (cm), body weight (kg), BMI (kg/m2), training age, playing height, ball speed (km/h), distance of hit ball (m), approach distance (m).

Research Design

The research aims to examine the relationship between physical attributes and long pass performance in football, focusing on the criterion measure of long pass, assessed via radar gun measurements in kilometers. The study utilizes a correlational research design, employing height (cm), weight (kg), ball speed (km/h), kicked ball distance (m), and approach run distance (m) as variables. Instruments including a radar gun Bushnell (Model: 101911. USA) for ball speed, digital weighing scale for weight (BEURER Typ 35, Germany), Stadiometer for body height measurement (SECA 206, Germany) and measuring tape for distances are used for data collection.

Procedure

All participants expressed great interest in participating in the study, and signed the form before the start of the study. The research was conducted in accordance with the professional and ethical standards of the Declaration of Helsinki (World Medical Association Declaration of Helsinki, 2013). Earlier on collecting data researcher describes the purpose of the present study. In the end, discuss the procedure, demonstrate the test, allow practicing, benefit of own performance test at any kick, take five lofted kicks in soccer, and concise of

the test of all subjects to collect accurate data by the Bushnell Radar Gun (Figure 1).

Figure 1. Bushnell Velocity radar gun -Model: 101911, USA

Radar Gun Application Procedure

In accordance with previous research (Díez-Fernández et al., 2022), the Bushnell Radar gun was utilized to measure ball speed during soccer kicking. To utilize the radar gun for evaluating long pass speed in soccer, start by positioning the device at one end of the field, aiming towards the opposite direction where the pass will be made (Figure 2). Select a player known for their ability to deliver strong and accurate long passes and have them stand ready at the starting point. Instruct the player to execute the long pass, aiming for a balance of speed and precision. After the pass, measure the ball's speed using the radar gun's reading. Record the speed and compare it with previous tests or typical long pass speeds of proficient players. The procedure typically involves five long kicks, followed by radar gun speed tests and distance measurements using a measuring tape. It's essential to recognize that various factors, such as player strength, skill level, field conditions, and weather, can influence the pass's speed. While radar gun tests offer insights into development, they should complement other training strategies to enhance long pass accuracy.

Figure 2. Data collection Procedure

Statistical analysis

Using Kolmogorov- Smirnov tests to scan the data and the data were normal distribution. The collected data was analyzed using descriptive statistics, mean and standard deviation (SD). An inferential statistics-paired and independent sample was applied to check the level of significance. The significance level was set at $p<0.05$. Descriptive and for the comparison appropriate inferential statistical tools SPSS have been used for the analysis of gathered data on long pass.

Results

The results present a detailed analysis of senior boys and girls football players' physical attributes and performance.

Table 1.
Normality and Homogeneity Tests for Senior Boys and Girls Football Players

Parameter	Test	Gender	Statistic	df	Sig.
Kicked ball speed (km)	Kolmogorov-Smirnov	Senior Boys	.111	35	.200
		Senior Girls	.069	39	.200
Distance Covered by Kicked Ball (m)	Kolmogorov-Smirnov	Senior Boys	.445	35	.000
		Senior Girls	.233	39	.000
Approach run distance (m)	Kolmogorov-Smirnov	Senior Boys	.179	35	.006
		Senior Girls	.149	39	.029
	Based on Mean				
Kicked ball speed (km)	Levene's		.253	1	.616
Distance Covered by Kicked Ball (m)	Levene's		2.183	1	.144
Approach run distance (m)	Levene's		1.661	1	.202

The significance level is p< 0.05

Table 2.
Descriptive Statistics of senior boys and girls football players

Parameter	Descriptive		Inferential -Statistics Mann -Whitney U Test	Remarks
	Category of Subject	Mean±SD		
Kicked ball speed (km)	Senior Boys	79.00± 9.36	0.00	Sig.
	Senior Girls	51.62± 7.92		
Distance Covered by Kicked Ball (m)	Senior Boys	46.53± 51.11	0.00	Sig.
	Senior Girls	17.47± 9.73		
Approach run distance (m)	Senior Boys	3.20±0.31	0.36	Not Sig.
	Senior Girls	3.34±0.41		

The significance level is p< 0.05

In Table 1, a Kolmogorov-Smirnov test ($p > 0.05$) (Razali & Wha, 2011) and visual inspection of their histograms, normal Q-Q plots, and box plots showed that the exam scores were approximately normally distributed for both samples, with a statistic of.111 and.069 (df = 35 and 39), sig. (p) =.200 (KS) of kicked ball speed (km), a statistic of.445 and.233 (DF = 35 and 39), sig. (p) =.000 (KS) of distance covered by kicked ball (m), a statistic of.179 and.149 (DF =

35 and 39), and sig. (p) =.006 (KS) of approach run distance (m). The test of homogeneity is based on the mean value of the Levene statistic, which is.253, df1 is 1, df2 is 72, and sig(r) is.616. Distance Covered by Kicked Ball (m) Levene statistic is 2.183, df1 is 1, df2 is 72, and sig(r) is.144. Approach run distance (m) levene statistic is 1.661, df1 is 1, df2 is 72, and sig(r) is.202.

The average speed of the Kicked ball speed (Table 2) in senior boys 79.00±9.36km/h is significantly different from the average speed for senior girls 51.62±7.92km/h (p<0.00). The distance Covered by the Kicked Ball (m) was also on average higher for senior boys (46.53±51.11m) compared to the mean value of senior girls (17.47±9.73m), for the level (p<0.00). Average approach run distance (m) for senior boys (3.20±0.31m) was not statistically significantly different from senior girls (3.34±0.41), (p>0.36).

Table 3.
Correlation of data for senior boys and girls football players

Parameter		Age		Kicked Ball Speed		Distance Covered by Kicked Ball	
Type of Subject		Senior Boys	Senior Girls	Senior Boys	Senior Girls	Senior Boys	Senior Girls
Kicked ball speed (km)	Pearson correlation *(r)*	-0.040	0.160				
	Sig. (2- tailed) *(p)*	0.822	0.332				
Distance covered by kicked ball (m)	Pearson correlation *(r)*	-0.401	-0.025	−0.044	0.388		
	Sig. (2- tailed) *(p)*	0.017	0.882	0.803	0.015		
Approach run distance(m)	Pearson correlation *(r)*	0.300	-0.197	−0.259	−0.117	−0.122	0.245
	Sig. (2- tailed) *(p)*	0.080	0.229	0.132	0.477	0.485	0.132

Correlation is significant at the *p*=0.05 level (2-tailed)

Table 3 contains the correlation of kinematic and kinetic outcome of boys and girls football players interacts that to the boys age has not significant its negative trivial (*r*= -.04; *p*=.82) strong relationship and in the girls, it is also not significant relationship with very weak positive relationship (*r*=.16; *p*=.33) with the kicked ball speed. To the boys age has not significant its negative trivial (*r*= -.04; *p*=.82) strong positive relationship and in the girls, it is also not significant relationship with negative trivial (*r*=. -04; *p*=.80) strong positive relationship with the distance covered by kicked ball (m). To the boys age has not significant its weak (*r*= .30; *p*=.08) strong positive relationship and in the girls, it is also not significant relationship with negative (*r*=. -19; *p*=.22) weak relationship with the approach run distance (M). To the boys age has not significant its negative (*r*= -.25; *p*=.13) weak relationship and in the girls, it is also not significant relationship with negative (*r*=. -11; *p*=.47) moderate relationship with the approach run distance (m). The boy's age has not significant its negative (*r*= -.12; *p*=.48) moderate relationship and in the girls, it is also not significant relationship with positive (*r*=.24; *p*=.13) weak relationship with the approach run distance (m).

Table 4.
Correlation of data of training age between senior boys and girls football players.

Parameter		Training age		Kicked ball speed		Distance covered by kicked ball	
Type of Subject		Senior boys	Senior girls	Senior boys	Senior girls	Senior boys	Senior girls
Kicked ball speed (km)	Pearson correlation *(r)*	-0.017	0.451				
	Sig. (2- tailed) *(p)*	−0.923	0.004				
Distance covered by kicked ball(m)	Pearson correlation *(r)*	-0.089	0.136	−0.044	0.388		
	Sig. (2- tailed) *(p)*	0.612	0.410	0.803	0.015		
Approach run distance(m)	Pearson correlation *(r)*	0.330	-0.289	−0.259	−0.117	−0.122	0.245
	Sig. (2- tailed) *(p)*	0.053	0.074	0.132	0.477	0.485	0.132

Correlation is significant at the *p*=0.05 level (2-tailed)

Table 4 contains the correlation of kinematic and kinetic outcome of boys and girls football players interacts that to the boy's training age has not significant its negative trivial (*r*=-.01; *p*= -.92 negative relationship and in the girls, it is also not significant relationship with moderate & trivial positive relationship (*r*=.45; *p*=.00) with the kicked ball speed(m). The boys training age has not significant its negative trivial(*r*= -.08; *p*= .61) moderate relationship and in the girls it is also not significant relationship with weak & moderate positive relationship (*r*=.13; *p*=.41) with the distance covered by kicked ball (m).To the boys training age has not significant its weak (*r*= .33; *p*=.05) trivial positive relationship and in the girls it is also not significant relationship with negative (*r*=.-28; *p*=.07) weak relationship with the approach run distance (m).

Table 5.
Correlation of data of BMI between senior boys and girls football players

Parameter		BMI		Kicked ball speed		Distance covered by kicked ball	
Type of Subject		Senior boys	Senior girls	Senior boys	Senior girls	Senior boys	Senior girls
Kicked ball speed (km)	Pearson correlation *(r)*	0.267	0.131				
	Sig. (2- tailed) *(p)*	0.120	0.426				
Distance covered by kicked ball(m)	Pearson correlation *(r)*	-0.392	−0.062	−0.044	0.388		
	Sig. (2- tailed) *(p)*	0.020	0.708	0.803	0.015		
Approach run distance (m)	Pearson correlation *(r)*	0.335	-0.182	−0.259	−0.117	−0.122	0.245
	Sig. (2- tailed) *(p)*	0.840	0.268	0.132	0.477	0.485	0.132

Correlation is significant at the p=0.05 level (2-tailed)

In Table 5 contains the correlation of kinematic and kinetic outcome of boys and girls football players interacts that to the boys BMI has not significant its positive (r=.26; p=.12) very weak relationship and in the girls, it is also not significant relationship with very weak positive relationship *(*r=.13; p=.42) with the kicked ball speed(m). The boys BMI has not significant it's negative (r=-.39; p=.02) very weak relationship and in the girls, it is also not significant with very weak negative relationship *(*r=-.06; p=.70) close to strong relationship with the distance covered by kicked ball (m). To the boy's training age has not significant its weak (r= .33; p=.84) & strong positive relationship and in the girls, it is also not significant relationship with negative (r=. -18; p=.26) weak relationship with the approach run distance (m).

Table 6.
Correlation of data between senior boys and girls football players

Parameter		Age		BMI	
Type of Subject		Senior boys	Senior girls	Senior boys	Senior girls
BMI	Pearson correlation *(r)*	0.340	0.266		
	Sig. (2- tailed) *(p)*	0.046	0.102		
Training Age	Pearson correlation *(r)*	0.424	0.153	0.017	0.204
	Sig. (2- tailed) *(p)*	0.011	0.351	0.923	0.213

Correlation is significant at the p=0.05 level (2-tailed)

Table 6 contains the correlation of kinematic and kinetic outcome of boys and girls football players interacts that to the boys age has not significant its positive trivial (r= .34; p=.04 weak relationship and in the girls, it is also not significant relationship with very weak positive relationship (r=.26; p=.10) with the BMI. The age and BMI have not significant its positive moderate (r= .42; p=.01) trivial relationship and in the girls, it is also not significant relationship with very weak positive relationship (r=.15; p=.35) training age. It has not significant positive trivial (r=.01; p=.92) strong relationship and in the girls, it is also not significant relationship with very weak positive relationship (r=.20; p=.21) with the training age.

Discussion

This study aimed to examine and evaluate the long pass amongst young football players that were male and female. Football is the highly competitive gam and irregular team sport that is defined by a transitional form that frequently happens in movement patterns, going from high-intensity actions like sprinting, jumping, shooting, accelerating, and decelerating to low intensity activities like jogging, walking, and standing (Faude et al., 2012; Rhodes et al., 2021). It is identical that man and woman are different in physique, physical abilities, biomechanically, physiologically and psychologically (Bishop et al., 1987; Hunter et al., 2023; Lewis et al., 1986; Oberlin, 2023). Long passes in soccer are a study of key techniques that allow players to pass a long way in the shortest amount of time and change the course of a game when used as a counterattack (Cakmak et al., 2018; Scharfen & Memmert, 2021). The angle of the kick, the posture of the body when kicking the ball, the length of the momentum, and the speed of the foot before contact all affect how quickly the ball travels after being kicked (Dujaka Aziz, 2019). To put the ball in a position that will help him defeat his opponent, a player can pass the ball to one of his teammates (Izzo, 2020). The analysis's findings provided significant clarity on an assortment of variables relating to senior boys' and girls' football performance, including speed, distance kicked, approach run, age, training age, and body mass index. The findings and their significance for comprehending the gender-based variations in football play are thoroughly examined here. The results indicate a significant difference in kicked ball speed between senior boys and girls, with boys exhibiting a significantly higher mean value compared to girls (Table 3). This finding aligns with existing literature suggesting that male football players tend to demonstrate greater power and speed in their kicks compared to females (Katis et al., 2015; Sakamoto et al., 2014; Sakamoto & Asai, 2013).

Similarly, significant differences were observed in the distance covered by the kicked ball between senior boys and girls, with boys covering a considerably greater distance on average (Table 3). This finding aligns with some existing literature (Ruscello et al., 2020). This outcome underscores the physiological disparities between genders, such as muscle mass and strength, which can influence the force exerted on the ball during kicking (Bartolomei et al., 2021; Brophy et al., 2010; Davis & Brewer, 1993). Unlike the previous metrics, no significant gender difference was found in approach run

distance (table 3). This suggests that the approach run technique may be equally employed by both genders, with factors such as technique, skill level, tactical understanding, agility and positioning playing a more critical role in this aspect of performance (Chaalali et al., 2016; Koopmann et al., 2020; Paul et al., 2016; Sheppard & Young, 2006). It highlights the importance of refining technical skills and strategic decision-making in both male and female players to optimize performance on the field (Ashford et al., 2021; Gioldasis, 2017; McMorris, 1997). Contrary to expectations, age and training age demonstrate limited significance in predicting football performance among senior players. The correlation analysis revealed a negligible relationship between age and performance metrics for both boys and girls (Table 4). This suggests that chronological age may not be a determining factor in football performance at the senior level (Costa et al., 2010; Hill et al., 2021). Instead, other factors such as skill level and tactical understanding may exert greater influence (Koopmann et al., 2020). Similarly, no significant association was found between training age and performance metrics, indicating that the duration of training may not necessarily translate into improved performance outcomes (Table 5). This underscores the importance of quality over quantity in training regimes for optimizing football performance.

The analysis of BMI as a possible predictor of football performance produces conflicting findings. While body mass index (BMI) can be used as a stand-in for body composition, there may be more impact on athletic achievement coming from other elements, such as muscle strength, agility, and skill mastery, given BMI's limited association with performance indicators. The analysis revealed no significant relationship between BMI and performance metrics for both genders (Table 6). Instead, factors such as strength-to-weight ratio, muscle distribution, and agility may play more significant roles in determining athletic prowess on the field. This underscores the multifaceted nature of performance determinants and the need for comprehensive assessments beyond basic anthropometric measures.

It is crucial to recognize the limitations of this study, including its sample size and potential confounding variables that were not addressed. Specifically, the study does not account for the biological development differences between boys and girls within the 15-18 age range. Although participants are similar in chronological age, girls generally mature earlier than boys, which could influence physical performance outcomes. Future research should incorporate considerations of biological age and developmental variations to offer a more thorough analysis of performance differences.

Future research could investigate additional factors like skill level, playing position, and psychological attributes to better understand gender differences in football performance. It would be particularly useful to explore how internal load varies between genders after long-distance kicking, as indicated in studies, which examined training load impacts in young male football players such as (Morera et al., 2023). Building on these findings, future studies could focus on developing and accessing targeted training programs aimed at reducing gender-based performance differences, with a special emphasis on techniques like lofted kicks. This approach would offer a more nuanced perspective on performance variations and help design effective training interventions (Kozina et al., 2024; Swamynathan et al., 2024).

Conclusion

The findings of this study highlight significant disparities in performance metrics between senior boys and girls in football. While boys demonstrate superior speed and power in their kicks and ball distance coverage, gender differences are less pronounced in approach run distance. Furthermore, age, training age, and BMI showed no significant associations with performance metrics, suggesting that other factors may play a more influential role. These findings contribute to our understanding of gender-specific performance characteristics in football and have implications for talent identification and training programs.

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Conflict of Interest

The authors declare no conflicts of interest regarding the publication of this study.

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