

## Relationship between Anthropometric Measurements, Selected Physical Variables, and Long Jump Performance

Dr. Praveen Kumar Singh Jadon  
Head of the Department  
Dept. of Physical Education & Sports  
K.A. (P.G.) College, Kasganj

### Abstract:

In order to determine how certain anthropometric measurements and physical characteristics relate to long jump performance, a study on certain physical characteristics and anthropometric measurements was done. Male long jumpers from Dr. Bheemrao Ambedkar University, Agra were chosen as the study's subjects. Height, weight, arm and leg lengths were chosen as the anthropometric measurements for the study, along with the physical variables of speed (50-yard sprint), agility (10 x 4-yard shuttle run), and explosive leg strength (standing broad jump). Using the Product Moment Method of Co-relation, the relationship between a few selected anthropometric measurements and physical characteristics and long jump performance was computed. The study's findings indicated that, at a 0.05 level of confidence, the calculated value of "r" for the standing wide jump (0.81) was significant. Additionally, the table showed that the factors height, weight, leg length, arm length, shuttle run (4x10 yards), and 50-yard dash were determined to be statistically unimportant to the performance in long jump.

### Introduction:

The long jump is a track and field event that requires a combination of explosive power, speed, and technique. This research paper aims to investigate the relationship between anthropometric measurements, selected physical variables, and long jump performance. The study focuses on understanding how an athlete's body composition, limb lengths, and various physical parameters influence their ability to excel in the long jump event. The findings of this research could potentially assist coaches, trainers, and athletes in optimizing training programs and talent identification strategies for long jump performance enhancement.

### Research objective:

The objective of the study was to determine how certain anthropometric measurements and physical characteristics related to long jump performance.

### Literature Review:

Analysis of previous studies exploring the relationship between anthropometric measurements, physical variables, and long jump performance.

Discussion on the influence of body composition, limb lengths, muscle strength, power, and agility on long jump performance.

Identification of gaps in existing research and rationale for the current study.

## **Subjects**

Male long jumpers from Dr. Bheemrao Ambedkar University in Agra were chosen as the study's subjects. The subjects were between the ages of 17 and 25. Only participants who could leap 5.00 metres or higher were chosen. The subjects came from various colleges from Agra Region. The subjects' daily job schedules, diets, and environmental circumstances were all the same.

## **Variables**

For the study, the physical variables and anthropometric measurements listed below were chosen: -

### **Anthropometrics measurements:**

Height  
Sitting Height  
Weight  
Arm Length  
Leg Length

### **Physical Variables**

Speed (50 yard dash )  
Agility (10 x 4 yards Shuttle run)  
Explosive Leg Strength (Standing Broad Jump)

### **Measures:**

The following criteria measurements were used to test the hypothesis: -

- Speed was measured by 50-yard dash and was recorded in 1/10 of the second.
- Agility was measured by 10 x 4 yards shuttle run and was recorded in 1/10 of the second.
- Explosive Leg Strength was measured by Standing Broad Jump and was recorded in centimeters.
- Body Weight was measured by weighing machine and was recorded in kilograms.

- Height was measured by stadiometer and recorded to the nearest centimeter.
- Leg Length was measured by measuring tape and was recorded in centimeters.
- Sitting height was measured by measuring tape and was recorded in centimeters.
- Arm Length was measured by measuring tape and was recorded in centimeters.

### Analysis:

The relationship of selected anthropometric measurement and physical variables to performance in long jump was calculated by using Product Moment Method of Co-relation.

### Findings

To find out the relationship between the independent variables namely selected anthropometric measurement, i.e. height, weight, sitting height, leg length and arm length and selected physical variables, i.e. Explosive Leg Strength (standing broad jump), Speed (50 yard dash), Shuttle Run (4x10yards run) and dependent variables namely performance in long jump, the product moment method of correlation was applied.

Variables X and Y had their frequencies of deviation recorded, and their products were ordered and examined. All of the sequences' product moments were calculated carefully taking into account plus and minus signs, and careful entries were also made in the "X" and "Y" columns on the basis of plus and minus sign. To make addition easier, every product's current state was circled. The results of applying the formula to determine the correlation ("r") between the independent variables are shown in Table 1.

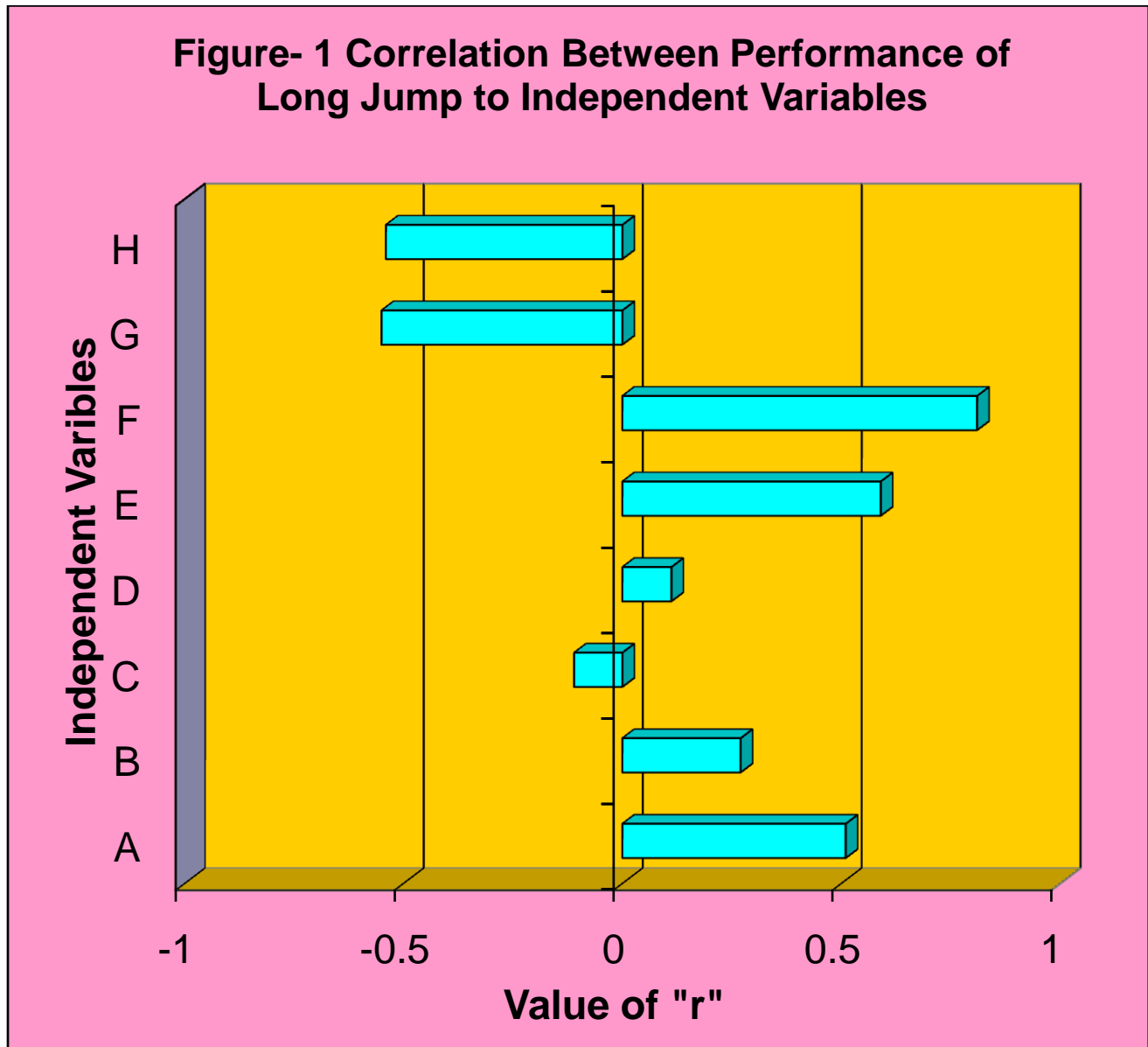
**Table-1**  
**COEFFICIENT OF CORRELATION BETWEEN DEPENDENT**  
**AND INDEPENDENT VARIABLES**

S.No.	Variables	Coefficient of Correlation
1	Performance in long jump and height	0.51
2	Performance in long jump and weight	0.27
3	Performance in long jump and Sitting height	-0.11
4	Performance in long jump and Leg length	-0.112
5	Performance in long jump and Arm Length	0.59
6	Performance in long jump and Explosive Leg Strength	0.81*
7	Performance in long jump and Speed	-0.55
8	Performance in long jump and Shuttle Run	-0.54

\* Significant at 0.05 level of confidence.

The tabulated value of "r" required being significant at 0.05 level of confidence for degree of freedom = 0.632.

The estimated value of "r" for the standing broad jump(0.81) was found to be significant at the 0.05 level of confidence, as shown in Table -1. But, the table also showed that the factors height, weight, leg length, arm length, shuttle run (4x10 yards), and 50-yard dash were determined to be statistically insignificant to the performance in long jump.



RELATIONSHIP OF SELECTED ANTHROPOMETRIC MEASUREMENTS AND PHYSICAL VARIABLES TO PERFORMANCE IN LONG JUMP

A-50 Yard Dash

B-Shuttle Run

C-Standing Broad Jump

D-Height

E-Weight

F-Sitting Height

G-Leg Length

H-Arm Length

## Discussion

The analysis of data in Table-1 reveals that performance in long jump was significantly related to standing broad jump (S.D.=0.81). Whereas, insignificant relationship was obtained height, weight, leg length, arm length, shuttle run (4x10yard) and 50 Yard dash to performance. Therefore, it crucial factors for a successive long jump performance Whereas height, weight, leg length, arm length, shuttle run (4x10yard) and 50 Yard dash were not important factors influencing performance in long jump.

## Practical Applications:

Recommendations for coaches, trainers, and athletes to optimize training strategies based on the study findings.

Talent identification and athlete profiling for long jump performance enhancement.

Development of specific training protocols targeting the identified key anthropometric measurements and physical variables.

## Conclusion:

Summary of the research findings.

Implications for long jump training and performance optimization.

Final remarks on the significance of anthropometric measurements and selected physical variables in relation to long jump performance.

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