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## Comperison of anthropometric variables between high and low performance endurance runners

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### Abstract

In the present study the researcher wants to know that significance level of anthropometric variables between high and low performance runners. Purpose of Study was to assess Comparison of Anthropometric Variable between High and Low Performance Endurance Runners. The fifty male students of B.P.Ed. In department of Physical Education, PG Government College, Sector-11, Chandigarh were selected by randomly as a sample. Following variables was covered which seemed to be related to endurance ability (*Independent Anthropometric Variable*: Age, Body Weight, Linear *Measurement*: Height, Leg length, Lower leg length, Trunk length, Thigh length, Foot length (are found to be significant). *Body Circumferences*: Arm Circumference, Chest Circumference, Abdomen Circumference, Hip Circumference, Thigh Circumference, Calf Circumference (are found to be significant), *Diameters*: Shoulder, Hip, Femur Bycondyler, Ankle, Elbow, Wrist (are found significant.) *Skin Folds*: Biceps Skin fold, Triceps Skin fold, Sub scapular Skin fold, Super iliac Skin fold, Thigh Skin fold and Calf Skin fold *Dependent Variables*: Performance (time) in 600 yards. Endurance ability test. Were selected for the study).

**Keywords:** Comperison, anthropometric variables, performance endurance

### Introduction

The present world of 21<sup>st</sup> Century will know the World of Hi-Technological Innovation. Where a layman is familiar with the words and meaning like satellite, computer, communication highway, Fiber optics etc. and with their meaning too. In present era, each and every field availing the services of such current advancements. There the field of physical education and sports is also affected from such developments of science and technologies. From many decade human beings are availing these technologies for the rapid development of their sports persons. And no doubt they are making new records day by day in the competitive sports. The term Kinanthropometry used in 1972 first time and it gains unexpected popularity and significance in sports. Because it assess the human physique, physical moment and performance through evaluation of physical structure and function of individual. In physical structure we assess the height, weight diameters, and circumference and skin fold thickness. Which have in depth concern with assessment of human physique, body composition, and physical growth, gross functions of body, fat weight, fat percentage and body density? Each of these mentioned variables have great, relationship with performance. Anthropometry is the oldest type of body measurements used, dating back to the beginning of recorded history. The concepts of the ideal proportion varied over periods of time. For example, Polyclitus fashioned Doryphorus, the spear thrower, as a fighter and an athlete, broad shouldered, thick set and square chested as the 'perfect man' (Clarke and Clarke, 1987).

Garay *et al.* (1964) after an intensive study of anthropometric measurement of Olympic Athletes concluded that top-level performance on particular events demands particular size of the body ad shape, other aspects being similar. They established strong relationship between the structure of an athletes and specific task clear physical proto type exists for optimal performance at Olympiac level.

In the present era of sports one thing is clear that excellence in performance in track and field event can only be achieved when and individuals only be achieved inherent and trained physical capabilities match the requirement of specific event. The sports persons of

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Different physical activities will have a different physique for example hurdler has long legs, sprinter has short and a thrower has long area. Further the sports persons of different physical activities will also is different in their activities will also are different in their body composition parameters according to their sportive activity. Moreover the present study would highlight some of the important anthropometric determinants, which may have to bear in mind while looking for the selection of talented athletes and also to develop these variables through systematic training programmed.

**Purpose of study**

To assess Comparison of Anthropometric Variable between High and Low Performance Endurance Runners.

**Procedure**

The fifty male students of B.P.Ed. In department of Physical Education, PG Government College, Sector-11, Chandigarh. Following variables was covered which seemed to be related to endurance ability, were selected for the study.

A. Independent anthropometric variable: age, body weight

- B. Linear Measurement: Height, Leg length, Lower leg length, Trunk length, Thigh length, Foot length
- C. Body Circumferences: Arm Circumference, Chest Circumference, Abdomen Circumference, Hip Circumference, Thigh Circumference, Calf Circumference.
- D. Diameters: Shoulder, Hip, Femur Bycondyler, Ankle, Elbow, Wrist.
- E. Skin Folds: Biceps Skin fold, Triceps Skin fold, Sub scapular Skin fold, Super iliac Skin fold, Thigh Skin fold and Calf Skin fold
- F. Dependent Variables: Performance (time) in 600 yards. Endurance ability test.

**Results**

The data collected from the students of B. P. ed (PG Government College, Sec-11 Chandigarh) and for calculations the 't' test method was applied to established the comparison variable of the study.

Comparison of linear measurement between high and low performance endurance runners (N=30+30, d. f. =58).

**Table 1:** Shows that the mean and standard deviation scores of linear measurement of high and low performance endurance runners.

S. no	Variables	High Performance Runners Mean	S. D	Low Performance Runners Mean	S.D	SED	't'
1	Body Weight	170.08	5.64	169.18	5.15	1.39	0.65
2	Leg Length	89.24	4.26	86.41	4.52	1.13	2.50**
3	Lower Leg Length	48.97	3.33	46.87	2.72	0.79	2.65**
4	Thigh Length	42.32	2.55	40.54	4.33	0.92	1.93*
5	Foot Length	26.38	1.01	26.40	1.21	0.29	0.07
6	Trunk Length	56.21	2.41	55.01	3.09	0.79	1.69*

\*Significant at 5% Level 5% = 2.01 \*\*Significant at 1% Level 1% = 1.67

Table-1 shows that the Mean and Standard Deviation scores of linear measurement of High and Low performance endurance runners. The difference in means Leg Length, Lower Leg Length, Thigh Length and Trunk Length are found to be significant at 1% and 5% level respectively as shown in the table. It suggested that High performance endurance

runners have more Leg Strength, Lower Leg Strength, Thigh Length and Trunk Length, then those of the low performance endurance runners. Other variables are found similar in both the group of endurance runners.

Comparison of Body Circumferences between High and Low performance Endurance Runners (N=30+30, d. f. =58)

**Table 2:** Shows that the difference in mean scores of body circumference, except chest circumference are found to be significant at 5 percent and 1 percent level as shown in the table.

S. no	Variables	High Performance Runners Mean	S. D	Low Performance Runners Mean	S. D	SED	't'
1	Arm Circumference	25.29	1.91	26.58	2.13	0.52	2.48**
2	Chest Circumference	85.12	3.50	86.78	6.32	1.32	1.25
3	Abdomen Circumference	74.59	4.99	77.80	9.22	1.91	1.68*
4	Hip Circumference	88.70	4.46	91.50	5.43	1.28	2.18**
5	Thigh Circumference	52.99	3.17	50.77	4.02	0.93	2.38**
6	Calf Circumference	34.61	2.83	33.03	2.99	0.75	2.10**

\*Significant at 5% Level 5% = 2.01 \*\*Significant 1% Level 1% = 1.67

Table-2 shows that the difference in mean scores of body circumference, except chest circumference are found to be significant at 5 percent and 1 percent level as shown in the table. It suggests that the Low Performance endurance runners have more Chest, Arm, Abdomen, Hip circumference than those of the high performance endurance runners. Only Thigh

and Calf circumference are found more in High performance endurance runners than those of the low performance endurance runners.

Comparison of Body Diameters between High and Low performance Endurance Runners (N=30+30, d. f. =58)

**Table 3:** It is obvious that the mean difference in shoulder-diameter of low performance endurance runners is found to be more than that of high performance endurance runners significant and it is at 5%

S. no	Variables	High Performance Runners Mean	S. D	Low Performance Runners Mean	S. D	SED	't'
1	Shoulder Diameter	38.96	2.85	40.14	2.52	0.69	1.71*
2	Hip Diameter	30.49	1.68	30.43	1.63	0.43	0.14
3	Femur Diameter	9.08	7.44	9.28	0.39	0.15	1.33
4	Ankle Diameter	7.01	0.52	7.08	0.38	0.12	0.58
5	Elbow Diameter	6.65	0.34	6.63	0.35	0.09	0.22

6	Wrist Diameter	5.39	0.29	5.49	0.32	0.08	1.00
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\*Significant at 5% Level 5% = 2.01 \*\*Significant at 1% Level 1% = 1.67

Table-3 It is obvious that the Mean Difference in Shoulder-Diameter of Low performance endurance runners is found to be more than that of High performance endurance runners significant and it is at 5% level. Other diameters measured in

both groups are found to be statistically insignificant. Comparison of Linear measurement between High and Low performance Endurance Runners (N=30+30, d. f. =58)

**Table 4:** Shows the mean difference scores of skin fold measurement of high and low performance runners.

S. no	Variables	High Performance Runners Mean	S. D	Low Performance Runners Mean	S. D	SED	't'
1	Biceps	3.4	2.7	5.5	5.6	1.14	1.84*
2	Triceps	7.3	3.14	9.8	5.12	1.10	2.27**
3	Sub-Scapular	8.71	1.82	11.83	6.78	0.92	3.39**
4	Supra-Iliac	7.49	2.32	11.43	6.78	1.30	3.03**
5	Thigh	9.49	3.28	11.51	4.50	1.02	1.98*
6	Calf	9.05	4.44	12.35	5.13	1.24	2.66**

\*Significant at 5% Level 5% = 2.01 \*\*Significant at 1% Level 1% = 1.67

Table-4 shows the mean difference scores of skin fold measurement of High and Low performance runners. All the skin fold measurement i.e. Biceps, Triceps, Sub-Scapular, Supra-Iliac, Thigh and Calf Skin folds of Low performance, endurance runners are found more than those of High performance endurance runners, and are significant at 1% and

5% level as shown in the table. It suggests the amount of subcutaneous tissues is more in low performance endurance runners than those of high performance endurance runners.

Comparison of Body Composition variables between High and Low performance Endurance Runners (N=30+30, d. f. =58).

**Table 5:** Clearly shows the mean difference between high and low performance endurance runners.

S. no	Variables	High Performance Runners Mean	S. D	Low Performance Runners Mean	S. D	SED	't'
1	Body-Density	2.66	1.06	2.02	1.05	0.27	2.37**
2	Fat-Percentage	16.91	2.98	19.54	5.44	1.13	2.32**
3	Fat-Weight	10.22	2.38	12.22	4.36	0.90	2.22**
4	Lean Body Mass	49.65	5.42	49.18	4.61	1.29	0.36

\*Significant at 5% Level 5% = 2.01 \*\*Significant at 1% Level 1% = 1.67

Table-5 Clearly shows the mean difference between high and low performance endurance runners. The body composition variables i.e. Fat percentage, Fat weights are found more in low performance endurance runners than those of high performance endurance runners. These differences in mean scores are significant at 1% level, whereas body density is found more in high performance endurance runners than the low performance endurance runners.

## Discussion

The results of present study are discussed as below:

From the table-1, it is obvious that leg length, lower leg length, thigh length and trunk length have been found more in high performance endurance runners than those of the low performance endurance runners. It is because of the more maturity level in high performance runners and is helpful in completing the endurance events efficiently.

Further, the body circumference i.e. arm, abdomen and hip are found to be more in low performance endurance runners. It occurs due to lack of physical exercise among the low performance endurance runners. Whereas high performance endurance runners have thigh and calf circumference more than the low performance endurance runners. It is due to their active participation in endurance activities that is why their thigh and calf circumferences developed largely than those of the low performance endurance runners.

Among the body diameters, only shoulder diameter is found more in low performance endurance runners than those of the high performance endurance runners. Other diameters are similar in both the groups of endurance runners. It is also because of accumulation of more fat at the shoulder & lack of physical activities.

Further the table-4 presents the more amounts of subcutaneous tissues in the low performance endurance runners than those high performance endurance runners. It is also due to lack of physical activities in low performance endurance runners that is why they get more fat accumulation in the body. Whereas high performance endurance runners participate in the activity regularly, and hence have low amount of subcutaneous tissues in the various skin-fold measures.

Out of body composition variables, fat percentage and fat weight have been found more in low performance endurance runners than those of the high performance endurance runners. Fat accumulations occur in body due to lack of physical activity and more balanced diets. Hence low performance endurance runners have more values of fat percentage and fat weight. Only body density found more in high performance endurance runners because of their regular participation in physical activities.

## Conclusions

From the above discussions, it is concluded that anthropometry measurement, i.e. leg length, lower leg length, thigh length, trunk length, body density, thigh and calf circumference are found more in high performance endurance runners whereas arm, abdomen, hip, circumference, shoulder diameter and all the skin folds i.e. biceps, triceps, sub scapular, supra iliac, thigh and calf skin folds, and fat percentage and fat weight are found more in low performance endurance runners than those of high performance endurance runners. Hence the hypothesis is partially accepted and partially rejected.

### Recommendations

On the basis of the results of the study. The following suggestions and recommendations are made:

1. The findings of study can be used by the coaches and physical education trainers as an aid in screening and selecting talented endurance runners.
2. For such type of research, more facilities, training and practice with instruments are essential for better results.
3. The present study will be of immense use for further research in the field.
4. This type of study is very useful at the school level to have talent at the primary level and further training can be managed to make them champion.
5. More facilities for research in physical education and sports should be provided for smooth conduct and better results.
6. The similar study can be conducted on the female endurance runners.

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