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Anthropometric Characteristics and Somatotype Profiles of University Athletes in Nigeria: A Cross-Sectional Study

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Resumen

Introducción: Este estudio tuvo como objetivo determinar y comparar las características antropométricas y somatotipos de atletas masculinos que participan en voleibol, baloncesto y fútbol en la Universidad de Madonna, Nigeria. **Métodos:** Se realizó un estudio transversal con 50 atletas masculinos (15 voleibolistas, 15 baloncesto, 20 jugadores de fútbol) de 18 a 25 años. Se obtuvieron mediciones antropométricas, incluyendo altura, peso, espesores de pliegues cutáneos, circunferencias óseas y circunferencias. El somatotipo se estimó utilizando el método de Heath-Carter. Se utilizó ANOVA unidireccional para comparar las diferencias entre los deportes. **Resultados:** Los jugadores de baloncesto eran más altos y más pesados que los otros atletas. Se encontraron diferencias significativas en altura (p = 0,033), espesor del pliegue cutáneo del tríceps (p = 0,049) y anchura del húmero (p = 0,013) entre los tres deportes. Los jugadores de voleibol exhibieron los puntajes más altos de endomorfia (4,03 ± 2,09) y mesomorfia (5,16 ± 1,44), mientras que los jugadores de fútbol mostraron los valores más bajos de endomorfia (2,97 ± 0,32) y más altos de ectomorfia (1,65 ± 0,71). La mayoría de los atletas de los tres deportes fueron clasificados como mesomorfos endomorfos. **Conclusión:** El estudio proporciona información sobre las características físicas específicas del deporte y las composiciones corporales entre los atletas universitarios nigerianos, lo que puede informar la identificación de talentos y las estrategias de entrenamiento. Los hallazgos resaltan la necesidad de más investigaciones para comprender los atributos únicos de los atletas en estos deportes dentro del contexto nigeriano.

Palabras Clave: Antropometría, Somatotipo, Atletas universitarios, Composición corporal, Características específicas del deporte.

Abstract

Introduction: This study aimed to determine and compare the anthropometric characteristics and somatotypes of male athletes participating in volleyball, basketball, and soccer at Madonna University, Nigeria. **Methods:** A cross-sectional study was conducted with 50 male athletes (15 volleyball, 15 basketball, 20 soccer players) aged 18-25 years. Anthropometric measurements, including height, weight, skinfold thicknesses, bone girths, and circumferences, were obtained. Somatotype was estimated using the Heath-Carter method. One-way ANOVA was used to compare the differences between the sports. **Results:** Basketball players were taller and heavier than the other athletes. Significant differences were found in height (p=0.033), triceps skinfold thickness (p=0.049), and humerus breadth (p=0.013) among the three sports. Volleyball players exhibited the highest endomorphy (4.03 ± 2.09) and mesomorphy (5.16 ± 1.44) scores, while soccer players showed the lowest endomorphy (2.97 ± 0.32) and highest ectomorphy (1.65 ± 0.71) values. The majority of athletes across all three sports were classified as endomorphic mesomorphs. **Conclusion:** The study provides insights into sport-specific physical characteristics and body compositions among Nigerian collegiate athletes, which may inform talent identification and training strategies. The findings highlight the need for further research to understand the unique attributes of athletes in these sports within the Nigerian context.

Keywords: Anthropometry, Somatotype, Collegiate athletes, Body composition, Sport-specific characteristics

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Introduction

Anthropometric variables and somatotype are fundamental physical characteristics to take into account when selecting successful athletes for any given sport, in conjunction with the strategic and technical proficiencies necessary for various athletic disciplines (Gualdi-Russo & Zaccagni, 2001; Cullen et al., 2020; Tsukru & Rhetso, 2023). It is widely accepted that the anthropometric traits of an athlete can impact their performance levels and aid in determining the most appropriate physique for a specific sport (Rienzi et al., 1999; Sánchez-Muñoz et al., 2012; Santos et al., 2014). These criteria are frequently employed to assess the physical capabilities of athletes (Tsunawake et al., 2003).

Moreover, the evaluation of an athlete's body composition, encompassing muscle mass and body fat percentage, assumes a pivotal role in comprehending their physical capacities and potential success in a particular sport (Lukaski & Raymond-Pope, 2021). Numerous scholars have underscored the significance of anthropometric variables and somatotype in appraising an athlete's physical attributes for peak performance (Gualdi-Russo & Zaccagni, 2001; Perroni et al., 2015; Bidaurrazaga-Letona et al., 2016; Silva, 2019).

In tandem with these physical characteristics, the formulation of sport-specific anthropometric profiles has emerged as a noteworthy element contributing to athletic triumph. Recent research indicates that tailored profiles grounded on height, mass, body ratios, and somatotype can facilitate the creation of more efficient training regimes and identification of pivotal indicators for athletes (Cherif et al., 2022; Staśkiewicz-Bartecka et al., 2023). By integrating a thorough examination of morphometric attributes alongside conventional anthropometric evaluations, coaches and sports scientists can acquire deeper insights into an athlete's capabilities and performance potential, thereby amplifying their competitive advantage in the realm of sports (Reilly et al., 2000; Kurtoğlu et al., 2024).

This individualized approach permits targeted interventions that optimize an athlete's physical attributes and mitigate the risk of injury, culminating in enhanced overall performance and longevity in their athletic career (Bawari et al., 2023).

Regional diversity in somatotype and physical characteristics is evident among athletes participating in different sports (Sodhi, 1980; Gualdi & Zaccagni, 2001). This variability can be ascribed to a combination of hereditary inclinations, training methodologies, and environmental elements unique to each geographical area (Cárdenas-Fernández et al., 2019). Athletes hailing from coastal areas may display elevated levels of aerobic capacity due to exposure to training conditions at sea level and increased oxygen supply (Bauman et al., 1999). Conversely, athletes originating from high-altitude regions may demonstrate improved endurance and red blood cell production from training in low-oxygen settings, resulting in adaptations that enhance performance at greater altitudes (Zahibi & Alavi, 2015). Studies indicate that athletes from mountainous regions typically possess greater muscle mass and strength compared to their counterparts from flat terrains, possibly due to the heightened resistance training inherent in maneuvering steep slopes and rough terrains (Clarys et al., 2001; Feriche et al., 2020).

Genetics plays a significant role in shaping the anthropometric traits and somatotypes of athletes. An individual's physical characteristics, including body composition, muscle mass, bone structure, and fat distribution, are influenced by specific genetic predispositions they inherit (Puthucheary et al., 2011; Brener et al., 2021; Livingstone et al., 2021). These genetic factors directly affect an athlete's somatotype, which pertains to their body composition and shape (Maciejewska-Skrendo et al., 2019). The three main somatotypes recognized are mesomorphic, endomorphic, and ectomorphic. Mesomorphs typically possess an inherently athletic physique characterized by well-defined muscles, making them well-suited for sports emphasizing strength and power (Lanier, 1997). Endomorphs, on the other hand, tend to have higher levels of body fat and excel in sports that demand increased mass, such as sumo wrestling or rugby. Ectomorphs are slender and tall, making them particularly suited for endurance activities like long-distance running or cycling (Boyce & Schoenfeld, 2022). Genetic variations also influence aspects like muscle fibre composition, aerobic capacity, and bone density, all of which can have implications for an athlete's performance in their respective sport (Payne, 2004; Appel et al., 2021).

Despite the abundant research conducted on anthropometric variables and somatotypes in athletes on a global scale, there exists a noticeable lack of studies that concentrate on these aspects within the Nigerian scenario. The absence of literature in this area holds significant importance due to the distinct genetic, environmental, and cultural factors that can impact the physical attributes of Nigerian athletes. It is imperative to comprehend these specific characteristics to design customized training regimes, refine athlete selection procedures, and enhance overall performance across various sports in the nation. Hence, the primary objective of this study is to examine the anthropometric variables and somatotypes of Nigerian athletes participating in diverse sports disciplines. Through this investigation, we aim to formulate profiles tailored to individual sports that can assist coaches, sports scientists, and policymakers in maximizing athlete progress and achievement. Furthermore, this study will contribute to a more comprehensive comprehension of geographical variations in athlete physiology, potentially revealing unique adaptations or traits distinctive to Nigerian athletes. The outcomes of this research endeavor will not only bridge a crucial gap in existing literature but also offer practical insights to elevate the competitive edge of Nigerian athletes at both domestic and international levels.

Materials and Methods

Study Design

The methodology employed in this research involved a cross-sectional approach aimed at examining the anthropometric attributes of male school athletes engaged in volleyball, basketball, and soccer. The utilization of a cross-sectional design was deemed suitable for this investigation due to its capacity to capture data from a specific cohort at a particular moment, thus offering a glimpse into the desired characteristics.

Participants

The selection of participants encompassed male individuals actively involved in school sports, namely volleyball, basketball, and soccer. Fifteen individuals were randomly recruited from both the volleyball and basketball teams, whereas twenty participants were selected from the soccer team. Random sampling was implemented to guarantee a representative cross-section from each sporting discipline. All participants enlisted in the study were in good health and provided verbal informed consent willingly.

Ethical Approval

Preceding the commencement of the research, ethical clearance was secured from the Madonna University Research Ethics Committee to ensure adherence to ethical standards and safeguard the welfare and rights of the participants.

Protocol

A total of ten anthropometric parameters were assessed within the scope of this study. These parameters comprised height, mass, four skinfold thicknesses (triceps, subscapular, supraspinale, and medial calf), two girths (arm flexed and tensed, and medial calf). Stature was gauged using the stadiometer, while body mass was quantified employing the beam balance. Skinfold thicknesses were evaluated utilizing the skinfold calipers, and bone dimensions (humerus and femur biepicondylar breadths) were determined with the assistance of digital bone calipers. Arm flexed and tensed, and medial calf girths, were quantified using the anthropometric tape.

Materials Used

Various materials were employed in the present investigation for the purpose of gathering anthropometric data. These materials encompassed a beam balance, stadiometer, skinfold calipers, digital bone calipers, and anthropometric tape. The beam balance was utilized for determining the participants' mass in kilograms, whereas the stadiometer was employed for measuring their height in centimeters. Skinfold calipers were utilized for the assessment of four skinfold thicknesses: triceps, subscapular, supraspinale, and medial calf. Digital bone calipers were deployed for ascertaining bone dimensions, and anthropometric tape was utilized for measuring arm and two girths (arm flexed and tensed, and medial calf).

Data Analysis

The amassed data underwent scrutiny utilizing version 21 of the Statistical Package for the Social Sciences (SPSS). Descriptive statistics, encompassing metrics like means, standard deviations, and frequencies, were computed in order to provide a concise overview of the anthropometric attributes of the participants. Inferential statistics, such as t-tests and analysis of variance (ANOVA), were employed to juxtapose the anthropometric measurements across distinct sports and to ascertain the presence of any noteworthy variances. The somatotype of the participants was approximated through the utilization of the Sweat Technologies 2001 MER Goulding software development, a specialized software tool devised for somatotype estimation.

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Limitations

It is imperative to recognize the constraints of this investigation. Primarily, the research solely involved male participants, thereby constraining the applicability of the results to female sports players. Moreover, the study exclusively concentrated on volleyball, basketball, and soccer, potentially restricting the relevance of the outcomes to athletes engaged in different sports. Additionally, the study's cross-sectional framework hinders the capacity to establish causation or track developments over time. Subsequent studies could explore longitudinal methodologies and incorporate a more varied athlete sample to improve the generalizability of the results.

Results

Table 1. Descriptive statistics of anthropometric variables for basketball, volleyball and soccer players

Anthropometric variables	Volleyball players (mean +S.D)	Min/ Max	Basketball players (mean +S.D)	Min/ Max	Soccer players (mean +S.D)	Min/ Max
Age(in years)	20.42 ± 1.48	18/23	21.74 ± 2.50	18/25	21.41±1.1.73	19/23
Height(m)	1.72 ± 0.54	1.6/1.8	1.78 ± 0.06	1.7/1.9	1.73±0.08	1.6/1.8
Mass(kg)	70.03±17.56	48/123	76.10 ±13.61	54/104	73.93±5.44	65/83
BMI(kgm^{-2})	23.63 ± 5.01	18.1/38	23.91 ± 3.16	19.5/30.7	24.74±1.17	23.1/27.6
Triceps SF(mm)	12.63 ± 9.97	5/40	10.13 ± 6.09	4/25	7.09±1.63	4/10
Subscapular SF(mm)	15.0 ±10.93	5/45	13.63 ± 4.42	8/24	11.50±2.12	6/15
Suprailiac SF(mm)	15.54 ± 8.79	6/40	12.87 ± 4.97	5/23	11.05±1.43	9/14
Medial calf SF(mm)	8.69 ± 2.79	6/17.2	8.70 ±3.30	5.5/16	7.34±1.22	5.5/9.5
Arm flexed girth(mm)	34.26 ± 4.39	28.1/42.9	32.97 ± 3.99	27/40	31.87±3.29	27/38
Calf girth(mm)	37.99 ± 3.39	34/45	37.27 ± 3.74	32.8/44.9	36.35±2.89	30/41.3
Humerus breadth(cm)	6.83 ± 0.49	5.9/7.5	7.17 ± 0.35	6.4/7.7	7.21±0.29	6.7/7.7
Femur breadth	8.50 ± 0.68	7.3/9.5	8.87 ± 0.44	7.6/9.3	8.81±0.36	8/9.3

Note: This table presents descriptive statistics (mean, standard deviation, minimum and maximum values) for various anthropometric measurements of volleyball, basketball, and soccer players. It provides an overview of physical characteristics like height, weight, BMI, skinfold thicknesses, and body girths for athletes in each sport.

Table 2. Descriptive statistics of somatotype variables for basketball, volleyball and soccer players

Somatotype variables	Volley ball player Mean ±S.D	Basketball player Mean ±S.D	Soccer player Mean ±S.D
Endommorphy	4.03± 2.09	3.51± 1.23	2.97± 0.32
Mesomorphy	5.16± 1.44	4.54± 1.31	4.93± 1.04
Ectomorphy	2.39± 1.45	2.36± 1.05	1.65 ± 0.71

Note: *This table shows the mean and standard deviation (SD) values for somatotype components (endomorphy, mesomorphy, ectomorphy) of volleyball, basketball, and soccer players. It gives insight into the body composition and physique ratings of athletes in each sport.*

Table 3. Comparative statistics for anthropometric and somatotype characteristics among the three sports using One-way ANOVA

Anthropometric variables	Volleyball players (mean+S.D)	Basketball players (mean+S.D)	Soccer players (mean+S.D)	*Pvalue*
Age(in years)	20.42 ± 1.48	21.74 ± 2.50	21.41±1.1.73	0.104
Height(m)	1.72 ± 0.05	1,78 ± 0.06	1,73±0.08	0.033*
Mass(kg)	70.03 ± 7.56	76.10 ± 13.61	73.93±5.44	0.415
BMI(kgm^{-2})	23.63 ± 5.01	23.91 ± 3.16	24.74±1.17	0.585
Triceps SF(mm)	12.63 ± 9.97	10.13 ± 6.09	7.09±1.63	0.049*
Subscapular SF(mm)	15.07 ± 0.93	13.62 ± 4.42	11.50±2.12	0.281
Suprailiac SF(mm)	15.54 ± 8.79	12.87 ± 4.97	11.05±1.43	0.073
Medial calf SF(mm)	8.69 ± 2.79	8.70 ±	7.34±1.22	0.178
Arm flexed girth(mm)	34.26 ± 4.39	32.97 ± 3.10	31.87±3.29	0.203
Calf girth(mm)	37.99 ± 3.39	37.27 ± 3.74	36.35±2.89	0.351
Humerus breadth (cm)	6.83 ± 0.49	7.17 ± 0.35	7.21±0.29	0.013*
Femur breadth (cm)	8.50 ± 0.68	8.87 ± 0.44	8.81±0.36	0.102
Endomorphy	4.03± 2.09	3.51±1.23	2.97± 0. 32	0.076
Mesomorphy	5.16± 1.44	4.54± 1.31	4.93±1.04	0.397
Ectomorphy	2.39± 1.45	2.36± 1.05	1.65± 0.71	0.074

* *SD: standard deviation, * indicates significantly different values for parameters where p<0.05*

Note: *This table compares the anthropometric and somatotype characteristics among the three sports using one-way ANOVA. It highlights statistically significant differences (p<0.05) in height, triceps skinfold thickness, and humerus breadth between the sports.*

Table 4. Multiple Comparisons for statistically significant variables

Variables	(I) groups	(J) groups	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Ht	basketball	soccer	.0500	.0230	.086	-.006	.106
		volleyball	.0620*	.0246	.039	.003	.121
	Soccer	basketball	-.0500	.0230	.086	-.106	.006
		volleyball	.0120	.0230	.861	-.044	.068
	volleyball	basketball	-.0620*	.0246	.039	-.121	-.003
		soccer	-.0120	.0230	.861	-.068	.044
Triceps	basketball	soccer	3.0483	2.2061	.359	-2.291	8.387
		volleyball	-2.5000	2.3584	.543	-8.208	3.208
	Soccer	basketball	-3.0483	2.2061	.359	-8.387	2.291
		volleyball	-5.5483*	2.2061	.040	-10.887	-.209
	volleyball	basketball	2.5000	2.3584	.543	-3.208	8.208

		soccer	5.5483*	2.2061	.040	.209	10.887
Arm circumference	basketball	soccer	-.0433	.1288	.940	-.355	.268
		volleyball	.3333*	.1377	.050	.000	.667
	soccer	basketball	.0433	.1288	.940	-.268	.355
		volleyball	.3767*	.1288	.014	.065	.688
	volleyball	basketball	-.3333*	.1377	.050	-.667	.000
		soccer	-.3767*	.1288	.014	-.688	-.065

*. The mean difference is significant at the 0.05 level.

Note: This table provides multiple comparisons (using Tukey HSD test) for the variables that showed statistically significant differences in Table 3. It shows pairwise comparisons between sports for height, triceps skinfold thickness, and arm circumference.

Table 5. Somatotype distribution based on categories

Somatotype categories	Basketball		Volleyball		Soccer	
	frequency	Percent frequency	frequency	Percent frequency	frequency	Percent frequency
Balanced endomorphy	-				-	
Mesomorphic endomorph	-		2	13.33	-	
Mesomorph-endomorph	3	20.00			-	
Endomorphic mesomorph	6	40.00	5	33.33	17	85
Balanced mesomorphy	1	6.67	3	20.00	2	10
Ectomorphic mesomorph	-		1	6.67	-	
Mesomorph-ectomorph	3	20.00	1	6.67	-	
Mesomorphic ectomorph	-		1	6.67	-	
Balanced ectomorph	-		1	6.67	-	
Endomorphic ectomorph	-				-	
Ectomorph-endomorph	-		1	6.67	-	
Ectomorphic endomorph	-		-		-	
Central	2	13.33	-		1	5
Total	15	100	15	100	20	100

Notes: This table presents the distribution of athletes across different somatotype categories for each sport. It shows the frequency and percentage of players falling into various body type classifications, providing insight into the predominant physiques in each sport.

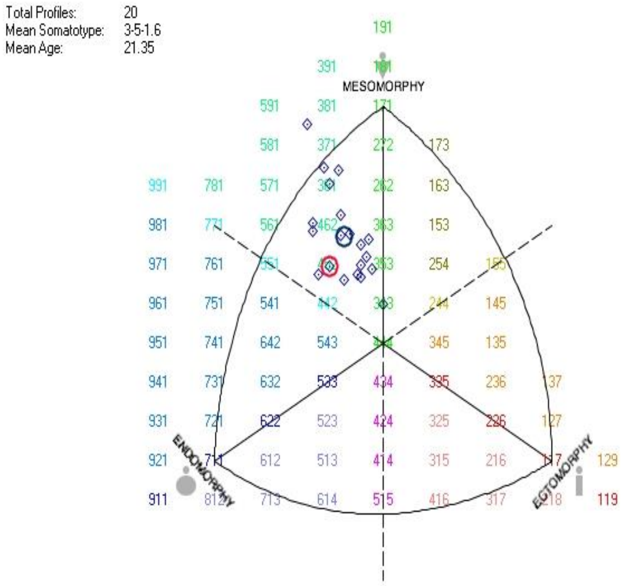

Figure 1. Somatochart of Soccer players

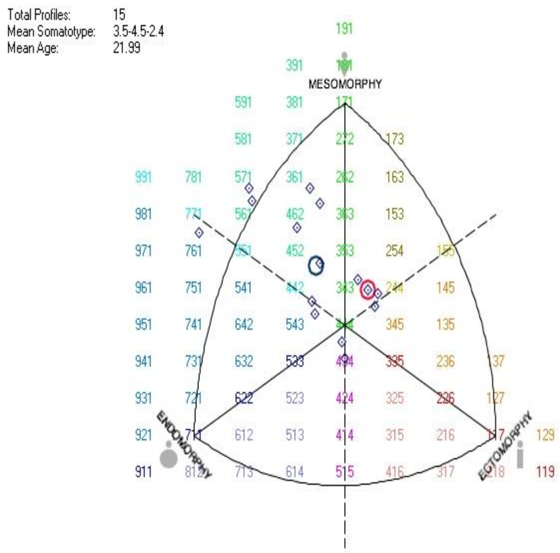

Figure 2. Somatochart of basketball players

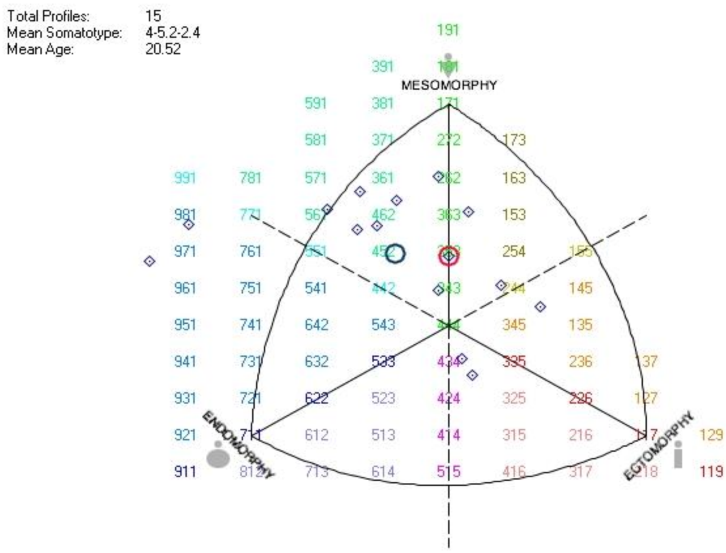

Figure 3. somatochart of Volleytball players

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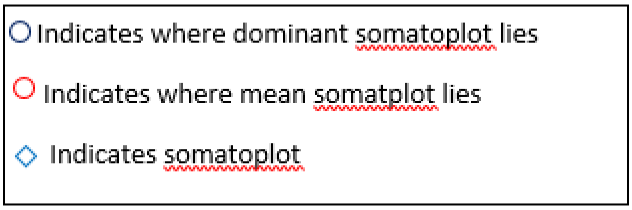

Note: The somatocharts (Figures 1-3) visually represent the body type distributions for soccer, basketball, and volleyball players. Soccer players tend to cluster in the mesomorph-endomorph region, suggesting moderate muscularity with some body fat. Basketball players show a wider distribution but still trend towards mesomorphy, indicating varied physiques with a general emphasis on muscularity. Volleyball players display the most diverse range of body types, with points widely dispersed across the somatochart. These visual representations complement the numerical data in the tables, illustrating how body type distributions vary across the three sports and suggesting that each sport may accommodate or favor different physiques to some degree.

Discussion

This study aimed to determine and compare the anthropometric variables and somatotypes of athletes involved in three different field sports (volleyball, basketball, and soccer) among undergraduate students at Madonna University, Elele, Rivers State, Nigeria. The results reveal several significant anthropometric and somatotype differences among the athletes in these sports.

Height exhibited significant discrepancies among the three groups ($p = 0.033$), with basketball athletes registering the highest stature (1.78 ± 0.06 m), trailed by soccer players (1.73 ± 0.08 m), and volleyball participants (1.72 ± 0.05 m). This outcome is consistent with prior studies indicating the pivotal role of height in basketball, where increased stature frequently confers a competitive edge (Apostolidis et al., 2003; Altavilla et al., 2018; Zarić et al., 2020). Notably, the stature of volleyball players in this investigation was below anticipated levels, despite the perceived advantage of height in volleyball as well (Marques & Marinho, 2009).

A plausible rationale for the diminished height observed in volleyball players in this research may be linked to the specific positional demands inherent in the sport. Positions emphasizing agility and swiftness over sheer height, such as liberos and defensive specialists, commonly feature shorter individuals renowned for their rapid reflexes and precise ball handling, contrasting with the towering presence typically associated with middle blockers or outside hitters (Palao et al., 2014; Pietraszewska et al., 2015). This emphasis on a diverse range of physical attributes across various positions underscores the intricate nature of volleyball's strategic and tactical requirements, underscoring the necessity for multifaceted skill sets beyond mere height (Nikolaidis et al., 2015; Pocek et al., 2021).

The measurement of triceps skinfold exhibited notable variances among the groups ($p = 0.049$), with volleyball participants displaying the highest measurements (12.63 ± 9.97 mm), followed by basketball participants (10.13 ± 6.09 mm), and soccer participants (7.09 ± 1.63 mm). Soccer athletes demonstrated reduced subcutaneous fat in the upper arm area in comparison to volleyball and basketball athletes, potentially attributed to the elevated cardiovascular requirements of soccer (Akdoğan & Taşçıoğlu, 2022; Debnath et al., 2023). This discovery provides insight into the potential influence of sport-specific training and physical demands on the body composition of athletes. These outcomes underscore the significance of customizing training regimens to the distinct physical demands of each sport to enhance body composition and athletic performance.

Humerus breadth exhibited significant variance across the cohorts ($p = 0.013$), indicating that soccer and basketball participants displayed greater thigh circumferences compared to volleyball players. This discrepancy may be linked to the distinct strength demands and muscle mass distribution in the lower extremities associated with these athletic disciplines (Akagi et al., 2014; Mala et al., 2015; Teixeira et al., 2015; Akdoğan & Taşçıoğlu, 2022).

Soccer athletes commonly depend on robust lower body power for sprinting and kicking, whereas basketball players necessitate strong lower limbs for leaping and rapid lateral motions on the playing surface (Jezdimirović et al., 2013; Teixeira et al., 2015). Conversely, volleyball competitors may prioritize agility and vertical jump height, potentially contributing to their comparably narrower thigh circumference (Nikolaidis et al., 2015b; Pietraszewska et al., 2015).

Furthermore, the training methodologies and conditioning regimens tailored to each sport have the capacity to impact muscle mass development and overall physique composition in competitors (Podrigalo et al., 2023; Park & Kim, 2024). The frequency and intensity of physical exercises within each sport can influence muscle hypertrophy and adipose distribution, consequently shaping the disparities in thigh circumference evident among athletes (Clemente-Suarez, 2015; Karatieieva et al., 2023).

While not reaching statistical significance, there were noticeable patterns in somatotype features observed within the three distinct groups. Volleyball participants demonstrated the highest levels of endomorphy (4.03 ± 2.09) and mesomorphy (5.16 ± 1.44), indicating a higher proportion of body fat and muscle mass. Conversely, soccer athletes exhibited the lowest endomorphy (2.97 ± 0.32) and the highest ectomorphy (1.65 ± 0.71) values, suggesting a slender build with comparatively longer limbs. These variations in somatotype components may be linked to the specific physical requirements and training routines associated with each sport. This finding emphasizes the necessity of taking into account sport-specific variables when evaluating body composition (Gualdi-Russo & Zaccagni, 2001; Buśko et al., 2013).

The distribution of somatotypes (Table 4) indicates that the majority of athletes in all three sports are classified under the endomorphic mesomorph category, with 85% of soccer players, 40% of basketball players, and 33.33% of volleyball players falling into this group. This points towards a prevalence of muscularity with some degree of adiposity within the sample. Nevertheless, there was greater variability in somatotype classifications among basketball and volleyball players in comparison to soccer players, suggesting a higher level of physical diversity in these collegiate sports.

Our results partially correspond with prior studies regarding somatotypes in the studied sports disciplines. The prevalence of mesomorphy in all three cohorts is in line with the discoveries of Rahmawat (2003), De Melo et al. (2012), and Gualdi-Russo and Zaccagni (2001). Nevertheless, the elevated endomorphy scores in our volleyball participants contrast with the results of (Tsunawake et al., 2003) who identified volleyball athletes as more ectomorphic. The decreased endomorphy and increased ectomorphy in football players in comparison to the other two categories are consistent with multiple investigations (Lago-Peñas et al., 2011; Portes et al., 2015; Nebigh et al., 2017; Abarghoueinejad et al., 2021; Martinez-Ferran et al., 2022), which have observed that successful footballers tend to possess a relatively slender physique.

Although these outcomes corroborate specific aspects of existing literature, it is imperative to acknowledge the constraints of somatotyping in accurately depicting the intricate nature of bodily composition. The discrepancies in endomorphy levels among volleyball participants when compared to earlier research imply the necessity for further exploration into the distinct attributes of athletes in this discipline. Furthermore, the uniformity in reduced endomorphy and heightened ectomorphy levels in football players may be influenced by a variety of factors beyond body morphology alone, including playing position, tactical approaches, and general fitness levels (Cáceres et al., 2019; Kaplánová et al., 2020; Petri et al., 2024).

Conclusion

This research offers valuable insights into the anthropometric characteristics and somatotypes of collegiate volleyball, basketball, and soccer athletes, which could have implications for talent identification and sport-specific training programs. The identified variations, such as the lower triceps skinfold measurements in soccer players, underscore the significance of sport-specific physical traits. The diversity in somatotypes observed within each sport indicates that a range of body types may be suitable at the collegiate level, potentially motivating aspiring athletes who do not conform to typical physiques. While certain findings corroborate existing literature, others reveal potentially distinctive attributes of this particular cohort, enriching our comprehension of physical characteristics in these sports and potentially guiding training and selection procedures at the collegiate le.

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Full access to data on request.

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The authors asserts that they have no conflict of interest to declare

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