



ISSN: 2456-4419

Impact Factor: (RJIF): 5.18

Yoga 2019; 4(2): 21-22

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www.theyogicjournal.com

Received: 17-05-2019

Accepted: 20-06-2019

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## Study of some anthropometric and motor performance variables in the performance of shot put in university players

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### Abstract

The purposed article carries out an extensive study to determine the selected anthropometric and motor performance variables with the performance of university level shot putters. The obtained parameters can subsequently be utilized in determining the relationship between the classes of parameters in order to enhance the performance characteristics of university level players in the game of shot put. The study presented in the proposed manuscript may provide fair criteria for the selection of young aged potential athletes.

**Keywords:** Anthropometric, physiological measurements, body mass index (BMI), mean, standard deviation

### 1. Introduction

In recent times, anthropometry plays a vital role in the design of apparels in sports industry, ergonomics and architecture, and any other industrial applications utilizing the statistical data about the distribution of body dimensions in the population. Anthropometric measurements started attracting the researchers since 1860's. In early 1960, the anthropometric measurements were carried to determine the fitness levels of children from the countries like South Africa, U.S.A. & England [1]. Quality research was reported in [2], on the comparison of the physical fitness levels among the Canadian and South African school boys. Comprehensive research was carried out by conducting eighteen different power tests to measure anaerobic power and to find out the fitness levels comparisons between European and North American children [3]. An extensive study on the habitual physical activity as well health related fitness levels of fourth graders (children) was presented. A cross sectional survey involving 528 fourth grade children consisting of 274 boys and 254 girls from seven schools was presented in the study [4]. Adding to further this fairly good study on the effects of frequency and duration of physical education programs on the health of Sixth Graders was presented extensively in [5]. A detailed study for physical fitness index referred by authors as (PFI) was conducted in fifty residential (Sainik) schools children and forty four Non-residential schools children measuring various physical anthropometric parameters as well as BMI (body mass index) also [6]. Duncan *et al* [7], carried out the study to measure anthropometric as well as physiological characteristics typically of junior elite volleyball players. The study was conducted on 25 national level volleyball players with mean age of 17.5 years. Unlike previous the extensive study on elite, semi-elite and novice volleyball players was presented depicting that the improvements in lower body muscular strength, agility can significantly improve the playing performance of junior volleyball players. The study was conducted on one hundred fifty three players with 57 males and 96 females under three categories: junior national, state and novice volleyball players [8]. Various anthropometric and physiological characteristics were measured in thirty-four gymnasts categorized as elite and non-elite with numbers 15 and 19 respectively [9]. Gravina *et al.*, conducted the study to measure the difference in anthropometric and physiological parameters of first team and reserve soccer players aged between 10-14 years [10].

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## 2. Method

For the purpose of presented study, three hundred male shot putters of Haryana and Delhi states who had participated in all India inter university athletics championships were randomly selected as subjects. The ages of the subjects were between 18 and 25 years. The study was taken on the basis of available literature on anthropometric and motor fitness variables and their test findings of the related research studies. Keeping in the mind about specific purpose of the study following anthropometric and motor fitness variables were selected:

1. Standing Height
2. Body Weight
3. Arm Length
4. Lower Arm Length
5. Upper Arm Length
6. Leg Length
7. Lower Leg Length

The following motor fitness variables were taken into consideration for finding any association/dissociation among both kind of variables:

1. Speed
2. Strength
3. Endurance
4. Agility
5. Flexibility

## 3. Results and Discussion

Table 1 reveals the anthropometric profile of university levels shot putters of Haryana. The mean standing height was 173.48,  $\pm$  5.473, the mean weight was 81.27kg,  $\pm$  7.52, the mean sitting height was 68.44,  $\pm$  5.39, the mean leg length was 94.365,  $\pm$  6.62, the mean upper leg length was 46.963,  $\pm$  4.716, the mean arm length was 78.60,  $\pm$  6.651, the mean upper arm length was 34.32,  $\pm$  5.07 and the mean lower leg length was 41.46  $\pm$  3.65.

**Table 1:** Anthropometric profile of university levels shot putters of Haryana

S.no.	Variables	Mean	Standard deviation
1	Standing Height	173.48	5.473
2	Weight	81.27	7.52
3	Sitting Height	68.44	5.39
4	Leg Length	94.365	6.62
5	Upper Leg Length	46.963	4.716
6	Arm Length	78.60	6.651
7	Upper Arm Length	34.32	5.07
8	Lower Arm Length	41.46	3.65

Table 2 shows the mean and standard deviation values of motor fitness variables of shot putters. The mean value was 21.54,  $\pm$  2.03 in relation to arm strength, 41.56,  $\pm$  5.67 in relation to abdomen strength, 2.36  $\pm$  0.21 in relation to leg strength, 6.98  $\pm$  0.33 in relation to speed, 2361.28,  $\pm$  49.55 in relation to endurance, 10.012  $\pm$  0.87 in relation to agility and 25,  $\pm$  1.95 in relation to flexibility

**Table 2:** mean and standard deviation of shot putters in relation to motor fitness variables.

S.no.	Variables	Mean	Standard deviation
1	Arm Strength	21.54	2.03
2	Abdomen Strength	41.56	5.67
3	Leg Strength	2.36	0.21
4	Speed	6.98	0.33
5	Endurance	2361.28	49.55
6	Agility	10.012	0.87
7	Flexibility	25	1.95

Table 3 clearly indicates that there was significant relationship between shot put performance and the standing height, weight, sitting height, arm length and upper arm length because the calculated values of  $r_{.05}(298) = 0.584, 0.646, 0.724, 0.641, 0.487$  were greater than the tabulated value  $r_{.05}(298) = 0.113$ . Whereas there was no significant relationship between shot put performance and Leg length, Upper leg length and Lower arm length because the calculated values of  $r_{.05}(298) = 0.026, 0.014, 0.130$  were lower than the tabulated value  $r_{.05}(298) = 0.113$ .

## 4. Conclusion

The result of the study indicated that the performance in shot put is directly proportional to strength and are in accordance with the rules of nature. The significant relationship might also be attributed to the natural growth of human being and according to the principle of growth and development; motor fitness variables are always significant if the law of nature is followed accordingly.

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