



## ANALYSIS OF ANTHROPOMETRIC VARIABLES AS PREDICTIVE FACTOR FOR FEMALE LONG JUMPERS

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### Abstract

Anthropometry is a scientific specialized closely allied to physical education, sports science, sports medicine, human biology, physical anthropology and several medicine disciplines. Assessment of human physical performance through anthropometry helps to evaluate the physical structure and the performance of individual. For the purpose of this study 55 female national level long jumpers were selected as a subject. Age group of athletes was 17 - 28 years. To carry out this study Single Group Experimental Research design was used. The test item selected for this study was anthropometric variables i.e. Height, Fore Leg Length, Thigh Length, Leg Length, Trunk Length, Sitting Height, Shoulder Width, Hip Width, Weight. The data on jumping performance along with anthropometric measurements was examined by Pearson's Product Movement Correlation in order to find out the relationship of jumping performance to each of the anthropometric variables separately. Multiple Linear Regression analysis was done in order to predict jumping performance on the basis of anthropometric measurements. The analysis was done with the help of SPSS 16.0 software. The level of significance to check the relationship obtained by Pearson's Product Movement Correlation was set at 0.05. Results of the study shows

that significant relationship was found out between Height, Leg Length, Shoulder Width and Hip Width among anthropometric variables with long jump performance but Significant difference was not found out in fore leg length, Thigh length, trunk length, sitting height and weight in anthropometric variables with long jump performance.

**Keywords:** Anthropometric Variables, Fore leg, Thigh and Long Jump.

### Introduction

Proficiency in any sport requires an ideal integration of numerous abilities developed to an ideal degree. However, performance measures of these abilities do vary from activity to activity. The long jump is a track and field event in which the performance of an athlete in sports does not depend only upon the physical fitness components but several other factors also contributed to his success, such as anthropometric variables. Anthropometry is a scientific specialized closely allied to physical education, sports science, sports medicine, human biology, physical anthropology and several medicine disciplines. Assessment of human physical performance through anthropometry helps to evaluate the physical structure and the



performance of individual. So anthropometry is a science which deals with human body measurements and sports person are selected on the basis of bodily characteristics for a particular sports or event. Therefore, a study of the analysis of Anthropometric variables as predictive factors for female long jumpers is important for better understanding of the important aspects of physique for the long jump performance. The purpose of this study is to determine the anthropometric attributes of national level female long jumpers. Besides that, this research will also help to determine the anthropometric characteristics that are the significant contributing factors to long jump performance.

### Methodology

For the purpose of this study 55 female national level long jumpers were selected as a subject. Age group of athletes was 17 - 28 years. To carry out this study Single Group Experimental Research design was used. The test item selected for this study was anthropometric variables i.e. Height, Fore Leg Length, Thigh Length, Leg Length, Trunk Length, Sitting Height, Shoulder Width, Hip Width, Weight. Standing height, fore leg length, thigh length, leg length, trunk length and sitting height was measured by steel tape. Shoulder width and hip width was measured by modified sliding calliper and Weight was measured by weighing machine. Performance of an athlete's was recorded during the competition. The data on jumping performance along with anthropometric measurements was examined by Pearson's Product Movement Correlation in order to find out the relationship of jumping performance to each of the anthropometric measurements separately. Multiple Linear Regression analysis was done

in order to predict jumping performance on the basis of anthropometric measurements. The level of significance to check the relationship obtained by Pearson's Product Movement Correlation was set at 0.05.

### Results of the Study

TABLE -1  
DESCRIPTIVE ANALYSIS OF ANTHROPOMETRIC  
VARIABLES

| S. No. | Anthropometric Variables | Min   | Max  | Mean   | SD    |
|--------|--------------------------|-------|------|--------|-------|
| 1      | Height                   | 153.7 | 174  | 164.27 | 4.285 |
| 2      | Fore Leg Length          | 39    | 50   | 43.69  | 2.327 |
| 3      | Thigh Length             | 40    | 52.5 | 45.70  | 2.400 |
| 4      | Leg Length               | 80.5  | 97   | 87.90  | 3.070 |
| 5      | Trunk Length             | 41.2  | 62.6 | 54.41  | 3.866 |
| 6      | Sitting Height           | 76.9  | 89.5 | 82.32  | 2.823 |
| 7      | Shoulder Width           | 29.8  | 39   | 35.57  | 1.829 |
| 8      | Hip Width                | 27.1  | 45   | 32.20  | 3.665 |
| 9      | Weight                   | 42.5  | 59.5 | 51.52  | 3.617 |

Above table depicts the descriptive analysis of selected anthropometric variables (Independent Variable). Mean values of anthropometric variables Height, Fore Leg Length, Thigh Length, Leg Length, Trunk Length, Sitting Height, Shoulder Width, Hip Width and Weight are 164.27, 43.69, 45.70, 87.90, 54.41, 82.32, 35.57, 32.20, and 51.52 respectively. Standard deviation values of anthropometric variables Height, Fore Leg Length, Thigh Length, Leg Length, Trunk Length, Sitting Height, Shoulder Width, Hip Width and Weight are 4.285, 2.327, 2.400, 3.070, 3.866, 2.823, 1.829, 3.665, and 3.617 respectively.



TABLE-2  
RELATIONSHIP OF ANTHROPOMETRIC MEASUREMENTS  
TO JUMPING PERFORMANCE (LONG JUMP)

| S. No. | Variables Correlated                      | Coefficient of Correlation |
|--------|---|----------------------------|
| 1      | Height and Long Jump Performance          | 0.391*                     |
| 2      | Fore Leg Length and Long Jump Performance | 0.210                      |
| 3      | Thigh Length and Long Jump Performance    | 0.180                      |
| 4      | Leg Length and Long Jump Performance      | 0.260*                     |
| 5      | Trunk Length and Long Jump Performance    | -0.190                     |
| 6      | Sitting Height and Long Jump Performance  | 0.047                      |
| 7      | Shoulder Width and Long Jump Performance  | 0.308*                     |
| 8      | Hip Width and Long Jump Performance       | 0.352*                     |
| 9      | Weight and Long Jump Performance          | 0.252                      |

\*Level of Significance at  $r_{0.05(55)} = 0.254$

It is revealed from table no 1 relationship between anthropometric variables (Independent variables) and Long jump performance (Dependent variables). Significant relationship was found between Height ( $r = 0.391$ ), Leg length ( $r = 0.260$ ), Shoulder width ( $r = 0.308$ ) and Hip width ( $r = 0.352$ ) with Long jump performance. And no significant relationship was found among Fore leg length ( $r=0.210$ ), Thigh length ( $r = 0.180$ ), Trunk length ( $r = -0.190$ ), Sitting height ( $r = 0.047$ ) and Weight ( $r = 0.252$ ) with long jump performance at 0.05 Level of significance.

TABLE-3  
MULTIPLE CORRELATIONS OF ANTHROPOMETRIC  
VARIABLES OF FEMALE LONG JUMPERS

| S. No. | Variables                                 | Multiple Correlation (R)      |
|--------|---|-------------------------------|
| 1      | Height and Long Jump Performance          | R <sub>c</sub> .1478 = 0.501* |
| 2      | Fore Leg Length and Long Jump Performance |                               |
| 3      | Thigh Length and Long Jump Performance    |                               |
| 4      | Leg Length and Long Jump Performance      |                               |
| 5      | Trunk Length and Long Jump Performance    |                               |
| 6      | Sitting Height and Long Jump Performance  |                               |
| 7      | Shoulder Width and Long Jump Performance  |                               |
| 8      | Hip Width and Long Jump Performance       |                               |
| 9      | Weight and Long Jump Performance          |                               |

Significant at 0.05 Level of Significance.

Above table shows the significant multiple correlations among selected anthropometric variables (Height, Leg Length, Shoulder width and Hip width) with Long jump performance i.e. 0.501 at 0.05 level of significance.

MULTIPLE LINEAR REGRESSION ANALYSIS FOR  
ANTHROPOMETRIC VARIABLES IN LONG JUMP

Multiple linear regression analysis in order to predict long jump performance is presented as follows:

$$Y = -2.417 + (.037 \text{ Height}) - (.008 \text{ Leg Length}) + (.045 \text{ Shoulder Width}) + (.026 \text{ Hip Width})$$

Where Y = Long jump performance.

**Conclusion**

Results of the study shows that significant relationship was found out between Height, Leg Length, Shoulder Width and Hip Width among anthropometric variables with long



jump performance but Significant difference was not found out in fore leg length, Thigh length, trunk length, sitting height and weight in anthropometric variables with long jump performance. On the basis of present findings it is concluded that to analyze long jump performance of female long jumpers we required some of the anthropometric variables. If we want to select athletes on the basis of anthropometric variables then we can use regression equation of these findings.

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