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## Selected anthropometric and physical fitness measures as predictors of performance in 400 meters track event

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### Abstract

The purpose of the study was conducted to determine the selected anthropometric and physical fitness measures as predictors of performance in 400 meters track event. Sports play an important role in the development of an individual and human civilization. The first sports, such as hunting and running, grew out of the need for survival. Others developed from religious rites. Anthropometry is the application of measurements to the study of human size, shape, proportion, composition, maturation and gross functions. Physical fitness as some aspects of desired life has a closer relationship to physical health, but it has a concept more comprehensive than physical aspects so that, without health, one can not at all gain full physical fitness. The present study was carried out on fifty male athletes, who were participated in All India Inter-university. Selected anthropometric parameters were measured by standard equipment. Linear measurement, researcher used Anthropometric rod, girth of the subject's flexible steel tape was used, skin fold measurement of the subject's skin fold caliper was used and diameters were measured with the help of Sliding Caliper. Collect the data for physical fitness of male athletes, AAPER youth fitness test (1976) was used. The selected anthropometric variables were taken for the study (Height, leg length, shoulder circumference, hip circumference, shoulder diameter, elbow diameter, thigh skin fold, biceps skin fold). To find out the relationship, Pearson's Product Moment Correlation was applied. For testing hypothesis, level of significance was set at .05 level. Combined Contribution of selected Anthropometric and Physical fitness Variables to the 400 meter Event Performance. It is evident from the combined contribution of the height, Thigh length, Shoulder diameter, Ankle diameter, thigh circumference, calf circumference triceps skin fold, Thigh skin fold and physical fitness variables (50 yards dash, 600 yards run and Shuttle Run 10x4m, Arms pull-ups) are significantly related to the performance in 400 meter sprint. Therefore athlete who got highest performance in 400 meter sprint test has significant relationship between the selected anthropometric and physical fitness variables. It is proved that these anthropometric and physical fitness variables help to increase 400 meter sprint performance.

**Keywords:** anthropometric, physical fitness, performance, 400 meters

### 1. Introduction

The strength of a nation rests upon the health of its people and future of the health of the people depends, to a large extent, on what is done to promote, improve and preserve good health, as health is a fundamental human right. To be a good person is the first requisite to success in life and to be a nation of healthy citizens is the first condition to national prosperity.

Physical activity improves overall health and fitness and it prevents many adverse health outcomes. The benefits of physical activity occur generally in healthy people, in people at risk of developing chronic diseases, and in people with current chronic conditions or disabilities. This chapter gives an overview of research findings on physical activity and health.

The knowledge of anthropometry equips us with the techniques of various body measurements like height, body weight, diameters and the skin hold thickness, which ultimately deal with the development of simple produces for the evaluation of physique and physical fitness rural, not only help in their general well being but are also expected to form the baseline criterion for screening school boy for appropriate games/sports. Numerous research studies conducted by many scientists, i.e. Sodhi (2002), Rajani (2000), Chuhan (2003, 2004) and Sparling *et al.* (1998) have given the characteristics of various sportsmen for specific sports and game, to assist in the talent selection of sportsmen. Correlation between the anthropometric variable and performance, have led to more systematic examination of physical requirements, essential to gain excellent performance in competition. Hence, the present investigator has made an attempt to find out the correlations between anthropometric variable and physical fitness components in selected track event.

### 2. Methodology

The present study was carried out on fifty male athletes, who were participated in All India Inter-university. Selected anthropometric parameters were measured by standard equipment.

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circumference, shoulder diameter, elbow diameter, thigh skin fold, biceps skin fold). To find out the relationship, Pearson's Product Moment Correlation was applied. For testing hypothesis, level of significance was set at .05 level.

**3. Result and statistical findings**

The scores of each selected anthropometric and physical fitness components are presented in the following table:

**Table 1.01:** Descriptive Statistics and relationship of selected Anthropometric variables to performance in 400m track event (N-50)

S. No	Variables	Mean	Std. Deviation	Co-efficient of correlation	P. Valve
1	Performance	53.61	1.041	-.682**	0.000
	Height	170.64	4.350		
2	Performance	53.61	1.041	-.629**	0.000
	Leg length.	98.66	3.061		
3	Performance	53.61	1.041	-.755**	0.000
	Shoulder circumference	98.46	2.467		
4	Performance	53.61	1.041	-.788**	0.000
	Hip circumference	93.92	5.677		
5	Performance	53.61	1.041	-.606**	0.000
	Shoulder diameter	2.29	.153		
6	Performance	53.61	1.041	-.431**	.002
	Elbow diameter	2.108	.572		
7	Performance	53.61	1.041	-.651**	0.000
	Thigh skin fold	55.52	3.078		
8	Performance	53.61	1.041	-.753**	0.000
	Biceps skin fold	84.70	2.589		

\*Correlation is significant at the 0.01 level (2-tailed).p.01 (-.682) =.000

Table 1.01 reveals that the statistical findings of height can be clearly interpreted as that the height increases, leads to deducts the timing or improve the performance of 400mt runners due to the negative significant coefficient correlation (-0.682\*\*), the Statistical findings of leg can be clearly interpreted as that the leg length increases, leads to deducts the timing or improve the performance of 400mt runners due to the negative significant correlation coefficient (-0.629\*\*), the statistical findings of shoulder can be clearly interpreted as that the shoulder circumference increases, leads to deducts the timing or improve the performance of 400mt runners due to the negative significant correlation coefficient (-0.755\*\*), the statistical findings of hip can be clearly interpreted as that the Hip diameter increases, leads to deducts the timing or improve the performance of 400mt runners due to the negative significant correlation coefficient (-0.722\*\*), the statistical findings of shoulder diameter statistical findings can be clearly interpreted as that the Shoulder diameter increases, leads to deducts the timing or improve the performance of 400mt runners due to the negative significant correlation coefficient (-0.606\*\*), the statistical findings of elbow diameter can be clearly interpreted as that the Elbow diameter increases, leads to deducts the timing or improve the performance of 400mt runners due to the negative significant correlation coefficient

(-0.431\*\*), the statistical findings of thigh skin fold can be clearly interpreted as that the Thigh skin fold increases, leads to deducts the timing or improve the performance of 400mt runners due to the negative significant correlation coefficient (-0.651\*\*), and the statistical findings of Biceps skin can be clearly interpreted as that the Biceps skin fold increases, leads to deducts the timing or improve the performance of 400mt runners due to the negative significant correlation coefficient (-0.753\*\*).

**Table 1.02:** Descriptive Statistics of 400 meters runners with physical fitness components

	Mean	Std. Deviation	N
Performance	53.6154	1.04139	50
Endurance	1.4208	.10997	50
Strength	24.3600	4.06960	50
Agility	9.3020	.77945	50
Speed	6.7238	.62896	50

Table 1.02 reveals that the mean ± Std. Deviation of 400 meters runners with physical fitness components. Endurance 53.6154±1.04139, Strength 24.3600±.10997, Agility 9.3020±.77945 and speed 6.7238±.62896.

**Table-1.03:** C0- efficient Correlations of 400 meters runners with physical fitness components

		Performance	Endurance	Pull-ups	Shuttle-run	50 yard dash
Pearson` Product moment Correlation	Performance	1.000	.672**	-.650	.603	.618
	Endurance		1.000	-.504	.614	.503
	Strength			1.000	-.505	-.450
	Agility				1.000	.525
	Speed					1.00

\*\*Correlation is significant at the 0.01 level (2-tailed)

Table 1.03 reveals that Correlation Matrix for each of the correlation coefficient at the 0.01 level has been shown. The correlation coefficient with asterisk mark (\*) indicates that it is

significant at 1% level. The table also evident the correlation matrix of the different Physical fitness variables for 400 meters runners.

#### 4. Discussion of results

The findings obtained from the present study are discussed taking into consideration their correlations, and regression equations of the related categories 400 meter athletes.

##### Linear measurement

From the analysis of the results it is clear that co-efficient of correlation of standing height, Leg length have significant and positive correlation with performance in 400 meter sprint significant at .01 level and so, these significantly correlated variables contribute to the performance in 400 meter sprint. All the variables are directly proportional to the 400 meter sprint performance. If height or lengths will increases, the stride length will also increase.

##### Circumference

Among the circumference measurements it is suggested that co- efficient of correlation of Hip circumference, shoulder circumference have significant and positive correlation with performance in 400 meter sprint significant at the .01 level and so, these significantly correlated variables contribute to the performance in 400 meter sprint.

It is proved that hip circumference; shoulder circumference also help to increase 400 meter sprint performance in athletics.

##### Bone Diameter

Among the diameter measurements, it is suggested that co-efficient of correlation of Shoulder diameter, Elbow diameter have significant and positive correlation with performance in 400 meter sprint significant at the level of .01 and so, these significantly correlated variables contribute to the performance in 400 meter sprint. It is proved that Shoulder diameter, Elbow diameter help to increase 400 meter sprint performance in athletics.

##### Skin Fold measurement

The co- efficient of performance in 400 meter sprint shows that Biceps skin fold and Thigh skin fold has negative and significant correlation with 400 meter sprint performance at the .01 level. Therefore athlete who got highest score on the performance of 400 meter sprint has significant relationship between the selected anthropometric variables Biceps skin fold and Thigh skin fold also help to increase 400 meter sprint performance.

##### Physical Fitness components: (Endurance, strength, agility and speed)

Among the physical fitness variables co-efficient of correlation of performance in 400 meter sprint shows that 50 yards dash, 600 yards run, Arms Pull-up and Shuttle run 10x4m have significant correlation with performance in 400 meter sprint at the level of 0.1 Athlete who got highest performance in 400 meter test has significant relationship between the selected physical fitness variables (50 yards dash, 600 yards run and Shuttle Run 10x4m, arms pull-ups). It is proved that 50 yards dash, 600 yards run and, Arms Pull-up test, Shuttle Run 10x4m also help to increase 400 meter sprint performance.

#### 5. Conclusion

Combined Contribution of selected Anthropometric and Physical fitness Variables to the 400 meter Event Performance. It is evident from the combined contribution of the height, Thigh length, Shoulder diameter, Ankle diameter, thigh circumference, calf circumference triceps skin fold, Thigh skin fold and physical fitness variables (50 yards dash, 600 yards

run and Shuttle Run 10x4m, Arms pull-ups) are significantly related to the performance in 400 meter sprint. Therefore athlete who got highest performance in 400 meter sprint test has significant relationship between the selected anthropometric and physical fitness variables. It is proved that these anthropometric and physical fitness variables help to increase 400 meter sprint performance.

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