

# Relationship Between Selected Anthropometric Variables and Playing Ability Among Female Basketball Players

Anjali Pal<sup>1</sup>, Deepika Sachan<sup>2</sup>, Prof. Swadesh Srivastava<sup>3</sup>

<sup>1</sup> PhD Scholar, Har Sahai PG College, Kanpur

correspondence Author & Mail :- pal13anjali@gmail.com

<sup>2</sup> PhD Scholar, Prof. H.N. Mishra College of Education, Kanpur

<sup>3</sup> Professor, Har Sahai PG College, Kanpur

## Abstract

**Aim:** The purpose of the study was to examine the relationship between selected anthropometric variables and the playing ability of female basketball players. **Methodology:** The study was conducted on 40 female basketball players aged 16–23 years from Kanpur district and Kanpur University level competitions. The selected anthropometric variables included standing height, sitting height, leg length, arm length, arm span, and palm span. Playing ability was assessed using the Johnson Basketball Skill Test. **Statistics:** Descriptive statistics and Pearson's Product Moment Correlation were used for data analysis. **Results:** The results revealed no significant relationship between standing height, sitting height and leg length with playing ability. However, arm length, arm span, and palm span showed significant positive correlations with playing ability. **Conclusion:** The findings indicate that specific anthropometric characteristics significantly influence basketball performance. It is recommended that coaches consider these measurements during talent identification and training program design.

**Keywords:** Anthropometry, Playing Ability, Anthropometric Variables & Female Basketball Players

**How to cite this article:** Pal A, Sachan D, Srivastava S. Relationship Between Selected Anthropometric Variables and Playing Ability Among Female Basketball Players. *Int J Drug Deliv Technol.* 2026;16(72s): 1413-1417. DOI: 10.25258/ijddt.16.72s.153

## Introduction

Basketball is one of the most popular and physically demanding team sports in the world. Successful performance in basketball depends on a combination of technical skills, tactical understanding, physical fitness, and anthropometric characteristics. Players require high levels of speed, agility, muscular strength, power, coordination, balance, and endurance to perform effectively during competition. Performance is therefore influenced not only by skill proficiency but also by the physical characteristics of the athlete (Drinkwater et al., 2008; Garcia-Gil et al., 2018).

Anthropometry is the scientific study of the measurements and proportions of the human body. In sports science, anthropometric assessment plays an important role in talent identification, player selection, performance prediction, and the design of sport-specific training programmes. Different sports require different body characteristics. For example, gymnasts generally benefit from a compact body structure, whereas basketball and volleyball players often gain advantages from greater height, longer limbs, and favourable body proportions (Drinkwater et al., 2008; Ackland et al., 1997).

Basketball is a sport in which anthropometric characteristics provide significant biomechanical advantages. Greater standing height facilitates rebounding, shooting, and defensive play. A larger arm span improves reaching ability during

shooting, passing, blocking, and stealing the ball. Longer leg length contributes to stride efficiency, acceleration, and jumping ability, while larger hand dimensions improve grip strength and ball control, enhancing dribbling, passing, and shooting performance. These physical attributes collectively contribute to successful basketball performance (Garcia-Gil et al., 2018; Drinkwater et al., 2008).

Although height is traditionally considered one of the most important physical characteristics in basketball, recent research suggests that height alone is insufficient to explain differences in playing ability. Other anthropometric variables, including arm span, leg length, sitting height, and body proportions, may influence movement efficiency, reach, agility, and overall game performance. Consequently, comprehensive anthropometric profiling provides a more accurate understanding of basketball performance than the assessment of height alone (Garcia-Gil et al., 2018; Flórez-Gil et al., 2025).

In women's basketball, anthropometric assessment is particularly important because physiological characteristics and physical development differ from those of male athletes. Studies have shown that anthropometric profiles vary according to playing position and competitive level among female basketball players. Understanding these characteristics can assist coaches in talent

## Relationship Between Selected Anthropometric Variables and Playing Ability Among Female Basketball Players

identification, player selection, position allocation, and the development of individualized training programmes (Flórez-Gil et al., 2025).

Modern sports training increasingly emphasizes evidence-based methods for talent identification and player development. While coaches' experience remains valuable, objective anthropometric measurements provide reliable and scientifically measurable information for evaluating athletic potential. Such assessments can improve the accuracy of player selection, support long-term athlete development, and contribute to enhanced competitive performance (Drinkwater et al., 2008).

Despite the recognized importance of anthropometric characteristics in basketball performance, relatively few studies have specifically examined their relationship with playing ability among female basketball players in India, particularly at the district and university levels. Therefore, the present study aims to investigate the relationship between selected anthropometric variables—standing height, sitting height, leg length, arm length, arm span, and palm span—and the playing ability of female basketball players. The findings are expected to contribute to scientific talent identification and evidence-based player selection in women's basketball.

### Problem of the Study

The purpose of the study was to assess the relationship between selected anthropometric variables and the playing ability of female basketball players.

### Hypotheses

1.  $H_0$ : There is no significant relationship between selected anthropometric variables and playing ability of female basketball players.
2.  $H_1$ : There is a significant relationship between selected anthropometric variables and playing ability of female basketball players.

### Methodology

The selection of subjects, selection of variables, instruments reliability, tester competency, reliability of test items, criterion measures, administration of tests, along with the procedures for collection of data and statistical techniques employed for the analysis of data has been presented.

### Research Design:

The study adopted a descriptive correlational research design.

The sample consisted of 40 female basketball players randomly selected from Kanpur district as subjects for the study. The age level of subjects ranged from 16 to 23 years. All the subjects were selected from Kanpur district and who had participated in district, state and university-level competitions. Data was collected from various colleges and university players of Kanpur, Uttar Pradesh. Only the post-test method was used to collect the data in order to check the performance of players. Before administering the tests, the subjects were briefed about the purpose of the study and details of the test were explained to them and a demonstration was provided of the skill test by a trained helper. They were also given a sufficient number of practice trials to enable them to become absolutely familiar with the test.

### Variables:

On the basis of review of literature, expert's opinion, and scholar's own understanding of the problem following Anthropometric variables were selected:

### Independent Variables (Anthropometric Variables):

- a. Standing height
- b. Sitting height
- c. Leg length
- d. Arm length
- e. Arm span
- f. Palm span

### Dependent Variable:

- a. Playing Ability

### Tools and Measurement:

Standing height, Sitting height, Leg length, Arm length, Arm span and Palm span were measured using flexible steel tape. The scores were recorded in centimeters. Playing ability was assessed through a standardized basketball skill test i.e., the Johnson Basketball Skill Test.

### Statistical Procedure:

Descriptive statistics (Mean and Standard Deviation) were calculated. Pearson's Product Moment Correlation was used to determine the relationship between anthropometric variables and playing ability. The level of significance was set at 0.05.

# Relationship Between Selected Anthropometric Variables and Playing Ability Among Female Basketball Players

## Results

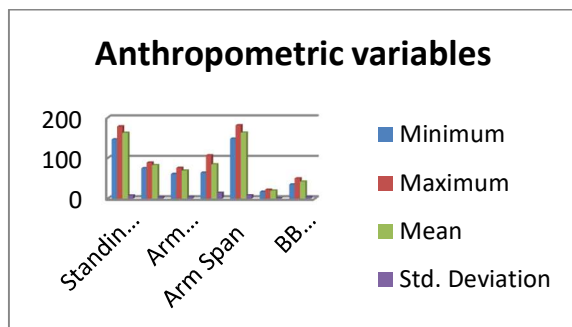
After analyzing the data collected the results are depicted in the following table:

**Table 1**  
**Descriptive statistics of Anthropometric variables of Basketball Players**  
(N= 40)

|                 | Range | Minimum | Maximum | Mean     | Std. Deviation |
|-----------------|-------|---------|---------|----------|----------------|
| Standing Height | 31.90 | 146.30  | 178.20  | 162.5313 | 7.68946        |
| Sitting Height  | 14.00 | 75.00   | 89.00   | 82.8000  | 3.50969        |
| Arm Length      | 15.10 | 60.90   | 76.00   | 69.2200  | 4.13851        |
| Leg Length      | 43.00 | 64.00   | 107.00  | 84.5750  | 14.23410       |
| Arm Span        | 33.00 | 148.00  | 181.00  | 163.0750 | 8.09364        |
| Palm Span       | 5.00  | 17.00   | 22.00   | 19.7000  | 1.43581        |
| BB Performance  | 15.00 | 35.00   | 50.00   | 41.8250  | 4.00569        |

Table 1, shows the descriptive statistics of selected Anthropometric variables of female Basketball Players i.e. Standing Height, Sitting Height, Arm Length, Leg Length, Arm Span and Palm Span. The mean and SD values were  $162.5313 \pm 7.68946$ ;  $82.8000 \pm 3.50969$ ;  $69.2200 \pm 4.13851$ ;  $84.5750 \pm 14.23410$ ;  $163.0750 \pm 8.09364$  and  $19.7000 \pm 1.43581$  respectively.

The maximum and minimum value of Standing Height, Sitting Height, Arm Length, Leg Length, Arm Span and Palm Span shown were 178.20 & 146.30, 89 & 75, 76 & 60.90, 107 & 64, 181 & 148, and 22 & 17 respectively.



**Table-2**  
**Correlation between Dependent Variable (Playing Ability) and Independent Variables (Selected Anthropometric Variable) of Basketball Players**

| Independent Variables | Correlation Coefficient | Significant Value |
|-----------------------|-------------------------|-------------------|
|                       | <b>r =</b>              |                   |
| Standing Height       | .134                    | .408              |
| Sitting Height        | .151                    | .353              |
| Arm Length            | .342*                   | .031              |
| Leg Length            | .238                    | .139              |
| Arm Span              | .362*                   | .022              |
| Palm Span             | .401*                   | .010              |

\* Significant at .05 level

Table 2, indicates that there is significant relationship between the dependent variable i.e playing ability of basketball players and independent variable i.e. Arm length, Arm span and Palm span. The relationship was not statistically significant because the p-value was greater than 0.05 level of significance.

On the other hand there is no significant relationship between the the playing ability of basketball player and Standing height, Sitting height and Leg length as the correlation coefficient value was lower than the significant value at the 0.05 level of significance.

## Discussion of Finding

The study examined the relationship between selected anthropometric variables and the playing ability of female basketball players. The results revealed no significant relationship between standing height, sitting height and leg length with playing ability. However, significant positive relationships were found between arm length, arm span and palm span with playing ability.

The non-significant relationship of standing height indicates that overall stature alone is not a decisive factor in basketball performance at the district and university level. Similarly, sitting height, which reflects trunk length, appears to have limited functional relevance in game-specific movements.

In contrast, limb dimensions showed significant influence. Greater arm length and arm span provide reach advantage in shooting, rebounding, and defense. A wider palm span enhances grip and ball control, improving technical execution.

Overall, the findings suggest that proportional limb measurements are more important than total height in determining playing ability.

## Relationship Between Selected Anthropometric Variables and Playing Ability Among Female Basketball Players

Therefore, talent identification and training programs should emphasize specific anthropometric characteristics rather than relying solely on overall stature.

### Discussion of Hypotheses

#### Hypothesis 1:

There will be a significant relationship between selected anthropometric variables and playing ability of female basketball players.

The findings partially support this hypothesis. Significant positive relationships were found between arm length, arm span and palm span with playing ability. However, standing height, sitting height and leg length did not show significant relationship with playing ability. Therefore, Hypothesis 1 is partially accepted.

#### Hypothesis 2:

There will be no significant relationship between certain anthropometric variables and playing ability of female basketball players.

This hypothesis is accepted for standing height, sitting height and leg length as no significant relationships were observed. However, it is rejected for arm length, arm span and palm span, which showed significant positive correlations.

Overall, limb dimensions were found to be more influential than overall height in determining playing ability.

### Conclusion

The study concludes that specific anthropometric variables significantly influence the playing ability of female basketball players. While standing height, sitting height and leg length do not show a significant relationship with performance; however, arm length, arm span, and palm span play an important role in enhancing basketball performance. Coaches and trainers should consider these anthropometric measurements during talent identification and training program development. The findings are limited by the relatively small sample size and the inclusion of players from a single geographical region. Future studies should include larger samples and players from different competitive levels.

### References:

1. **C. Uma Devi, Saran Sakthivel S & Dr T Arun Prasanna**, "Impact Of Motor Fitness Variables And Playing Ability Among Basketball Men Players", *IJFANS International Journal of Food and Nutritional Sciences*, Volume 11, Iss 12, Dec 2022.
2. **Daniel Apaak, Stephen Anim & Richmond Stephen Sorkpor**, "Relationship Between Physical Fitness Variables and Playing Ability Among Handball Players in Senior High Schools in Central Region, Ghana". *International Journal of Sports Science and Physical Education*. Vol. 6, No. 4, Dec. 2021, pp. 80-86.
3. **Daniel Apaakl & Alexander Kweku Eshun**, "Relationship between Selected Physical Fitness Variables and Shooting Accuracy among High School Basketball Players in the Cape Coast Metropolis, Ghana", *Journal of Advances in Sports and Physical Education*, Scholars Middle East Publishers, Dubai, 2022, v05i11.002.
4. **Yadav, D. S., & Chaudhary, M.** (2016). A Study of Selected Physical Fitness Variables of Basketball and Handball Players of Lucknow. *Indian Journal of Applied Research*, 6(10), 627–628.
5. **Gomes J.H. & et al**, "Relationship between physical fitness and game related statistics in elite professional basketball players: Regular season vs. Playoffs", *Motriz, Rio Claro*, v.23 n.2, 2017, e1016-26.
6. **H. Harrison Clarke**, *Application of Measurement to Health and Physical Education* (Englewood Cliffs: N.S. Prentice-Hall Inc., 1963), P.22.
7. **Kumar Neeraj**, "Comparison of physiological and psycho-motor variables among football, handball and cricket game players", *International Journal of Yoga, Physiotherapy and Physical Education*, [www.sportsjournal.in](http://www.sportsjournal.in), Volume 3; Issue 1; January 2018.
8. **Singh Hardayal**, "Science of Sports Training, (D.V.S. Publication, New Delhi, 1997), P-156.
9. **Somashakar R and Sudhakara G**, "Selected physical fitness variables and basketball performance", *International Journal of Physical Education, Sports and Health* 2019; 6(4): 141-142.
10. **Starr L. Johnson and Jack K. Nelson**, *Practical Measurement for Evaluation in Physical Education* (Minneapolis: Burgess Publishing Company, 1979), p. 215.
11. **Vineet Nehra, Ashish & Rajinder Kaur**, "A Scientific Approach To Studying Physical Fitness Variables That Regulate Performance Of Male Basketball Players",

European Chemical Bulletin 2023, 12  
(Special Issue 5), 3450-3454.

12. **Drinkwater, E. J., Pyne, D. B., & McKenna, M. J.** (2008). Design and interpretation of anthropometric and fitness testing of basketball players. *Sports Medicine*, 38(7), 565–578.
13. **Flórez-Gil, J., et al.** (2025). Anthropometric profile of female basketball players: The influence of competitive level and playing position. *Journal of Human Sport and Exercise*.