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LOWER LIMB ANTHROPOMETRIC CHARACTERISTICS AS PREDICTORS OF VERTICAL JUMP PERFORMANCE AMONG COMPETITIVE FEMALE NETBALL PLAYERS

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Abstract:
Vertical jump performance (VJP) is one of the key indicators of explosive power of the lower limb, and it is essential for obtaining better performance and successful outcomes in Netball, where jumping ability is repeatedly used for shooting, passing, receiving, and rebounding. Although Anthropometric characteristics of Netball players have been suggested to influence jumping performance, the predictive anthropometric variables remain insufficiently understood. The purpose of this study is to investigate the relationships between selected lower-limb anthropometric variables, such as Leg length (LL), Thigh circumference (TC), Calf circumference (CC), and vertical jump performance (VJP), and to understand the lower-limb anthropometric predictor variables to improve VJP among female All India inter-university Netball players (N=120), aged between 18–25 years. Lower limb anthropometric characteristics such as LL, TC, and CC were measured by following the International Standards for Anthropometric Assessment (ISAK) protocol, while VJP was assessed using the Sargent Vertical Jump Test. Descriptive statistics, the Shapiro–Wilk test, Pearson's product–moment correlation, and multiple linear regression (Enter method) were calculated with IBM SPSS (Statistical Package for the Social Sciences) software. The findings revealed that CC shows a strong positive relationship with VJP, whereas LL and TC were not significantly correlated with VJP. Multiple linear regression analysis showed that the anthropometric variables collectively explained 66.3% of the variance in VJP. The findings revealed that CC is the

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strongest anthropometric predictor of VJP among female Netball players, whereas TC showed no significant predictive value, and LL exhibited a small negative association after adjustment for the other variables.

Keywords: anthropometry; vertical jump; female netball players; lower-limb morphology; explosive power

1. Introduction

Netball is the world's most popular female participation team sport with over 20 million players in over 80 countries requiring a high level of technical, tactical and physical proficiency (Whitehead *et al.*, 2021). The sport is described as a high-intensity intermittent activity where players repeatedly sprint, decelerate and accelerate at high speeds, change direction multi-directionally, jump, land and pass while following strict movement regulations (Whitehead *et al.*, 2021; Chandler *et al.*, 2014; van Gogh *et al.*, 2020). These patterns of movement place significant physiological and neuromuscular demands on athletes, requiring well-developed speed, agility, muscular strength, power, balance, coordination and aerobic fitness to sustain optimal performance throughout competition (Thomas *et al.*, 2019; Graham *et al.*, 2020; Whitehead *et al.*, 2021). Among these physical qualities, lower-limb explosive power is considered an essential determinant of successful performance in Netball because it enables players to generate quick force during repeated jumping actions that are essential for shooting, receiving passes, intercepting passes, and contesting aerial balls (Thomas *et al.*, 2017; Graham *et al.*, 2020). Therefore, the identification of the factors that influence lower-limb explosive power is of considerable importance in talent identification, player selection and the development of evidence-based strength and conditioning programmes aimed at enhancing competitive Netball performance.

The vertical jump is commonly accepted as a valid measure of lower-body explosive power and is considered to be one of the most important physical performance characteristics in Netball. In competition, players perform numerous maximal and repeated jumping actions to secure rebounds, intercept overhead passes, contest aerial possession and make successful shooting attempts, especially in the goal circle and defensive areas of the court. These sport-specific actions require the rapid development of force through coordinated neuromuscular activation, making vertical jump ability an important determinant of match performance (Whitehead *et al.*, 2021). Furthermore, higher-level Netball players consistently display superior vertical jump performance (VJP) to lower-level players, emphasizing the significance of lower-limb power in differentiating playing standards and supporting talent identification processes (Simpson *et al.*, 2019).

Lower-body strength has also been found to be strongly correlated with vertical jump height (VJH), sprint performance, and change-of-direction ability in Netball players, indicating lower-body strength is a determinant of an athlete's overall neuromuscular capacity and functional athleticism (Thomas *et al.*, 2017; Graham *et al.*, 2020). Therefore, VJP has been incorporated into physical profiling, athlete monitoring, and strength and conditioning programmes in competitive Netball, and it is important for practitioners in making an informed decision in assessing explosive power and formulating strategies for improving it.

The anthropometric variables have been identified as significant factors affecting athletic performance due to their effects on biomechanical efficiency, force production, movement economy, and the execution of sports-specific skills. Mechanical leverage, muscle architecture, and the ability to create explosive movements are influenced by body dimensions, including limb length, body mass, muscle girth and segmental proportions, and this has an impact on performance in a variety of sports (Norton & Olds, 1996; Ackland *et al.*, 2012). For team sports that involve a lot of jumping, sprinting and quick changes of direction, a good anthropometric profile may increase the amount of power generated in the lower limbs and overall athletic ability (Carvajal *et al.*, 2009; Nikolaidis *et al.*, 2015). Anthropometric parameters have been shown to relate to physical performance such as speed, agility, muscular strength and VJH in volleyball, basketball, soccer and handball players (Carvajal *et al.*, 2009; Sheppard *et al.*, 2008).

The importance of lower-limb anthropometric characteristics in sports science has grown over the last few years due to their potential to affect the biomechanical and neuromuscular mechanisms of explosive movements, such as vertical jumping. Morphological characteristics such as limb length, muscle girth, and dimensions of the various segments of the body may alter force production, mechanical leverage, and efficiency of the stretch-shortening cycle, which can impact jump performance (Nishiumi *et al.*, 2023; Whitehead *et al.*, 2021). Specifically, leg length (LL) might affect the mechanical advantage of the lower limb through changes in the moment arms and force transmission of the joints during the propulsion phase of the jump. Likewise, the circumference of the thighs is often used as a realistic measure of the lower limb muscularity, specifically of the hamstrings and quadriceps muscles, which exert a large force during hip and knee extension. Some researchers have suggested that the CC could also be a reflection of the development of plantar flexor musculature responsible for ankle propulsion and improvements in take-off velocity during vertical jumping. There is recent evidence that the relationship between lower-limb strength and jumping ability and overall athletic ability is generally stronger for sports with better anthropometric characteristics, and the strength of these relationships differs by sport and competitive level (Duvenage *et al.*, 2024; Nishiumi *et al.*, 2023; Whitehead *et al.*, 2021). However, the relationships among specific lower-limb anthropometrics (LL, TC and CC) and VJP in competitive female Netball players are not known. This may help fill this void with valuable information for talent identification, athlete profiling and the design of evidence-based strength and conditioning programmes.

Previous studies have consistently shown that anthropometric characteristics are related to VJP, the magnitude and nature of which varies depending on the sport, competition level, sex and the anthropometric variables studied. Anthropometric variables, in addition to muscular strength and power, are important factors for countermovement and spike jump performance in studies conducted with elite volleyball players, but sometimes anthropometric measures alone account for a smaller proportion of the variance in performance than neuromuscular measures (Sheppard *et al.*, 2008). Recent studies have found that vertical jump ability is related to lower-limb muscle morphology, including the architectural characteristics of the vastus lateralis and gastrocnemius muscles, which further underscores the significance of lower-limb morphology in vertical jumping (Jiang *et al.*, 2024). Moreover, it has been highlighted in systematic reviews that VJP will not be determined by only one anthropometric, neuromuscular, biomechanical, or strength factor (Whitehead *et al.*, 2021; Nishiumi *et al.*, 2023). These results offer important knowledge about the factors that determine jumping performance, but most studies have been conducted on volleyball or basketball or mixed groups of athletes; data are still scarce on elite female Netball players. Moreover, previous research has mainly focused on overall body size, body composition, or muscle architecture, while anthropometric measurements of the body that can be easily taken in the field, such as LL, TC, and CC, have received comparatively little research and focus as possible predictors of VJP. Therefore, there is a need to investigate further whether such readily available anthropometric measures of the lower limb are able to be used to predict VJP in competitive female Netball players.

Although previous studies have established that anthropometric parameters influence physical performance and vertical jump ability in different types of athletes, there are still several important gaps in the literature. Firstly, most existing literature has concentrated on general anthropometric variables like height, body mass, BMI, and body composition, with comparatively less attention on practical anthropometric measurements in the lower limb like LL, TC, and CC (Ackland *et al.*, 2012; Whitehead *et al.*, 2021). Secondly, the majority of studies that have investigated the relationship between anthropometry and VJP have been conducted with volleyball, basketball, soccer or combined teams of these sports, and this means that the findings are limited to the specifics of competitive female Netball players, who have had a different positional demand and movement pattern to other team sports (Whitehead *et al.*, 2021; Duvenage *et al.*, 2024). In addition, previous studies have lacked a focus on simple relationships between anthropometric variables and physical performance and have involved fewer studies that used predictive statistical models to determine the independent contribution of specific anthropometric characteristics of the lower limb to VJP. Hence, research investigating the use of readily available field measurements, such as LL, TC and CC, as important predictors in the performance of vertical jumps in competitive female Netball players is warranted. This type of evidence can have practical applications for talent identification, athlete profiling and individualized strength and conditioning programming.

In view of the limited evidence regarding the predictive role of lower-limb anthropometric characteristics in female Netball players, the present study aimed to examine whether LL, TC, and CC are significant predictors of VJP. Specifically, the study sought to determine the relationships between these lower-limb anthropometric variables and VJP and to evaluate their independent contributions using multiple linear regression analysis. It was hypothesized that lower-limb anthropometric characteristics would significantly predict VJP among competitive female Netball players. The findings of this study are expected to contribute to the existing body of knowledge by providing evidence on the practical utility of simple field-based anthropometric measurements for athlete profiling, talent identification, and the development of individualized strength and conditioning programmes in Netball.

2. Materials and Methods

2.1 Study Design

This current study follows a cross-sectional predictive research design protocol to investigate the predictive relationship between selected lower-limb anthropometric characteristics and vertical jump performance (VJP) among female Netball players. A cross-sectional design was selected because all the assessments were obtained during a single testing session without manipulating the research environment, allowing the investigation of the associations between the anthropometric variables and VJP through Pearson's product–moment correlation. Furthermore, the study enabled the predictive evaluation of Leg length (LL), Thigh circumference (TC), and Calf circumference (CC) in contributing to variations in VJP through multiple linear regression analysis (Setia, 2016; Tabachnick *et al.*, 2019).

2.2 Participants

A total of 120 female Netball players in the All-India Inter-University Netball Championship, aged between 18 and 25 years, voluntarily participated in this study using a random sampling technique. Recruiting participants from this championship ensured that all Netball players had highly competitive exposure, technical proficiency, and systematic training experience. Before sample selection, the researcher ensured all the selected players had a minimum of three years of playing and practice experience. In addition, participants were required to be free from any musculoskeletal injury, neurological disorder, cardiovascular condition, or other medical condition that could negatively affect anthropometric measurements and VJP at the time of testing. Before data collection, all participants were informed about the nature and purpose of the study and provided informed consent.

2.3 Variables

- Leg length (LL),
- Thigh circumference (TC),
- Calf circumference (CC),
- Vertical Jump Height (VJH).

2.3 Anthropometric Measurements

Lower limb anthropometric measurements were obtained following the standardized anthropometric measurements protocol recommended by the International Society for the Advancement of Kinanthropometry (ISAK) (Marfell-Jones *et al.*, 2012). All measurements were taken by the same trained investigator in a comfortable environment to minimize measurement error and maximise inter-rater reliability. All linear and circumferential measurements were taken using a good quality anthropometric measuring tape and recorded to the nearest 0.1 cm. Scores were measured twice for each, and the mean score was used in the statistical analysis. If the difference between two measurements was more than 0.5cm, a third measurement was taken and the median value recorded.

2.3.1 Leg Length

Leg length (LL) was measured with the participant in a supine position as the distance from the anterior superior iliac spine to the distal tip of the medial malleolus of the dominant leg.

2.3.2 Thigh Circumference

Thigh circumference (TC) was measured at the midpoint between the inguinal crease and the proximal border of the patella of the dominant leg while participants stood in a relaxed anatomical position, ensuring the body weight was equally distributed on both feet, and the measuring tape was positioned horizontally without compressing the underlying soft tissue.

2.3.3 Calf Circumference

Calf circumference (CC) was measured at the point of maximum calf girth of the dominant leg while participants stood in a relaxed anatomical position. The measuring tape was maintained in a horizontal position without compressing the soft tissue.

2.4 Vertical Jump Assessment

The Sargent Jump Test, which was a standardized test to measure the explosive power of the lower limbs, was used as an assessment tool for VJP (Sargent, 1921; Markovic *et al.*, 2004). Before testing, participants completed a standardized 10-minute warm-up consisting of light jogging and dynamic stretching. Standing reach height was first measured while standing side by side with a wall and extending the dominant arm as far as possible overhead with both feet flat on the floor. Then the participants performed a maximal countermovement jump with natural arm swing, which was the highest point reached on the wall. Three maximal jumps were performed with 1 minute of passive recovery between each, with the highest overstand recorded for each participant. The vertical jump height (VJH)was defined as the difference between standing (reach) height and maximum height in jumping and was reported in centimetres (cm).

2.5 Data Collection Procedure

Data collection was conducted during the All-India Inter-University Netball Championship held at Maris Stella College, Vijayawada. Before data collection, informed consent was obtained from the participants, along with explaining the purpose, procedures, and potential benefits and risks of the study. All assessments were carried out under a standardized protocol to ensure consistency and minimize measurement bias. Before the performance assessment, participants completed a standardized 10-minute warm-up, which involved light jogging, dynamic stretching, and progressive lower-limb activation exercises to prepare for better performance.

Anthropometric measurements, including LL, TC, and CC, were assessed under the guidelines of the International Society for the Advancement of Kinanthropometry (ISAK). Participants performed the Sargent Jump Test to evaluate lower-limb explosive power. Each participant completed three maximal vertical jump trials with a one-minute recovery interval between trials to reduce the influence of fatigue. The best VJH from the three trials was finalised as the VJH score. To ensure data quality, all entries were re-checked for completeness and accuracy before analysis.

2.6 Statistical Analysis

Descriptive statistics such as mean, standard deviation, minimum score, and maximum score were calculated to understand the nature of the data. The data normality was assessed using the Shapiro–Wilk test. Pearson's product–moment correlation was conducted to investigate the relationships between anthropometric characteristics and VJH. Multiple linear regression analysis (Enter method) was performed to determine the predictive contributions of the selected lower-limb anthropometric variables to VJP. Multicollinearity among the predictor variables was assessed using tolerance values and the variance inflation factor (VIF). The level of significance was set at $p < .05$, and all the analyses were computed using IBM SPSS Statistics version 26.0.

3. Results

Table 1: Descriptive Characteristics of the Competitive Female Netball Players (N = 120)

Variables	Mean ± Standard Deviation	Minimum	Maximum
Age (years)	22.2 ± 2.1	19	25
Playing experience (years)	5.4 ± 1.8	3	8
LL (cm)	94.71 ± 4.92	82.30	105.30
TC (cm)	53.38 ± 2.62	45.70	58.10
CC (cm)	36.11 ± 2.01	30.60	40.90
VJH (cm)	73.61 ± 5.51	59.40	86.80

Note: LL - Leg length, TC - Thigh circumference, CC - Calf circumference, VJH - Vertical jump height.

Table 1 shows the demographic characteristics of participants, their anthropometric measurements, and explosive strength performance. The participants' average age was 22.2 ± 2.1 years, with 5.4 ± 1.8 years of playing experience, and their mean LL was 94.71 ±

4.92 cm. The mean TC was 53.38 ± 2.62 cm, while the mean CC was 36.11 ± 2.01 cm. The mean VJH, used as an indicator of explosive strength, was 73.61 ± 5.51 cm.

Table 2: Tests of Normality for the Study Variables (N = 120)

Variables	Shapiro–Wilk (p)
LL	.065*
TC	.130*
CC	.068*
VJH	.457*

Note: LL - Leg length, TC - Thigh circumference, CC - Calf circumference, VJH - Vertical jump height.
*Normally distributed

Table 2 shows the output of the Shapiro-Wilk normality assumption test. These results indicate that the data were normally distributed (p > 0.05). Therefore, the assumption of normality was satisfied for all the variables, supporting the use of parametric tests, including Pearson's product–moment correlation and multiple linear regression.

Table 3: Pearson Correlation Matrix for Lower-Limb Anthropometric Variables and Vertical Jump Height (N = 120)

Variables	LL*	TC*	CC*	VJH*
LL	1			
TC	−0.065	1		
CC	.012	-.024	1	
VJH	-.164	-.025	.795**	1

Note: LL - Leg length, TC - Thigh circumference, CC - Calf circumference, VJH - Vertical jump height.
* Pearson's correlation Values.
** p < .01 (two-tailed).

Table 3 shows the output of Pearson's product–moment correlation analysis to identify the relationships between lower-limb anthropometric variables and VJH among female Netball players. The results reveal that CC and VJH demonstrated a strong positive correlation ($r = .795$, $p < .001$). In contrast, LL and VJH ($r = -.164$, $p = .073$), and TC and VJH ($r = -.025$, $p = .784$) were not significantly associated with vertical jump height.

Table 4: Model Summary of the Multiple Linear Regression Predicting Vertical Jump Height from Lower-Limb Anthropometric Variables (N = 120)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.814	.663	.654	3.246

Note: Predictors: Leg length (LL), Thigh circumference (TC), and Calf circumference (CC).
Dependent variable: Vertical jump height (VJH).

Table 4 shows the output of the model summary of the multiple linear regression examining the predictive contributions of LL, TC, and CC to VJH. The results reveal that there is a strong positive relationship between the predictor variables and VJH ($R = .814$), and it explained 66.3% of the variance in VJH ($R^2 = .663$). After adjusting for the three predictor variables and the sample size, the model accounted for 65.4% of the variance (Adjusted $R^2 = .654$). This small difference between R^2 and Adjusted R^2 (0.009) indicates that the three predictors are meaningful predictors of VJH and the model is not inflated by unnecessary predictors. The standard error of the estimate was 3.246 cm, indicating that, on average, the predicted VJH differs from the actual measured VJH by approximately 3.25 cm**.** This relatively small prediction error suggests that the regression model provides reasonably accurate estimates of VJP among competitive female Netball players.

Table 5: ANOVA for the Multiple Linear Regression Model Predicting Vertical Jump Height

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	2403.509	3	801.170	76.044	.000*
	Residual	1222.124	116	10.536		
	Total	3625.633	119			

Note: Dependent variable: Vertical jump height (VJH), Predictors: Leg length (LL), Thigh circumference (TC), and Calf circumference (CC).
*Significant at .001 level.

Table 5 shows the output of analysis of variance (ANOVA) for the multiple linear regression model. The result indicated that the combination of leg length, thigh circumference, and calf circumference significantly predicted vertical jump height among the competitive female Netball players, $F(3, 116) = 76.044$**,** $p < .001$. These findings reveal that the regression model provided a significantly better prediction of VJP than a model without the selected anthropometric predictors.

Table 6: Multiple Linear Regression Coefficients Predicting Vertical Jump Height from Lower-Limb Anthropometric Variables

Predictor	B	Std. Error	β	t	P	95% CI for B	Tolerance	VIF
LL	-.197	.061	-.175	-3.246	.002*	-.317, -.077	.996	1.004
TC	-.036	.114	-.017	-.321	.749	-.261, .189	.995	1.005
CC	2.19	.148	.797	14.778	.000*	1.894, 2.480	.999	1.001

Note: B - unstandardized regression coefficient, SE - standard error, β - standardized regression coefficient, CI - confidence interval, VIF - variance inflation factor, LL - Leg length, TC - Thigh circumference, CC - Calf circumference.
*Significant at .05 level.

Table 6 shows the regression coefficients for the predictors of VJH. CC was the strongest and most substantial positive predictor of VJP ($\beta = .797$, $t = 14.778$, $p < .05$). Specifically, for every 1 cm increase in CC, VJH increased by approximately 2.19 cm (B=2.19), after controlling for LL and TC. LL showed a statistically significant negative association with VJH ($\beta = -.175$, $t = -3.246$, $p < .05$), indicating that greater LL was associated with a slightly lower VJH when the other anthropometric variables were held constant. In contrast, TC was not a significant predictor ($\beta = -.017$, $t = -0.321$, $p = .749 > .05$). The multicollinearity statistics indicated no evidence of multicollinearity among the predictors, with tolerance values ranging from .995 to .999 and VIF values ranging from 1.001 to 1.005**,** which are well within acceptable limits. It suggested that LL, TC, and CC contributed independent information to the prediction of VJH.

4. Discussion

The findings of this study reveal that lower-limb anthropometric characteristics may contribute differently to VJH among competitive female Netball players. The results of this study demonstrated a strong positive relationship between CC and VJH, and emerged as the strongest predictor in the multiple regression model. In contrast, LL showed no significant bivariate association with VJH but exhibited a negative regression coefficient after adjustment for the other predictors, while TC did not significantly contribute to the prediction model. Collectively, finding shows the selected anthropometric variables accounted for approximately two-thirds of the variance in VJP, indicating that these three selected lower-limb anthropometric characteristics may explain a substantial proportion of Vertical jumping ability.

The positive association between CC and VJP may reflect the important functional role of the plantar-flexor musculature during explosive lower-limb movements. The gastrocnemius and soleus muscles are major contributors to plantar flexion of the ankle during the propulsion phase of jumping and are essential for generating vertical ground reaction force and efficiently utilizing the stretch-shortening cycle (Komi, 2000). Greater muscular development around the calf region may therefore improve force production and elastic energy utilization during take-off, resulting in better jumping performance. Similar studies demonstrated positive associations between lower-leg muscularity and explosive performance (Sharma *et al.*, 2017). Nevertheless, because CC is only an indirect indicator of muscle size, it should not be considered a direct measure of muscular strength or power.

The regression analysis indicated that LL became a significant negative predictor after controlling for the remaining anthropometric variables, despite the absence of a significant bivariate correlation. From a biomechanical perspective, longer lower limbs increase the moment of inertia that must be overcome during rapid extension of the hip, knee, and ankle joints. Unless accompanied by proportional increases in muscular strength and rate of force development, greater limb length may increase the mechanical demands of explosive jumping. However, this finding differs from several previous investigations that have reported either weak positive or non-significant relationships between LL and VJP (Ashley *et al.*, 2003; Sharma *et al.*, 2017). Similarly, TC was not significantly associated with VJP. Although TC is frequently used as an indirect indicator of lower-limb muscularity, CC measurements do not distinguish between contractile muscle tissue, adipose tissue, connective tissue, or differences in muscle architecture. Consequently, athletes with similar TC may differ substantially in maximal strength, muscle quality, and explosive force production. Previous studies suggested that muscle size alone cannot fully explain jumping performance, which depends on the interaction of muscle architecture, tendon stiffness, neuromuscular coordination, and rate of force development (Cormie *et al.*, 2011). Therefore, the absence of a significant association in this study emphasizes that simple anthropometric measurements should be interpreted alongside functional performance assessments.

The regression model explained 66.3% of the variance in VJH, suggesting that the selected anthropometric variables collectively possessed substantial predictive value. Nevertheless, approximately one-third of the variability remained unexplained, indicating that additional physiological and neuromuscular factors likely influence VJP. Previous research has consistently demonstrated that maximal strength, muscle fibre characteristics, tendon mechanical properties, stretch-shortening cycle efficiency, technical jumping mechanics, and sport-specific training all contribute significantly to VJP (Cormie *et al.*, 2011; Markovic & Mikulic, 2010). Consequently, anthropometric variables should be regarded as one component of a multifactorial performance model rather than independent determinants of jumping ability.

Although this finding focuses on anthropometric predictors, the broader literature emphasizes that Netball performance depends upon a complex interaction between body morphology, physical fitness, technical skill, and neuromuscular performance. Netball requires frequent jumping, rapid acceleration and deceleration, multidirectional movement, and repeated high-intensity efforts throughout competition (Fox *et al.*, 2013). Therefore, athletes possessing favourable anthropometric characteristics may still demonstrate inferior jump performance if they lack adequate muscular strength, power, or technical proficiency. Conversely, systematic strength and plyometric training may substantially improve explosive performance despite relatively modest anthropometric advantages.

From a practical perspective, these findings suggest that simple field-based anthropometric assessments could be incorporated into athlete monitoring programmes because they are inexpensive, non-invasive, and easy to administer. However, coaches and strength and conditioning professionals should avoid relying exclusively on anthropometric measurements when evaluating athletic potential. Instead, these measurements should be combined with objective assessments of lower-limb strength, power, sprint ability, agility, and sport-specific skill. Such a multidimensional approach provides a more comprehensive understanding of athlete performance and supports evidence-based talent identification and training prescription.

5. Conclusion

This study examined the relationships between selected lower-limb anthropometric characteristics and VJP among competitive female Netball players. In this study, CC demonstrated a strong positive association with VJH and emerged as the strongest predictor of VJP. In contrast, TC did not significantly predict VJP, while LL showed a small negative contribution after controlling for the other anthropometric variables.

Collectively, the selected anthropometric variables explained a substantial proportion of the variance in VJP, highlighting the potential influence of lower-limb morphology on explosive athletic ability.

These findings suggest that anthropometric assessment may provide useful supplementary information when evaluating physical performance in female Netball players. However, VJP is a multifactorial characteristic influenced by neuromuscular, biomechanical, physiological, and technical factors in addition to body dimensions. Therefore, anthropometric measurements should be interpreted alongside functional performance assessments rather than used as independent indicators of athletic potential. Future research should incorporate direct measures of muscle morphology, lower-limb strength, and neuromuscular function to provide a more comprehensive understanding of the determinants of explosive performance in Netball players.

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Conflicts of Interest
The authors declare no conflict of interest.

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