



ISSN: 2456-0057

IJPNPE 2025; 10(2): 227-234

Impact Factor (RJIF): 5.91

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www.journalofsports.com

Received: 22-07-2025

Accepted: 26-08-2025

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Relationships between anthropometric profiles and physical abilities of basketball players at the 2023 national phase of the University Games of Benin

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DOI: <https://www.doi.org/10.22271/journalofsport.2025.v10.i2d.3101>

Abstract

Background: Basketball requires muscular power, agility, and low body fat. Anthropometric and physical assessments can help distinguish players by position or age. In Benin, university competitions highlight elite athletes, but data on younger players remain limited.

Objective: To examine relationships between anthropometric profiles and physical abilities in male and female basketball players at the 2023 University Games of Benin.

Methods: A comparative cross-sectional study involved 45 men and 43 women from 13 teams in Grand-Popo. Measurements included body mass, height, wingspan, and hand span. Physical tests were the sargent jump, medicine ball throw, 20 m sprint, and T-test.

Results: Among women, performance was consistent across positions; the throw test correlated with body mass ($r = 0.332$) and hand span ($r = 0.379$). In men, the Sargent jump correlated with height ($r = 0.413$), wingspan ($r = 0.347$), and hand span ($r = 0.443$).

Conclusion: Anthropometry influences vertical jump and upper-limb strength, informing talent identification and training in Beninese university basketball.

Keywords: Athletes, athletic performance, physical fitness, body composition, basketball

1. Introduction

Sport is a form of physical activity in which participants adhere to a common set of rules and pursue a clearly defined objective, most often performance-related [1]. Its practice therefore requires certain qualities morphological, physical, and physiological that can enable athletes to achieve high performance. Indeed, performance attainment depends on technical, tactical, physical, physiological, and psychological parameters [2].

According to a study by Gil *et al.* [3], the analysis of anthropometric, physiological, and physical parameters allows differentiation between elite and non-elite players and the establishment of profiles according to playing position or age [4]. Basketball, a highly demanding sport, requires physical qualities to sustain alternating offensive and defensive actions and high energy expenditure [5]. This underscores the importance of good physical fitness, acquired through structured training. Basketball specifically demands agility, muscular power, and a low body fat percentage [6]. Understanding the determinants of sports performance is of interest to athletes, coaches, organisers, and federations [7].

Numerous studies have evaluated these qualities, but few have focused on university sports, which play a significant role in student life and include recreational activities and university games [8]. In Benin, the Beninese Office of School and University Sport (OBSSU) oversee the organisation of the University Games (JUB). From 14 June to 2 July 2023, the zonal phase of the 10th University Games led to a national phase in which the best teams, thanks to their anthropometric and physical profiles, outperformed their opponents. This national phase remains a major event and a hub for Beninese University sports elites.

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Aware of the importance of school and university sport for long-term performance, the Beninese government continues to invest despite the lack of data on the morphological, physical, and physiological characteristics of young teams. It is therefore crucial to investigate these aspects to guide technical staff in talent identification, selection, and decision-making. Understanding the relationships between anthropometric profiles and physical abilities can inform training and enhance performance.

The purpose of this study was to investigate the relationships among male and female basketball players participating in the 2023 national phase of the University Games of Benin. Specifically, it sought to answer the question: What are the relationships between anthropometric profiles and physical abilities of basketball players at the 2023 national phase of the University Games of Benin?

2. Materials and Methods

2.1 Study Type and Setting

This was a comparative cross-sectional study conducted during the 2023 national phase of the University Games of Benin, held in Grand-Popo by the Beninese Office of School and University Sport (OBSSU) from 5 to 11 November 2023. A comprehensive survey allowed contact with all basketball teams participating in the 2023 national phase. Out of 14 teams present in Grand-Popo, 13 took part in the collection of anthropometric data and the physical tests, including seven men's basketball teams and six women's basketball teams. This involved forty-five male players (mean age: 22.08 ± 2.88 years) and forty-three female players (mean age: 20.44 ± 1.82 years). Inclusion criteria were: registration in a team qualified for the national phase, possession of a valid sports licence, and signing of informed consent.

2.2 Evaluation

All measurements were collected according to standardized procedures: body mass and height were measured using a weighing scale and a stadiometer, respectively. A graduated ruler was used to measure wingspan^[9] and hand span was measured as the distance between the tips of the thumb and little finger at maximum extension^[10].

Lower-limb strength was assessed using the Sargent test^[5]. While upper-limb strength was measured with the Medicine Ball throw^[11]. Speed was evaluated using a 20 m sprint test to assess maximal velocity or anaerobic power^[12]. Agility was assessed with the T-test, which evaluates speed and the ability to change direction^[13]. Standardised protocols were followed for all tests.

Variables were grouped into three categories: anthropometric (height, body mass, wingspan, hand span), physical (strength, speed, agility), and playing positions (Point Guard, Guard, Forward, Centre). The same evaluators were used to ensure measurement reliability.

2.3 Ethical Considerations

The protocol adhered to the ethical principles of the Declaration of Helsinki. Participants were informed about the objectives, procedures, and potential risks associated with the study. Participation was voluntary and conditional upon signing informed consent.

2.4 Statistical Analysis

Analyses were performed using SPSS version 27. Quantitative variables are presented as mean \pm standard deviation. Normality was assessed using the Shapiro-Wilk

test. Correlations between anthropometric profiles (height, body mass, wingspan, hand span) and physical abilities (strength, speed, agility) were evaluated using Pearson's correlation. Comparisons across positions and institutions were conducted using ANOVA, with Bonferroni post hoc tests. Statistical significance was set at $p < 0.05$.

3. Results

3.1 Anthropometric Profiles

Among women, the mean age was 20.44 ± 1.82 years and the mean body mass 61.25 ± 7.20 kg, with significant variability ($p = 0.00$ and $p = 0.01$). Other variables did not show significant variation. Among men, the mean age was 22.08 ± 2.88 years, with significant variability, while anthropometric variables were similar across groups (Table 1).

Among women, players were similar in body mass, height, BMI, and hand span, but Forwards had a greater wingspan than Centres (1.82 ± 0.07 vs 1.74 ± 0.05 ; $p = 0.02$). Among men, body mass, BMI, and hand span were similar, whereas height and wingspan varied significantly, particularly among Centres and between Forwards and Point Guards (1.85 ± 0.06 vs 1.77 ± 0.05 ; $p = 0.02$) (Table 2).

3.2 Physical Abilities

Among women, in the 20 m sprint test, players from ESGIS were the slowest ($p = 0.00$). Among men, in the T-test of agility, players from INJEPS were the least agile compared with those from UNSTIM (11.09 ± 0.58 vs 9.93 ± 0.14 ; $p = 0.01$) (Table 3).

Among women, performance was similar across playing positions. Among men, the Sargent test showed a significant difference between Guards and Point Guards (65.22 ± 6.66 vs 50 ± 12.51 ; $p = 0.00$), with Guards exhibiting greater vertical jump (Table 4).

3.3 Relationship between Anthropometric Profile and Physical Abilities

Among women, the throw test was moderately correlated with body mass ($r = 0.332$) and hand span ($r = 0.379$), with no significant relationship observed with the other tests. Among men, the Sargent test was moderately correlated with height ($r = 0.413$), wingspan ($r = 0.347$), and hand span ($r = 0.443$), while the throw test was moderately correlated with height ($r = 0.403$) and wingspan ($r = 0.441$) (Table 5).

4. Discussion

The aim of this study was to compare the anthropometric and physical profiles of students participating in the 2023 national phase of the University Games of Benin.

Anthropometric parameters refer to body dimensions (height, wingspan, hand span) that may influence an athlete's sports performance^[14]. Depending on the sport, anthropometric factors can be among the primary determinants of performance^[14]. It is therefore important to consider and appropriately weight these factors during talent selection^[14]. In many sports, however, there is no ideal morphology, making anthropometric factors less relevant^[14]. In parallel, capacity refers to the ability to perform a task, whether physical or abstract^[15]. Physical capacity corresponds to muscular power and the respiratory and cardiovascular adaptation to various efforts^[15]. It is characterised by endurance, strength, flexibility, agility, balance, and reaction time^[16]. Accordingly, while averages and distributions of indices can be established within a population, they cannot

precisely predict individual performance ^[15]. Moreover, it is possible to monitor training progress or compare different sporting and professional populations ^[15]. In this regard, an athlete's physical characteristics largely predict their potential to perform at a high level in their discipline ^[17]. This study therefore aims to demonstrate how its results align with data from the literature and elite sport.

4.1 Population Characteristics and Anthropometric Profiles:

The mean age was 20.44 ± 1.82 years for women and 22.08 ± 2.88 years for men, indicating that the players were young and in the senior category ^[18]. According to the literature, individuals aged 15-24 predominantly engage in gymnastics, fitness training, and team sports ^[19]. At the Tokyo 2020 Olympics, athletes in speed, flexibility, and VO_2 max events were the youngest, with a median and mean age of 23 years for men and 22 years for women ^[20].

Height and body mass are among the factors that determine a basketball player's position on the court ^[21]. Among female players, the mean anthropometric values were: body mass 61.25 ± 7.20 kg, height 1.69 ± 0.06 m, BMI 21.42 ± 2.38 kg/m², wingspan 1.76 ± 0.06 m, and hand span 21.93 ± 1.45 cm. Differences between university groups were significant only for body mass ($p = 0.01$), while by playing position, only wingspan showed a significant difference ($p = 0.03$), indicating relative anthropometric homogeneity among the players.

In men, the mean values were: body mass 72.69 kg, height 1.84 m, BMI 21.44 kg/m², wingspan 1.96 m, and hand span 24.57 cm. No significant differences were observed between groups, and according to playing positions, only height varied significantly ($p < 0.05$).

Body Mass Index (BMI) is an estimate of the amount of body fat based on weight and height data ^[22]. According to the WHO, a BMI between 18.9 and 24.9 kg/m² is considered normal ^[23]. A study involving 14 teams reported that the mean BMI per playing position ranged from 21.9 to 23.4 kg/m², remaining within the normal range ^[24]. Furthermore, a sport such as basketball requires good agility, an optimal level of muscular power, and a relatively low body fat percentage ^[6]. These findings confirm that the participants were of normal weight but differ from the values reported by Yusuf Köklü *et al.* ^[25], where, in the Turkish first division, height (1.97 m) and body mass (98.4 kg) were substantially higher than the averages observed in men, whereas in the second division, they were slightly lower (1.95 m and 94.7 kg) ^[25], approaching first division values but remaining above the averages observed in the present study across groups and playing positions. Yusuf Köklü *et al.* ^[25], reported no significant differences in height or body mass between the Turkish first and second divisions.

In Pro A and Pro B, centres were taller and heavier (2.03 m, 103.9 kg) than forwards (1.95 m, 89.4 kg) and guards (1.85 m, 82 kg) ^[17]. However, the study noted that these differences were not related to the players' level of play ^[17]. Although height is an advantage in basketball, it may not depend on the level of competition (league) ^[26]. Body composition influences both individual and team performance in basketball ^[26]. Moreover, numerous studies have reported that players' height, weight, and BMI are associated with team performance ^[27-31]. Body composition is crucial in team sports, as excess fat impedes movements against gravity ^[32].

Wingspan in females is relatively low compared to elite-level values (1.90 m) ^[33, 34], the wingspan of men approaches that observed at the elite level (2.03 m) ^[33, 34], this enables players

to cover more space during the defensive phase.

Wingspan is close to elite values, whereas in males it is lower; a greater wingspan would facilitate ball reception and grip. The American international Kawhi Leonard has a wingspan 52% greater than the average, measuring 28.6 cm ^[35].

4.2 Physical Capacities

Leg power is an important characteristic for short-term, high-intensity activities such as sprinting and jumping ^[36]. Among females, the average performances were: Sargent test 36.23 ± 6.74 cm, throw 4.87 ± 0.64 m, 20 m sprint 3.87 ± 0.36 s, agility 13.11 ± 0.93 s. Players showed similar results across positions and tests, except for the 20 m sprint, where a significant difference between institutions was observed ($p = 0.00$). The average Sargent test performance in females (36 cm) is considered average according to the literature (31-40 cm = average, 41-50 cm = above average) ^[37]. Additionally, the average 20 m sprint (3.87 s) and agility (13.11 s) performances were respectively average and low, whereas elite sprinters run between 3.0 and 3.4 s ^[38-42]. Similarly, female agility in this 2023 national phase was low (13.11 s; 11.5-12.5 s = average). Upper-limb strength in the throwing test (4.87 m) was slightly below average (4.90 m) ^[11, 43].

Among males, the average performances were: Sargent test 57.11 ± 9.44 cm, throw 6.25 ± 0.82 m, 20 m sprint 2.99 ± 0.20 s, agility 10.42 ± 0.62 s. The average Sargent test performance in males (57 cm) is considered good (51-60 cm = good, 61-70 cm = very good) ^[37]. Additionally, male performances in the 20 m sprint (2.99 s) and agility (10.42 s) are good, approaching elite level (sprint 2.7-3.1 s) ^[38-42]. Similarly, an agility test performance between 9.5 and 10.5 s is considered good ^[44]. The average throwing test performance in males (6.25 m) is good (6.20-7 m) ^[11, 43]. Male players in the 2023 national phase demonstrated good agility and speed. Test performances (Sargent, throw, 20 m sprint) were generally similar, except according to playing position ($p = 0.00$). One study showed that physical performances of professional basketball players differ depending on whether they are guards, forwards, or centres ^[25]. Positions on the court require specific physical attributes in professional basketball ^[25]. Consequently, this suggests that coaches should tailor physical conditioning programmes according to specific playing positions ^[25].

Basketball requires substantial energy resources and physical capacities to sustain the alternation between offense and defense ^[5]. Speed appears to be the most critical parameter for achieving optimal vertical jump performance ^[45]. According to Grosgeorges ^[46], a basketball game involves 4-5 km of movement depending on the position and level, with alternating periods of work and rest. Good physical condition is therefore essential, and Turkish first- and second-division players exhibit similar physical performances ^[25]. These results suggest that high-level basketball players exhibit similar physical characteristics ^[25]. It could be said that the players in the 2023 national phase exhibit similar physical characteristics, as is typical at any comparable level of play.

4.3 Relationship between Anthropometric Profile and Physical Capacities

Among females, the throwing test showed a moderate correlation with body mass ($r = 0.332$) and Hand span ($r = 0.379$), whereas no significant correlation was found with the other tests. However, the literature reports a significant correlation between BMI and medicine-ball throw

performance ($r = 0.663$)^[5]. Basketball performance is influenced by body composition, with each position requiring specific attributes^[47].

Among males, the Sargent test showed a moderate correlation with height ($r = 0.413$), wingspan ($r = 0.347$), and arm span ($r = 0.443$), whereas the throwing test was correlated with height ($r = 0.403$) and wingspan ($r = 0.441$). Basketball is one of the

most popular sports worldwide^[48], the study of basketball players' anthropometry and body composition is important, as it significantly influences performance^[49]. Moreover, basketball is influenced by body components, which provide a useful biomarker of physical capacities^[47]. Indeed, in high-level basketball, the anthropometric profile guides training planning and player selection^[50].

Table 1: Characteristics and Anthropometric Profiles (Mean \pm SD) of Basketball Players at the 2023 National Phase of the University Games of Benin

		Age	BM (Kg)	Height (m)	BMI (Kg/m ²)	Wingspan (m)	Hand span (Cm)
Women	ESGIS (08)	18.75 \pm 1.03	67.62 \pm 6.36	1.73 \pm 0.05	22.41 \pm 2.06	1.81 \pm 0.07	22.75 \pm 1.28
	FLASH-UP (07)	19.28 \pm 1.49	60.71 \pm 7.11	1.71 \pm 0.06	20.64 \pm 2.17	1.77 \pm 0.08	22 \pm 0.57
	INJEPS (07)	20.29 \pm 1.11	54.86 \pm 5.39	1.67 \pm 0.04	19.50 \pm 1.27	1.77 \pm 0.04	21.86 \pm 2.47
	FASHS-UAC (10)	21.10 \pm 1.66	59.40 \pm 5.27	1.66 \pm 0.07	21.44 \pm 2.83	1.74 \pm 0.05	22.10 \pm 0.99
	ENSET-Lokossa (05)	21.40 \pm 1.51	61.00 \pm 6.74	1.66 \pm 0.07	21.98 \pm 2.59	1.75 \pm 0.05	21.60 \pm 1.51
	SAP-Parakou (06)	22.33 \pm 1.75	64.17 \pm 7.57	1.67 \pm 0.06	22.73 \pm 2.06	1.74 \pm 0.03	20.83 \pm 1.16
	Players (N=43)	20.44 \pm 1.82	61.25 \pm 7.20	1.69 \pm 0.06	21.42 \pm 2.38	1.76 \pm 0.06	21.93 \pm 1.45
	p-Value (ANOVA)	0.00	0.01	0.19	0.10	0.21	0.27
Men	INJEPS (08)	23.12 \pm 1.95	70.75 \pm 6.86	1.86 \pm 0.08	20.56 \pm 2.72	1.97 \pm 0.07	24 \pm 1.41
	FLASH-UP (05)	27 \pm 4.47	71.8 \pm 3.70	1.82 \pm 0.04	21.54 \pm 1.12	1.92 \pm 0.06	23 \pm 1.22
	ESGIS (06)	19.83 \pm 0.40	69.67 \pm 9.89	1.81 \pm 0.10	21.06 \pm 2.15	1.93 \pm 0.10	23.17 \pm 1.16
	EPAC (06)	22.00 \pm 2.09	75.67 \pm 8.75	1.86 \pm 0.09	21.80 \pm 2.06	1.94 \pm 0.11	22.33 \pm 0.51
	HECM-Calavi (06)	22 \pm 2.36	74.5 \pm 8.54	1.83 \pm 0.06	22.29 \pm 4.14	1.97 \pm 0.10	22.83 \pm 0.75
	UCAO (09)	21.22 \pm 1.20	75.11 \pm 6.33	1.85 \pm 0.07	21.93 \pm 2.19	2.01 \pm 0.11	23.22 \pm 1.20
	UNSTIM (05)	20 \pm 1.41	70.20 \pm 7.72	1.85 \pm 0.05	20.52 \pm 2.37	1.93 \pm 0.06	22 \pm 1.41
	Players (N=45)	22.08 \pm 2.88	72.69 \pm 7.42	1.84 \pm 0.07	21.44 \pm 2.38	1.96 \pm 0.09	24.57 \pm 10.80
	p-Value (ANOVA)	0.00	0.64	0.94	0.85	0.57	0.68

ESGIS : Higher School of Information Management and Sciences; FLASH_UP : Faculty of Arts, Letters, and Humanities_University of Parakou; INJEPS : National Institute of Youth, Physical Education and Sport; FASHS_UAC: Faculty of Human and Social Sciences_University of Abomey-Calavi; ENSET_Lokossa: Higher Normal School of Technical Education_Lokossa; SAP-Parakou : Sapientia Parakou; EPAC: Polytechnic School of the University of Abomey-Calavi; HECM: Higher School of Commerce and Management; UCAO: Catholic University of West Africa; UNSTIM: National University of Science, Technology, Engineering and Mathematics; BM: Body Mass; BMI: Body Mass Index; Mean: average; SD: standard deviation; N: sample size; kg: kilogramme; m: metre; cm: centimetre

Table 2: Anthropometric Profiles (Mean \pm SD) of Basketball Players at the 2023 National Phase of the University Games of Benin, According to Playing Position

		BM (Kg)	Height (m)	BMI (Kg/m ²)	Wingspan (m)	Hand span (Cm)
Women	Forward (17)	58.12 \pm 6.05	1.67 \pm 0.04	20.84 \pm 2.22	1.74 \pm 0.05 [†]	21.35 \pm 1.27
	Guard (6)	63.17 \pm 10.99	1.68 \pm 0.06	22.06 \pm 2.45	1.76 \pm 0.05	22.67 \pm 1.36
	Point guard (12)	61.50 \pm 6.74	1.69 \pm 0.06	21.58 \pm 2.90	1.76 \pm 0.05	22.33 \pm 1.49
	Centre (8)	66.13 \pm 3.94	1.74 \pm 0.08	21.92 \pm 1.90	1.82 \pm 0.07 [†]	22 \pm 1.60
	Players (N=43)	61.25 \pm 7.20	1.69 \pm 0.06	21.42 \pm 2.38	1.76 \pm 0.06	21.93 \pm 1.45
	p-Value (ANOVA)	0.05	0.09	0.62	0.03	0.15
Men	Forward (17)	73 \pm 6.99	1.85 \pm 0.06 ^{†*}	21.38 \pm 2.49	1.95 \pm 0.05	22.88 \pm 0.99
	Guard (9)	71.11 \pm 6.11	1.80 \pm 0.03 [*]	21.76 \pm 2.09	1.94 \pm 0.06	3078 \pm 2.10
	Point guard (9)	70.56 \pm 10.11	1.77 \pm 0.05 ^{†‡}	22.33 \pm 3.15	1.88 \pm 0.11	23.44 \pm 1.50
	Centre (10)	75.50 \pm 5.85	1.92 \pm 0.03 ^{**‡}	20.45 \pm 1.42	2.06 \pm 0.07 ^{**}	22.90 \pm 1.37
	Players (N=45)	72.69 \pm 7.42	1.84 \pm 0.07	21.44 \pm 2.38	1.96 \pm 0.09	24.57 \pm 10.80
	p-Value (ANOVA)	0.46	0.00	0.38	0.00	0.30

BM: Body Mass; BMI: Body Mass Index; Mean: average; SD: standard deviation; N: sample size; kg: kilogramme; m: metre; cm: centimetre; †: significant difference between Forward and Centre; ‡: significant difference between Forward and Point Guard; *: significant difference between Forward and Centre; **: significant difference between Guard and Centre; ‡: significant difference between Point Guard and Centre

Table 3: Physical Abilities (Mean \pm SD) of Basketball Players at the 2023 National Phase of the University Games of Benin

		S-test (Cm)	Throw (m)	20 m sprint (s)	T-test (s)
Women	ESGIS (08)	37.63 \pm 9.47	4.82 \pm 0.38	4.29 \pm 0.30 ^{†‡‡}	13.48 \pm 0.97
	FLASH-UP (07)	33.71 \pm 5.76	4.67 \pm 0.39	3.57 \pm 0.37 [‡]	12.97 \pm 0.54
	INJEPS (07)	37.00 \pm 6.45	4.39 \pm 0.54	3.84 \pm 0.26	12.24 \pm 1.29
	FASHS-UAC (10)	36.40 \pm 7.73	5.30 \pm 0.67	3.77 \pm 0.23 [†]	13.19 \pm 0.72
	ENSET-Lokossa (05)	34.60 \pm 4.15	4.97 \pm 1.03	4.08 \pm 0.13	13.26 \pm 0.41
	SAP-Parakou (06)	37.50 \pm 5.24	4.96 \pm 0.56	3.67 \pm 0.35 [‡]	13.54 \pm 0.97

	Players (N=43)	36.23±6.74	4.87±0.64	3.87±0.36	13.11±0.93
	p-Value (ANOVA)	0.87	0.09	0.00	0.09
Men	INJEPS (08)	55.50±8.17	6.64±0.84	3.15±0.14	11.09±0.58 [†]
	FLASH-UP (05)	55.00±4.63	6.29±0.31	2.94±0.10	10.38±0.30
	ESGIS (06)	59.00±6.41	6.35±0.74	3.00±0.12	10.30±0.95
	EPAC (06)	55.50±17.63	5.93±0.78	2.99±0.11	10.15±0.18
	HECM-Calavi (06)	55.17±7.27	6.81±0.37	2.93±0.16	10.20±0.14
	UCAO (09)	59.89±11.47	5.87±1.24	2.98±0.33	10.50±0.72
	UNSTIM (05)	58.80±5.07	5.91±0.23	2.89±0.18	9.93±0.14 [‡]
	Players (N=45)	57.11±9.44	6.25±0.82	2.99±0.20	10.42±0.62
	p-Value (ANOVA)	0.92	0.22	0.29	0.01

ESGIS : Higher School of Information Management and Sciences; FLASH_UP : Faculty of Arts, Letters, and Humanities_University of Parakou; INJEPS : National Institute of Youth, Physical Education and Sport; FASHS_UAC: Faculty of Human and Social Sciences_University of Abomey-Calavi; ENSET_Lokossa: Higher Normal School of Technical Education_Lokossa; SAP-Parakou : Sapientia Parakou; EPAC: Polytechnic School of the University of Abomey-Calavi; HECM: Higher School of Commerce and Management; UCAO: Catholic University of West Africa; UNSTIM: National University of Science, Technology, Engineering and Mathematics; S-test: Sargent test; Mean: average; SD: standard deviation; N: sample size; m: metre; cm: centimetre; s: second[†]: significant difference between ESGIS and FASHS_UAC; [‡]: significant difference between ESGIS and FLASH_UP; [‡]: significant difference between ESGIS and SAP-Parakou; [‡]: significant difference between INJEPS and UNSTIM

Table 4: Physical Abilities (Mean±SD) of Basketball Players at the 2023 National Phase of the University Games of Benin, According to Playing Position

		S-test (Cm)	Throw (m)	20 m sprint (s)	T-test (s)
Women	Forward (17)	35.29±7.23	4.67±0.69	3.96±0.33	13.37±1.03
	Guard (6)	39±8.22	4.68±0.65	3.88±0.31	12.88±0.89
	Point guard (12)	37.58±6.84	5.14±0.67	3.79±0.32	13.01±1.02
	Centre (8)	34.13±3.74	4.79±0.48	3.77±0.36	12.86±0.47
	Players (N=43)	36.23±6.74	4.87±0.64	3.87±0.36	13.11±0.93
	p-Value (ANOVA)	0.47	0.40	0.55	0.50
Men	Forward (17)	56.59±6.95	6.12±0.67	2.99±0.16	10.36±0.59
	Guard (9)	65.22±6.66 [†]	6.13±0.64	2.95±0.14	10.06±0.50
	Point guard (9)	50±12.51 [†]	6.14±0.88	3.04±0.33	10.73±0.75
	Centre (10)	57.10±7.37	6.61±1.13	3±0.16	10.55±0.56
	Players (N=45)	57.11±9.94	6.25±0.82	2.99±0.20	10.42±0.62
	p-Value (ANOVA)	0.00	0.49	0.85	0.12

S-test: Sargent test; Mean: average; SD: standard deviation; N: sample size; m: metre; cm: centimetre; s: second; [†]: significant difference between Guard and Point Guard

Table 5: Relationship between Anthropometric Profiles and Physical Abilities of Basketball Players

		Sargent test (Cm)	Throw (m)	20 m sprint (s)	T-test (s)
Women	BM (kg)	0.045	0.332*	0.149	0.101
	Height (m)	-0.045	0.247	0.035	-0.044
	BMI (kg/m ²)	0.066	0.183	0.144	0.151
	Wingspan (m)	-0.079	0.054	0.135	-0.123
	Hand span (cm)	0.145	0.379*	0.225	0.088
Men	BM (kg)	0.167	0.279	0.084	-0.099
	Height (m)	0.413**	0.403**	-0.124	-0.161
	BMI (kg/m ²)	-0.141	-0.028	0.170	0.018
	Wingspan (m)	0.347*	0.441**	0.103	0.006
	Hand span (cm)	0.312*	-0.178	-0.123	0.034

m: metre; BM: Body Mass; cm: centimetre; s: second; kg: kilogramme; *: correlation is significant at the 0.05 level (two-tailed); **: correlation is significant at the 0.01 level (two-tailed)

5. Conclusion

The lack of data on university sport hinders its development. This study aims to examine the relationships between anthropometric profiles and physical capacities of basketball players in the 2023 national phase in Benin. Participants in the 2023 national phase exhibited similar anthropometric and physical profiles according to their positions and institutions. Female students from INJEPS showed lower body mass, while male students demonstrated reduced agility. Compared

with the literature, their capacities remain below elite level. A moderate correlation was observed between height and upper-limb strength, indicating that anthropometric profile influences the development of physical capacities and performance. A sport-specific optimal profile could therefore facilitate this development.

These results provide a reference framework for talent identification, selection, and training, linking school, university, and national-level sport. The OBSSU should

incorporate physical and physiological assessments. Similar to secondary school sports classes, universities should have trained coaches and programmes tailored to the anthropometric profiles of the players. This study could be extended to create a database on morphological, physical, and physiological requirements, establish a standard profile of participants, and implement a detection-selection protocol to evaluate the relevance and success of the University Games.

6. Declarations

6.1 Acknowledgments

We thank all the participants who kindly gave their time to contribute to the success of this work. We are especially grateful to Colombe Mensah and Coach Sèdjro from ESGIS for their availability and support.

6.2 Ethical Considerations

The protocol adhered to the ethical principles of the Declaration of Helsinki. Participants were informed of the study's objectives, procedures, and potential risks. Their participation was voluntary and contingent upon signing an informed consent form.

6.3 AI Declaration

In preparing this work, the authors used ChatGPT to translate the content into English. After using this tool/service, the authors reviewed and edited the content as necessary and take full responsibility for the published material.

6.4 Conflicts of Interest

The authors declare that they have no conflicts of interest.

6.5 Author Contributions

- MCG organised the data, proposed the methodology, participated in data collection, and drafted the original manuscript.
- ODA designed the study, organised the data, conducted the analyses, proposed the methodology, validated the data, and drafted the original manuscript.
- SLH designed the study, organised the data, conducted the analyses, proposed the methodology, validated the data, and reviewed and edited the manuscript.
- PMD conducted the analysis, survey, and revision of the original version.
- LDD performed the analysis, conducted the survey, and revised the original manuscript.
- TA performed the analysis, survey, and revision of the original version.
- BA supervised, revised, and approved the final version.
- All authors have read and approved the final version of the manuscript, and agreed on the order of authorship.

6.6 Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

6.7 Data Availability Statement

The anonymised dataset generated and analysed during the study is available from the corresponding author upon reasonable request.

6.8 Disclaimer

The views and opinions expressed in this article are those of the authors and do not necessarily reflect the policy or official position of any affiliated institution or funding body.

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