



ISSN: 2456-0057

IJPNPE 2018; 3(1): 2296-2298

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www.journalofsports.com

Received: 10-01-2018

Accepted: 15-02-2018

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Anthropometric and physical fitness measures as predictors of performance in 400 meters hurdle track event

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Abstract

The present study was conducted to determine the selected anthropometric and physical fitness measures as predictors of performance in 400 meters hurdles track event. Anthropometry is the science that deals with measurements of size, weight, shape, proportion, composition, maturation and gross functions and proportions of human body. 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 cannot at all gain full physical fitness. The present study was carried out on fifty male athletes, who were participated in All India Interuniversity. 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, AAPHER 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 levels. Combined Contribution of selected Anthropometric and Physical fitness Variables to the 400 meters hurdles event Performance. It is evident from the combined contribution of the height, Leg length, Shoulder circumference, Hip circumference, Shoulder diameter, Elbow diameter, thigh skin fold & Biceps 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 110 meter hurdles sprint. Therefore athlete who got highest performance in 110 meters hurdles 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 meters hurdles performance.

Keywords: Anthropometric, physical fitness measures, hurdles track event

Introduction

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 from 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) ^[8, 9] 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.

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Methodology

The present study was carried out on fifty male athletes, who were participated in All India Interuniversity. 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 subjects skin fold caliper was used and diameters were measures with the help of Sliding Caliper. Collect the data for physical fitness of male athletes, AAPHER youth fitness test (1976) was used.

The selected anthropometric variables were taken (Height, thigh length, thigh circumference, calf circumference, shoulder diameter, ankle diameter, thigh skin fold, triceps 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.

Result and statistical findings

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

Table 1: Relationship of selected Anthropometric variable to performance in 400 m hurdle track event (n-50)

S. no.	Variables	Co-efficient of correlation
1.	Height	.653
2.	Thigh length	.623
3.	Thigh circumference	.670
4.	Calf circumference	.818
5.	Shoulder diameter	0.278**
6.	Ankle diameter	.422
7.	Triceps skin fold	.718
8.	Thigh skin fold	.667**.

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

Table 1 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 hurdle runners due to the negative significant coefficient correlation (-0.653**), the statistical findings of thigh length

can be clearly interpreted as that the Thigh length increases, leads to deducts the timing or improve the performance of 400 meter hurdle runners due to the negative significant correlation coefficient (-0.623**), the statistical findings of thigh can be clearly interpreted as that the thigh circumference increases, leads to deducts the timing or improve the performance of 110 meter hurdle runners due to the negative significant correlation coefficient (-0.670**). the statistical findings of calf can be clearly interpreted as that the calf circumference increases, leads to deducts the timing or improve the performance of 400 meter hurdle runners due to the negative significant correlation coefficient (-0.807**), the statistical findings of shoulder can be clearly interpreted as that the Shoulder diameter increases, leads to deducts the timing or improve the performance of 400 meter hurdle runners but insignificant correlation coefficient (-0.297**), that the Ankle diameter decreases, leads to deducts the timing or improve the performance of 110 meter hurdle runners due to the positive significant correlation coefficient (0.422**), the Triceps skin fold increases, leads to deducts the timing or improve the performance of 110 meter hurdle runners due to the negative significant correlation coefficient (-0.718**), the Thigh skin fold increases, leads to deducts the timing or improve the performance of 400 meter hurdle runners due to the negative significant correlation coefficient (-0.667**).

Table 2: Descriptive Statistics 400 meters hurdle with physical fitness components

	Mean	Std. Deviation	N P-Value
Performance	53.1166	1.04140	50 0.002
Endurance	1.4354	.10745	50 0.004
Strength	19.2300	6.04867	50 0.201
Agility	8.2300	.81717	50 0.000
Speed	6.3830	.66814	50 0.000

Table 2 reveals that The mean ± Std. Deviation of 400 meters hurdle runners. The performance 53.1166±1.04140, Endurance 1.4354±.10745, Strength 19.2300±6.04867, Agility 8.2300±.81717, Speed 6.3830±.66814.

Table 3: Correlations of 400 meters runners with physical fitness components

Variables	Physical fitness component	Performance	Endurance	Arms pull-ups	Shuttle-run
Performance	1.000	.690	-.795*	.797*	.807**
Endurance		1.000	-.558	.559	.731*
Strength			1.000	-.731*	-.636
Agility				1.000	.609
Speed					1.000

Table 3 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 hurdlers. Above table also indicates that a significant difference was found in endurance, Shuttle-run and 50yard dash test as the P- value is 0.004, 0.000 and 0.000 which is less than 0.05, So the null hypothesis of no difference among the means of different groups was rejected at 5% level whereas an insignificant difference was found in the arms pull-ups and the P- value is 0.201.

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 hurdle athletes.

Linear measurement

From the analysis of the results it is clear that co-efficient of correlation of height and thigh length have significant and positive correlation with performance in 400 meter hurdle 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 hurdle performance. If height or lengths will increases, the stride length will also increase. It is proved that height and thigh length help to increase 400 meter hurdle performance in athletics.

Circumference

Among the circumference measurements it is suggested that co- efficient of correlation of thigh circumference, calf circumference have significant and positive correlation with performance in 400 meter hurdle significant at the .01 level

and so, these significantly correlated variables contribute to the performance in 400 meter hurdle.

It is proved that thigh circumference and calf circumference also help to increase 400 meter hurdle performance in athletics.

Bone Diameter

Among the diameter measurements, it is suggested that coefficient of correlation of Shoulder diameter and Ankle 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 hurdle. It is proved that Shoulder diameter and Ankle diameter also help to increase 400 meter hurdle performance in athletics.

Skin Fold measurement

The co-efficient of performance in 400meter hurdle sprint shows that Triceps skin fold and Thigh skinfold has negative and significant correlation with 400 meter hurdle performance at the .01 level. Therefore athlete who got highest score on the performance of 400 meter hurdle has significant relationship between the selected anthropometric variables (Triceps skin fold and Thigh). It is proved that Triceps skin fold and Thigh skin fold also help to increase 400 meter hurdle 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 hurdle at the level of 0.1. Athlete who got highest performance in 400hurdle 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 hurdle performance.

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