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## Comparative study on selected anthropometric measurements among Punjab and Haryana inter- University female Kabaddi players

**Jaskirt Singh and Dr. Arun Kumar**

### Abstract

The purpose of the study was to Analyse Anthropometric Measurements among Punjab and Haryana Inter-University Female Kabaddi Players. Firstly, regarding linear measurements, Punjab kabaddi players exhibited shorter height, lower weight. Shorter arm and leg lengths compared to their counterparts from Haryana. These differences indicate potential variations in overall body size and proportionality between the two groups, which could influence performance attributes such as speed, agility and power. Secondly, the analysis of body circumferences revealed notable distinctions, particularly in waist and abdominal circumferences. Punjab players tended to have larger waist and abdominal circumferences than Haryana players, suggesting differences in central adiposity and body fat distribution. These variations could have implications for metabolic health, injury risk, and overall athletic performance. While chest and hip circumferences did not show significant differences between Punjab and Haryana players, the observed discrepancies in waist and abdominal circumferences underscore the importance of considering regional variations in body composition among kabaddi players. Moreover, the analysis of skinfold thickness revealed significant differences between the two groups, with Punjab players generally exhibiting thicker skinfold measurements compared to Haryana players. These findings suggest variations in subcutaneous fat distribution and body composition profiles, which could influence factors such as agility, endurance, and susceptibility to injuries.

**Keywords:** Kabaddi players, Haryana, Punjab, lower weight

### Introduction

The first kind of bodily measuring, anthropometry, dates back to the dawn of recorded history. Over time, several ideas about the appropriate percentage emerged. For instance, Doryphorus, the spear thrower, was fashioned by Polyclethus to be an athlete and combatant with a square chest, thick set, and broad shoulders the "ideal man" (Duncan *et al.*, 2006) [6]. While measurements of body proportion explain the connection between height and weight among the lengths, widths, and circumferences of different body segments, measurements of body size include descriptive data like height, weight, and surface area. Top athletes in several sports have been shown to have the proportions that let them perform at a certain level biomechanically (Rao, 2000) [9].

We can see this in the proportionate bodies of boxers and gymnasts, the massive builds of great shot-putters and discus throwers, the superstructure of elite basketball players, the solidity of elite football players, and the wiriness of champion distance runners (Bhatnagar, 1980) [3]. The study of the human body's dimensions and functions for use in anthropological comparison and categorization is known as anthropometry. It has been extensively shown that using information such as skull sizes and body proportions to categorise people into national, racial, and ethnic groups is usually incorrect. However, anthropometric methods are still employed in physical and palaeoanthropology, particularly to examine the evolutionary changes in extinct hominids.

Something that is anthropometric is defined as being related to or of anthropometry. That is the science of measuring things like human weight and height. The study acknowledges the goals of determining human physical differences and the many efforts to correlate racial and psychological behaviours.

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Anthropometry is the accurate measuring of different bodily components. In order for size and form to be precisely and impartially characterised (Jawis *et al.*, 2005) [7]. The measurements of skin fold thickness, stature (height), and body mass (wt) are considered basic anthropometric measures.

## Methodology

### Design of the Study

The study adopted a comprehensive approach by employing a survey method with a cross-sectional study design. This design allowed for the collection of extensive data from female kabaddi players of Punjab and Haryana participating in Inter-University competitions during the specific academic year of 2023-24.

### Source of Data

The primary data source encompassed female kabaddi players engaged in Inter-University competitions from Punjab and Haryana during the academic year 2023-24. This wider scope

ensured a representative sample that captured the diversity within the population of interest.

### Sampling Method

A random (lottery) sampling technique was meticulously employed to select a sample of 48 female kabaddi players from Inter-University teams in Punjab and Haryana. The selection criteria were carefully crafted to encompass a broad spectrum of participants, ensuring the inclusion of diverse backgrounds and skill levels.

### Selection of Subjects

Subjects were meticulously chosen based on comprehensive criteria, including active participation in kabaddi, representation of their universities during the specified academic year, and falling within the age range of 18 to 25 years. This meticulous selection process ensured the inclusion of participants with varied characteristics, enriching the depth and breadth of the study findings.

**Table 1:** Selection of Subjects

Criteria	Description
Participation in Kabaddi	All selected participants were actively involved in kabaddi, ensuring a consistent level of engagement in the sport.
Representation of Universities	Participants represented their respective universities during the academic year 2023-24, ensuring diverse representation.
Age Range	Participants were between the ages of 18 and 25 years, encompassing a range of developmental stages and experiences.
Gender	Only female kabaddi players were included in the study, ensuring a focused examination of gender-specific characteristics.
Number of Players (Punjab)	24
Number of Players (Haryana)	24

### Collection of Data

Trained female assistants meticulously conducted the measurements using specified tools, adhering to standardized procedures to ensure accuracy and reliability. This meticulous approach minimized potential sources of bias and error, enhancing the robustness of the data collected.

### Tools and Techniques

In the study, anthropometric data were collected using standardized tools. These tools included the anthropometric rod or steel tape, which was utilized for linear measurements such as height, arm length, leg length, sitting height, and body mass index (BMI). Additionally, a weighing machine was employed to measure the body weight of the participants.

For skinfold measurements, a skinfold caliper was utilized to assess biceps, triceps, subscapular, and suprailiac skinfold thicknesses. This allowed for a comprehensive evaluation of body composition among the participants.

Furthermore, steel measuring tape was used to obtain measurements of body circumferences, specifically focusing on waist, abdomen, and hip circumferences. These tools and techniques were chosen for their accuracy and reliability in capturing various anthropometric parameters essential for the study's objectives.

### Variables

The study comprehensively examined both dependent and independent variables, encompassing a wide range of anthropometric measurements such as linear measurements, skinfold measurements, and body circumferences. This holistic approach provided a comprehensive understanding of the physical attributes of female kabaddi players from Punjab and Haryana.

### Results and Discussion

In the analysis and interpretation of the data collected for this

study, a rigorous examination of various anthropometric measurements was undertaken to discern differences between female kabaddi players from Punjab and Haryana. These measurements encompassed a range of physical characteristics, including linear dimensions, body circumferences, and skinfold thicknesses.

Initially, descriptive statistics such as means and standard deviations were calculated for each anthropometric parameter, providing a snapshot of the sample's characteristics. Subsequently, inferential statistics, such as t-tests, were employed to determine the significance of differences between the two groups.

**Table 2:** Mean of Linear Measurements of Punjab Female Kabaddi Players (in Centimetres and Kilograms).

Linear Measurements	Punjab Mean	SD
Height (cm)	162.58	4.42
Weight (kg)	61.89	3.86
Total Arm Length (cm)	50.46	3.31
Total Leg Length (cm)	85.96	4.23
Sitting Height (cm)	117.52	5.94
Body Mass	23.44	1.61

The table 2 presents the descriptive statistics for various linear measurements of Punjab kabaddi players. These measurements include height, weight, total arm length, total leg length, sitting height, and body mass index (BMI). Descriptive statistics include the mean and standard deviation (SD) for each measurement.

### Height (cm)

This indicates that the average height of Punjab kabaddi players is approximately 162.58 centimeters, with a standard deviation of 4.42 centimeters, suggesting a moderate amount of variability in heights among the players.

**Weight (kg)**

The average weight of Punjab kabaddi players is approximately 61.90 kilograms, with a standard deviation of 3.86 kilograms, indicating relatively consistent weights among the players.

**Total Arm Length (cm)**

This measurement represents the average length of the arms of Punjab kabaddi players, with a mean of 50.47 centimeters and a standard deviation of 3.31 centimeters, suggesting a moderate degree of variability in arm lengths.

**Total Leg Length (cm)**

Punjab kabaddi players have an average total leg length of approximately 85.97 centimeters, with a standard deviation of

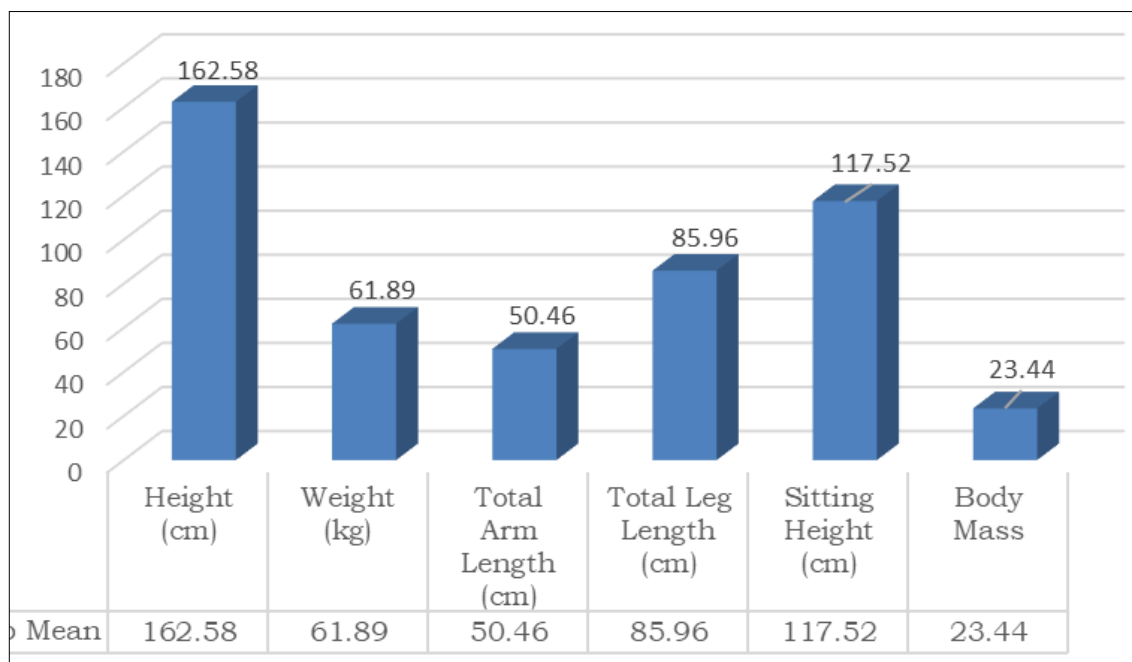
4.24 centimeters, indicating some variability in leg lengths among the players.

**Sitting Height (cm)**

This measurement represents the average sitting height of Punjab kabaddi players, with a mean of 117.53 centimeters and a standard deviation of 5.95 centimeters, indicating a moderate amount of variability in sitting heights.

**Body Mass Index (BMI)**

The average BMI of Punjab kabaddi players is approximately 23.45, with a standard deviation of 1.61, indicating that, on average, the players have a healthy BMI within the normal range.



**Fig 1:** Shows Mean of Linear Measurements of Punjab Female Kabaddi Players

**Table 3:** Mean of Body Circumference of Punjab Female Kabaddi Players (in Centimeters)

Body circumferences (cm)	Punjab Mean	SD
Chest Circumference (cm)	91.41	8.53
Waist Circumference (cm)	77.39	3.62
Abdominal Circumference (cm)	79.09	1.62
Hip Circumference (cm)	95.30	4.32

The table 3 presents the mean and standard deviation (SD) of various body circumferences for Punjab kabaddi players, including chest circumference, waist circumference, abdominal circumference, and hip circumference.

**Chest Circumference**

The average chest circumference of Punjab kabaddi players is approximately 91.41 cm, with a standard deviation of 8.54 cm, indicating some variability in chest sizes among the players.

**Waist Circumference**

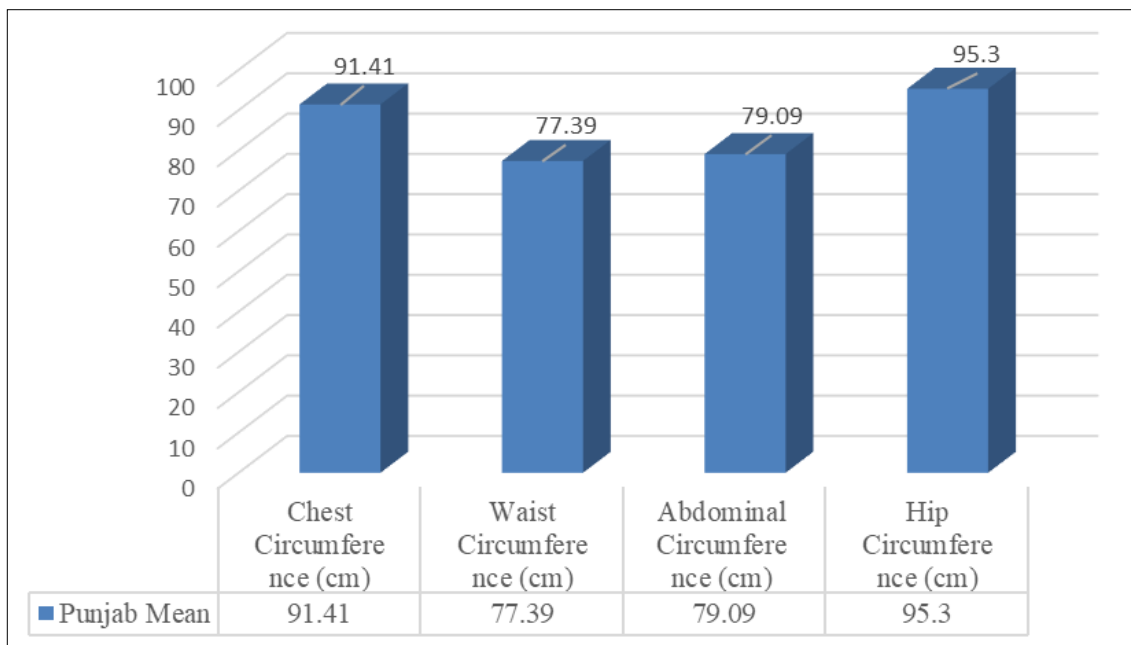
Punjab kabaddi players have an average waist circumference of about 77.39 cm, with a standard deviation of 3.62 cm, suggesting relatively consistent waist sizes within the group.

**Abdominal Circumference**

The average abdominal circumference of Punjab kabaddi players is around 79.10 cm, with a standard deviation of 1.62 cm, indicating a relatively narrow range of variation in abdominal sizes within the group.

**Hip Circumference**

The average hip circumference of Punjab kabaddi players is approximately 95.31 cm, with a standard deviation of 4.32 cm, suggesting some variability in hip sizes among the players.



**Fig 2:** Mean of Body Circumference of Punjab Female Kabaddi Players

**Table 4:** Mean of Skinfold measurements of Punjab Female Kabaddi Players (in Centimetres)

Skinfold measurements (cm)	Punjab Mean	SD
Biceps Skinfold (cm)	1.19	0.27
Triceps Skinfold (cm)	2.00	0.37
Subscapular Skinfold (cm)	2.07	0.21
Suprailiac Skinfold (cm)	1.77	0.37

The table 4 displays the mean and standard deviation (SD) of various skinfold measurements for Punjab kabaddi players, including biceps skinfold, triceps skinfold, subscapular skinfold, and suprailiac skinfold.

**Biceps Skinfold**

Punjab kabaddi players have an average biceps skinfold measurement of approximately 1.19 mm, with a standard deviation of 0.28 mm, indicating a relatively consistent level of subcutaneous fat in the biceps area among the players.

**Triceps Skinfold**

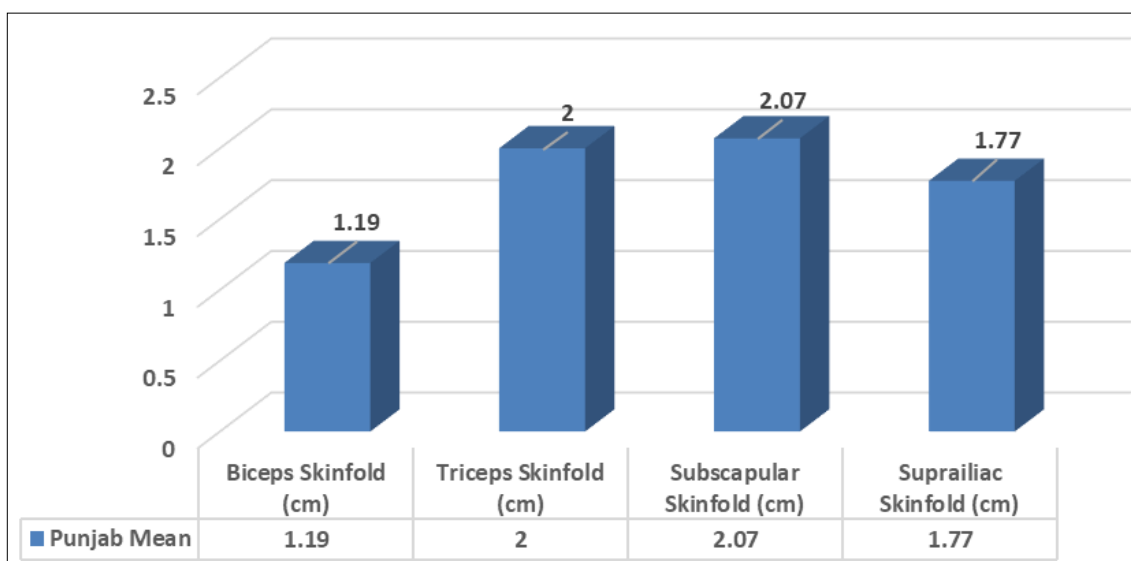
The average triceps skinfold measurement for Punjab kabaddi players is around 2.00 mm, with a standard deviation of 0.37 mm, suggesting some variability in the amount of subcutaneous fat in the triceps region within the group.

**Subscapular Skinfold**

Punjab kabaddi players have an average subscapular skinfold measurement of about 2.08 mm, with a standard deviation of 0.21 mm, indicating a relatively narrow range of variation in subcutaneous fat in the subscapular area among the players.

**Suprailiac Skinfold**

The average suprailiac skinfold measurement for Punjab kabaddi players is approximately 1.77 mm, with a standard deviation of 0.37 mm, suggesting some variability in the amount of subcutaneous fat in the suprailiac region within the group.



**Fig 3:** Mean of Skinfold measurements of Punjab Female Kabaddi Players

**Table 5:** Mean of Linear Measurements of Haryana Female Kabaddi Players (in Centimeters and Kilograms)

Linear Measurements	Haryana Mean	SD
Height (cm)	166.20	3.05
Weight (kg)	65.66	2.86
Total Arm Length (cm)	52.80	1.72
Total Leg Length (cm)	89.15	3.65
Sitting Height (cm)	119.81	3.79
Body Mass	23.76	0.62

The table 5 presents the mean and standard deviation (SD) of various linear measurements for Haryana kabaddi players, including height, weight, total arm length, total leg length, sitting height, and body mass index (BMI).

**Height (cm)**

The average height of Haryana kabaddi players is approximately 166.21 cm, with a standard deviation of 3.05 cm, indicating a relatively consistent height among the players.

**Weight (kg)**

Haryana kabaddi players have an average weight of about 65.66 kg, with a standard deviation of 2.87 kg, suggesting relatively consistent weights within the group.

**Total Arm Length (cm)**

The average total arm length of Haryana kabaddi players is around 52.80 cm, with a standard deviation of 1.73 cm, indicating a relatively narrow range of variation in arm lengths within the group.

**Total Leg Length (cm)**

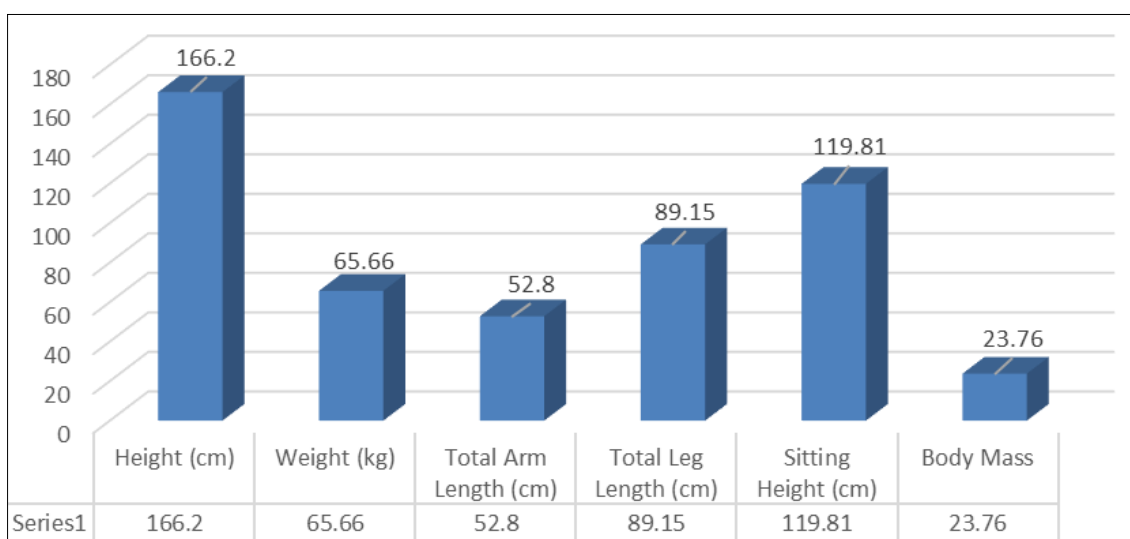
Haryana kabaddi players have an average total leg length of approximately 89.16 cm, with a standard deviation of 3.65 cm, suggesting some variability in leg lengths among the players.

**Sitting Height (cm)**

The average sitting height of Haryana kabaddi players is about 119.81 cm, with a standard deviation of 3.80 cm, indicating a moderate amount of variability in sitting heights within the group.

**Body Mass Index (BMI)**

The average BMI of Haryana kabaddi players is approximately 23.76, with a standard deviation of 0.63, indicating that, on average, the players have a healthy BMI within the normal range.

**Fig 4:** Mean of Linear Measurements of Haryana Female Kabaddi Players**Table 6:** Mean of Body circumferences of Haryana Female Kabaddi Players (in Centimeters)

Body circumferences (cm)	Haryana Mean	SD
Chest Circumference (cm)	89.77	6.15
Waist Circumference (cm)	74.96	3.70
Abdominal Circumference (cm)	76.21	2.01
Hip Circumference (cm)	92.97	4.41

The table 6 displays the mean and standard deviation (SD) of various body circumferences for Haryana kabaddi players, including chest circumference, waist circumference, abdominal circumference, and hip circumference.

**Chest Circumference**

The average chest circumference of Haryana kabaddi players is approximately 89.77 cm, with a standard deviation of 6.15 cm, indicating some variability in chest sizes among the players.

**Waist Circumference**

Haryana kabaddi players have an average waist circumference of about 74.97 cm, with a standard deviation of 3.70 cm, suggesting relatively consistent waist sizes within the group.

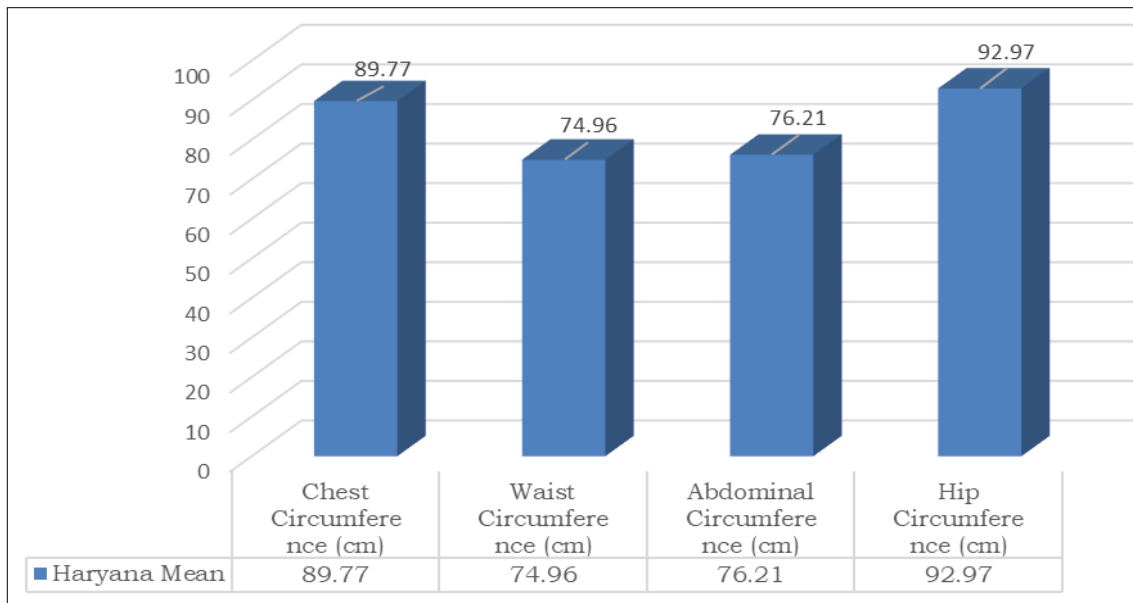
**Abdominal Circumference**

The average abdominal circumference of Haryana kabaddi players is around 76.21 cm, with a standard deviation of 2.01 cm, indicating a relatively narrow range of variation in abdominal sizes within the group.

**Hip Circumference**

The average hip circumference of Haryana kabaddi players is approximately 92.97 cm, with a standard deviation of 4.41 cm, suggesting some variability in hip sizes among the players.





**Fig 5:** Mean of Body circumferences of Haryana Female Kabaddi Players

**Table 7:** Mean of Skinfold measurements of Haryana Female Kabaddi Players (in Centimeters)

Skinfold measurements (cm)	Haryana Mean	SD
Biceps Skinfold (cm)	1.02	0.17
Triceps Skinfold (cm)	1.73	0.29
Subscapular Skinfold (cm)	1.80	0.25
Suprailiac Skinfold (cm)	1.42	0.21

The table 7 displays the mean and standard deviation (SD) of various body skinfold measurements for Haryana kabaddi players, bicep skinfold, triceps skinfold, subscapular skinfold, and suprailiac skinfold.

**Biceps Skinfold**

The average biceps skinfold thickness among the individuals in Haryana is approximately 1.03 centimetres, with a standard deviation of 0.17 centimetres. This measurement indicates the amount of subcutaneous fat present in the biceps area, which can be influenced by factors such as diet, exercise, and genetics.

**Triceps Skinfold**

The average triceps skinfold thickness is approximately 1.73 centimetres, with a standard deviation of 0.29 centimetres.

This measurement provides an indication of subcutaneous fat in the triceps region, which is commonly used in body composition assessments.

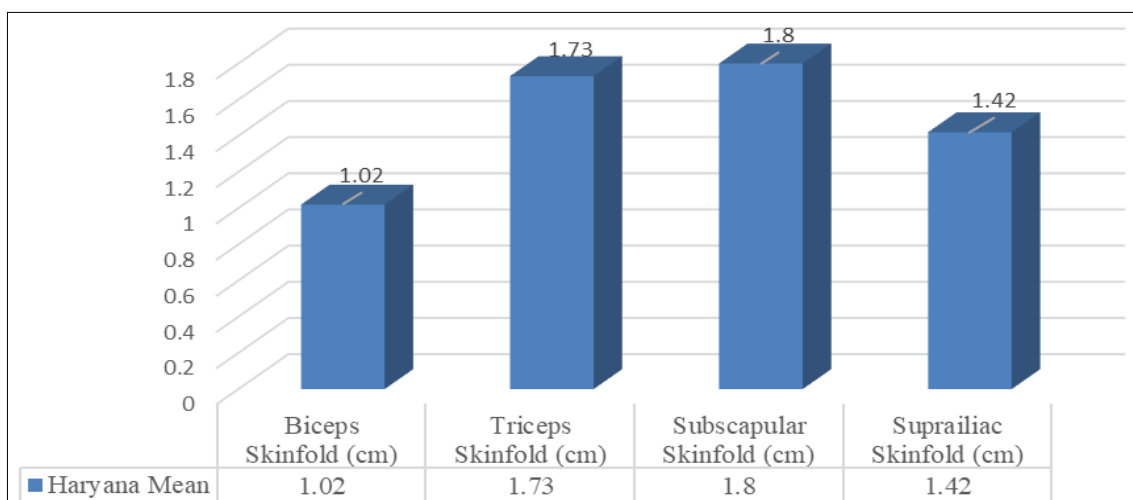
**Subscapular Skinfold**

The average subscapular skinfold thickness is around 1.80 centimetres, with a standard deviation of 0.25 centimetres. This measurement, taken just below the shoulder blade, is important as fat accumulation in this area can correlate with visceral fat and health risks

**Suprailiac Skinfold**

The average suprailiac skinfold thickness is approximately 1.42 centimetres, with a standard deviation of 0.22 centimetres. This measurement, taken above the hip bone, serves as an indicator of total body fat percentage and can be useful in assessing overall body composition.

In summary, these measurements provide valuable information about the distribution of subcutaneous fat in different areas of the body among individuals in Haryana. They can be used in various contexts, such as health assessments, fitness evaluations, and research on regional body composition characteristics.



**Fig 6:** Mean of Skinfold measurements of Haryana Female Kabaddi Players

**Table 8:** Comparative Analysis of Linear Measurements among Punjab and Haryana Female Kabaddi Players based on t-values (in Centimeters and Kilograms)

Linear Measurements	Punjab Mean	Haryana Mean	SD	t-value
Height (cm)	162.58	.....	4.42	0.0018
	.....	166.20	3.05	
Weight (kg)	61.89	.....	3.86	0.00038
	.....	65.66	2.86	
Total Arm Length (cm)	50.46	.....	3.31	0.0036
	.....	52.80	1.72	
Total Leg Length (cm)	85.96	.....	4.23	0.0075
	.....	89.15	3.65	
Sitting Height (cm)	117.52	.....	5.94	0.11
	.....	119.81	3.79	
Body Mass	23.44	.....	1.61	0.37
	.....	23.76	0.62	

\*Significance at 0.05 level

### Height (cm)

Punjab kabaddi players have an average height of 162.58 cm, with a standard deviation of 4.42 cm, whereas Haryana kabaddi players have an average height of 166.20 cm with a standard deviation of 3.05 cm. The t-value of 0.0018 suggests a statistically significant difference in height between the two groups.

### Weight (kg)

The average weight of Punjab kabaddi players is 61.89 kg, with a standard deviation of 3.86 kg, while Haryana kabaddi players have an average weight of 65.66 kg, with a standard deviation of 2.86 kg. The t-value of 0.00038 indicates a statistically significant difference in weight between the two groups.

### Total Arm Length (cm)

Punjab players have an average total arm length of 50.46 cm, with a standard deviation of 3.31 cm, whereas Haryana

players have an average total arm length of 52.80 cm, with a standard deviation of 1.72 cm. The t-value of 0.0036 suggests a statistically significant difference in arm length between the two groups.

### Total Leg Length (cm)

Punjab players have an average total leg length of 85.96 cm, with a standard deviation of 4.23 cm, while Haryana players have an average total leg length of 89.15 cm, with a standard deviation of 3.65 cm. The t-value of 0.0075 indicates a statistically significant difference in leg length between the two groups.

### Sitting Height (cm)

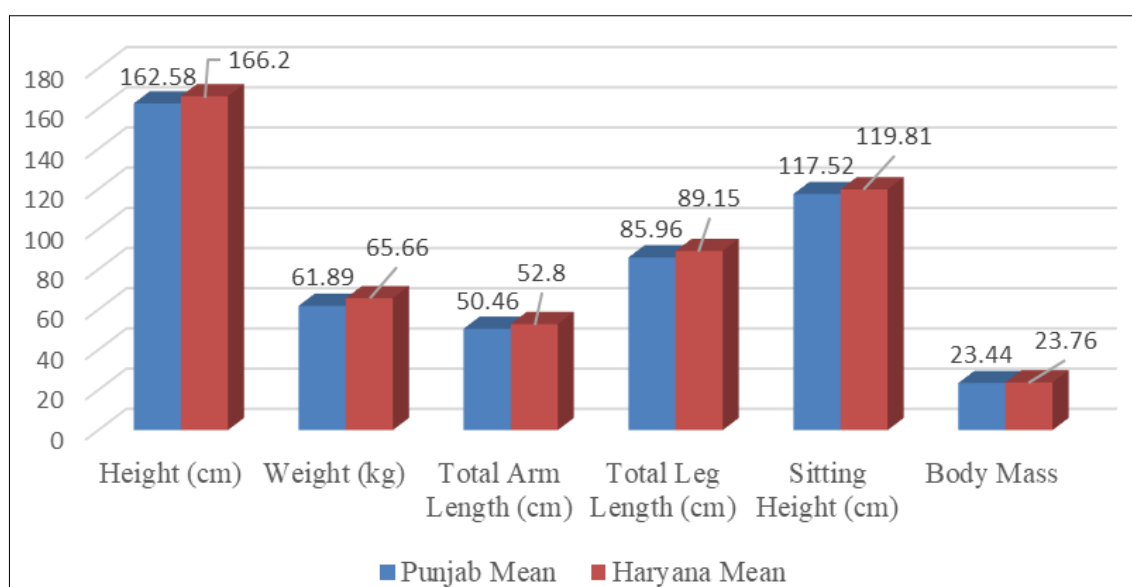
Punjab players have an average sitting height of 117.52 cm, with a standard deviation of 5.94 cm, while Haryana players have an average sitting height of 119.81 cm, with a standard deviation of 3.79 cm. The t-value of 0.11 suggests no statistically significant difference in sitting height between the two groups.

### Body Mass

The body mass (BMI) shows no statistically significant difference between Punjab and Haryana players. Punjab players have an average BMI of 23.44, with a standard deviation of 1.61, while Haryana players have an average BMI of 23.76, with a standard deviation of 0.62. The t-value of 0.37 indicates that the difference in BMI between the two groups is not statistically significant.

### Findings

Haryana kabaddi players tend to be taller, heavier, and have longer arm and leg lengths compared to Punjab players. However, sitting height and BMI do not show significant differences between the two groups. These findings provide insights into the anthropometric differences between the two groups of kabaddi players.

**Fig 7:** Comparative Analysis of Linear Measurements among Punjab and Haryana Female Kabaddi Players based on t-values (in Centimeters and Kilograms)

**Table 9:** Comparative Analysis of Body Circumference among Punjab and Haryana Female Kabaddi Players based on t-values (in Centimeters)

Body Circumference	Punjab Mean	Haryana Mean	SD	t-value
Chest Circumference (cm)	91.41	.....	8.53	0.44
	.....	89.77	6.15	
Waist Circumference (cm)	77.39	.....	3.62	0.026
	.....	74.96	3.70	
Abdominal Circumference (cm)	79.09	.....	1.62	1.83
	.....	76.21	2.01	
Hip Circumference (cm)	95.30	.....	4.32	0.07
	.....	92.97	4.41	

\*Significance at 0.05 level

**Chest Circumference**

The average chest circumference of Punjab kabaddi players is 91.41 cm, with a standard deviation of 8.53 cm, while for Haryana kabaddi players, it's 89.77 cm with a standard deviation of 6.15 cm. The t-value of 0.44 suggests no statistically significant difference in chest circumference between the two groups.

**Waist Circumference**

Punjab kabaddi players have an average waist circumference of 77.39 cm, with a standard deviation of 3.62 cm, while Haryana players have an average waist circumference of 74.96 cm, with a standard deviation of 3.70 cm. The t-value

of 0.026 indicates a statistically significant difference in waist circumference between the two groups.

**Abdominal Circumference**

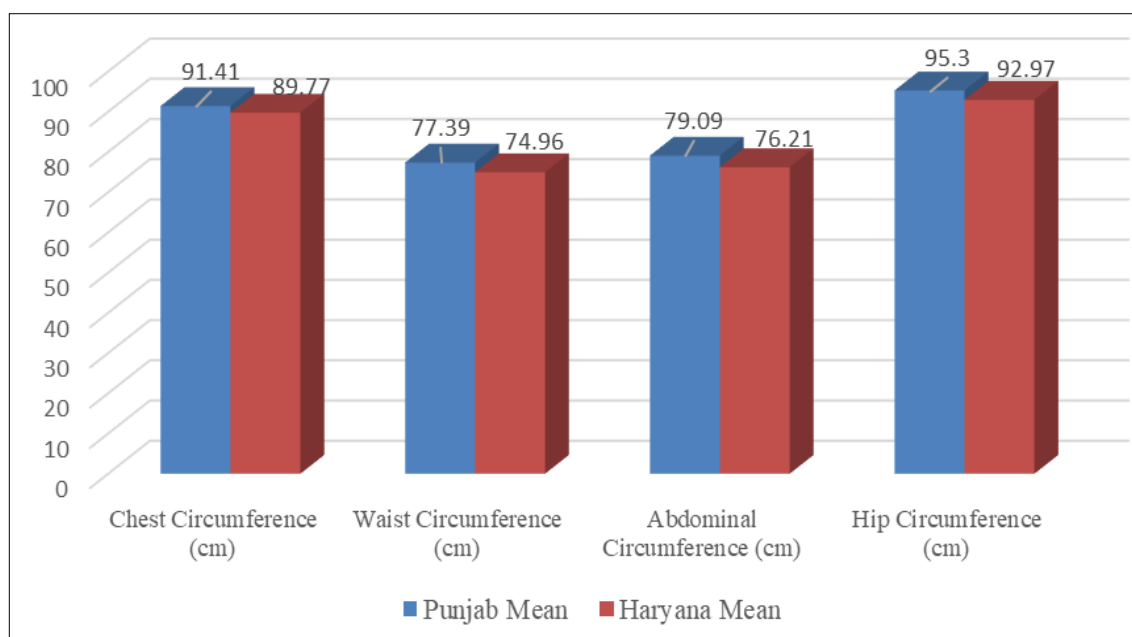
The average abdominal circumference for Punjab players is 79.09 cm, with a standard deviation of 1.62 cm, whereas for Haryana players, it's 76.21 cm with a standard deviation of 2.01 cm. The t-value of 1.83 suggests a statistically significant difference in abdominal circumference between the two groups.

**Hip Circumference**

Punjab players have an average hip circumference of 95.30 cm, with a standard deviation of 4.32 cm, while Haryana players have an average hip circumference of 92.97 cm, with a standard deviation of 4.41 cm. The t-value of 0.07 suggests no statistically significant difference in hip circumference between the two groups.

**Findings**

There are significant differences in waist and abdominal circumferences between Punjab and Haryana kabaddi players, while chest and hip circumferences show no significant differences. These differences in body circumferences can provide valuable insights into the physical characteristics and body compositions of kabaddi players from these regions.

**Fig 8:** Shows Comparative Analysis of Body Circumference among Punjab and Haryana Female Kabaddi Players**Table 10:** Comparative Analysis of Skinfold Measurements among Punjab and Haryana Female Kabaddi Players based on t-values (in Centimeters).

Skinfold Measurements (cm)	Punjab Mean	Haryana Mean	SD	t-value
Biceps Skinfold (cm)	1.19	.....	0.27	0.01
	.....	1.02	0.17	
Triceps Skinfold (cm)	2.00	.....	0.37	0.007
	.....	1.73	0.29	
Subscapular Skinfold (cm)	2.07	.....	0.21	0.0002
	.....	1.80	0.25	
Suprailiac Skinfold (cm)	1.77	.....	0.37	0.0002
	.....	1.42	0.21	

\*Significance at 0.05 level

**Biceps Skinfold**

Punjab kabaddi players have an average biceps skinfold thickness of 1.19 centimeters, with a standard deviation of 0.27 centimeters, while Haryana kabaddi players have an average thickness of 1.02 centimeters, with a standard deviation of 0.17 centimeters. The t-value of 0.01 suggests a statistically significant difference in biceps skinfold thickness between the two groups.

**Triceps Skinfold**

Punjab players have an average triceps skinfold thickness of 2.00 centimeters, with a standard deviation of 0.37 centimeters, while Haryana players have an average thickness of 1.73 centimeters, with a standard deviation of 0.29



centimeters. The t-value of 0.007 indicates a statistically significant difference in triceps skinfold thickness between the two groups.

### Subscapular Skinfold

Punjab players have an average subscapular skinfold thickness of 2.07 centimeters, with a standard deviation of 0.21 centimeters, while Haryana players have an average thickness of 1.80 centimeters, with a standard deviation of 0.25 centimeters. The t-value of 0.0002 suggests a statistically significant difference in subscapular skinfold thickness between the two groups.

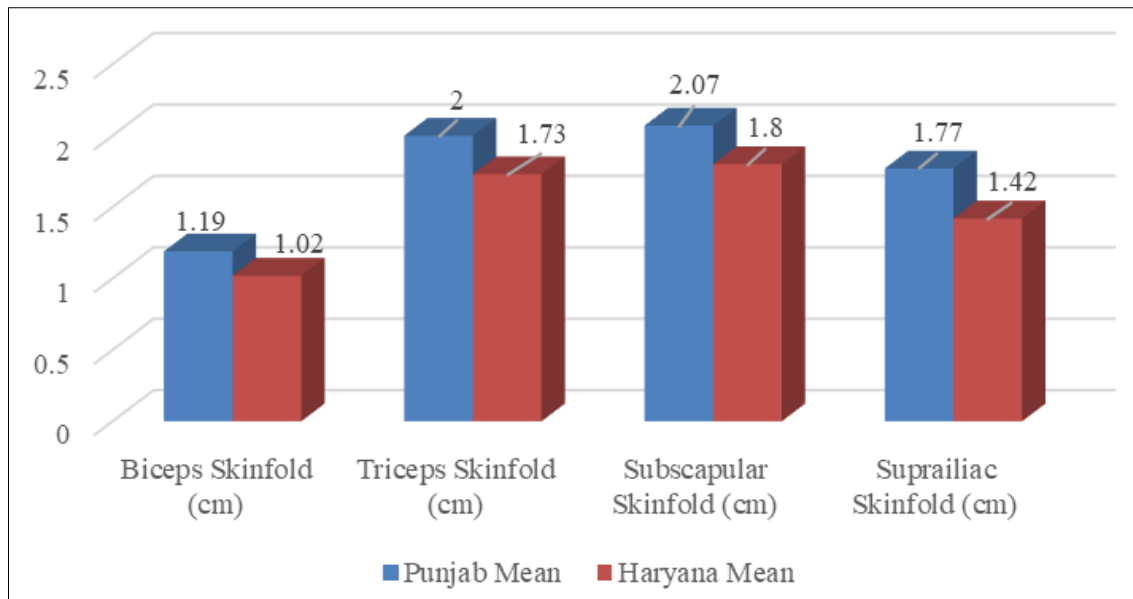
### Suprailiac Skinfold

Punjab players have an average suprailiac skinfold thickness

of 1.77 centimeters, with a standard deviation of 0.37 centimeters, while Haryana players have an average thickness of 1.42 centimeters, with a standard deviation of 0.21 centimeters. The t-value of 0.0002 indicates a statistically significant difference in suprailiac skinfold thickness between the two groups.

### Findings

Punjab kabaddi players tend to have thicker skinfold measurements (biceps, triceps, subscapular, and suprailiac) compared to Haryana kabaddi players. These differences could indicate variations in body composition and fat distribution between the two groups.



**Fig 9:** Comparative Analysis of Skinfold Measurements among Punjab and Haryana Female Kabaddi Players

The study aimed to conduct a comparative analysis of selected anthropometric measurements among female kabaddi players from Punjab and Haryana at the inter-university level. The objectives included assessing linear measurements such as height, weight, arm length, leg length, and sitting height, examining body circumferences, and evaluating skinfold measurements. The hypothesis stated that there would be no significant differences in these measurements between the two groups. Data collection involved a random sampling method, resulting in a sample size of 48 female kabaddi players, equally distributed between Punjab and Haryana. Measurements were taken using standardized tools, and statistical analyses, including t-tests, were conducted to compare the data between the two groups.

The findings revealed significant differences in several anthropometric measurements between Punjab and Haryana kabaddi players. Specifically, Punjab players tended to have shorter height, lower weight, shorter arm and leg lengths, and thicker skinfold measurements compared to their counterparts from Haryana. However, no significant differences were observed in sitting height and BMI between the two groups.

In terms of body circumferences, while chest and hip circumferences did not show significant differences, there were notable variations in waist and abdominal circumferences between Punjab and Haryana players.

### Conclusion

The present study aimed to compare selected anthropometric

measurements among female kabaddi players from Punjab and Haryana at the inter-university level. Through a comprehensive analysis, including linear measurements, body circumferences, and skinfold thickness, the study sought to shed light on the physical characteristics and body compositions of kabaddi players from these regions.

The hypothesis that there would be no significant differences in anthropometric measurements between Punjab and Haryana players was largely rejected based on the findings of the study. The data revealed significant disparities in various aspects of body morphology between the two groups.

### References

1. Astrand P, Rodahl K. Textbook of Work Physiology. New York: McGraw Hill, Kongkusha Ltd.; c1970.
2. Benny K. An Investigation of Selected Anthropometric Measurement and Body Composition Variables. Gwalior: Jiwaji University; c1988.
3. Bhatnagar DP. Some Morphological Measurement in Athletics, Volleyball, Kabaddi Players of Rural Areas of Madhya Pradesh. Journal of Sports Medicine and Physical Fitness; c1980, 32.
4. Callister R. Physiological Characteristics of Elite Judo Athletes. Medicine and Science in Sports and Exercise. 1990 Apr;22:568.
5. Drinkwater DT, Ross WD. Anthropometric fractionation of body mass. In: Ostry M, Beunen G, Simons J, editors. Kinanthropometry II. Baltimore: University Park Press;

c1980. p. 178-189.

6. Duncan MJ, Woodfield L, al-Maleeb Y. Anthropometric and physiological characteristics of junior elite volleyball players. *British Journal of Sports Medicine*. 2006 Jul;40(7):649-651.
7. Jawis MN, Singh R, Singh HJ, Yassin MM. Anthropometric and physiological profiles of sepak takraw players. *British Journal of Sports Medicine*. 2005 Nov;39(11):825-829.
8. Monsma DV, Mauna RM. Anthropometry and Somato Type of Competitive Female Skaters 11-22 yrs, Variation by Competitive Level and Discipline. *The Journal of Sports Medicine and Physical Fitness*; c2005, 45(4).
9. Rao EP. *The Complete Handbook on Kabaddi*. Vizianagram, AP: Jagdamba Publication; c2000.
10. Malina RM, Beunen G. Skeletal maturity and body size of teenage Belgian track and field athletes. Department of Anthropology, University of Texas, Austin. 1986;13(4):331-339.