



**ORIGINAL RESEARCH PAPER**

**Physiology**

**STUDY OF LEAN BODY MASS AND FAT MASS IN LONG DISTANCE RUNNERS.**

**KEY WORDS:** long distance runners, skin fold thickness.

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**ABSTRACT**

**Background:** In the endeavor to achieve excellence in sport, all of the possible concomitants of performance have been subject to scientific research. Modern sport science is characterized by the purposefulness of its endeavor to improve elite athletes and to discover talents as precisely as possible. There is evidence to support the concept that an individual's physique greatly limits or enhances successful participation in physical activity.

**Objectives:** To assess and compare skinfold thickness of university and state level players and age matched controls.

**Material and methods:** The present study was carried out in thirty male long distance runners playing at university and state level, their age range from 16-20 yrs with an average of 17.2 yrs. Thirty age matched subjects taken as control group. Skinfold thickness was assessed at standard sites by using skin fold caliper. Percentage of body fat was measured using Fat –o-measure.

**Results:** Body fat percentage and fat mass was lower in athletes than controls which was highly significant. Where as lean body mass was also significantly lower in athletes than controls.

**Conclusion:** Body fat percentage of athletes was less as compared to the controls, which may be due to the training regimens through which the athletes are undergoing. Lean body mass was significantly less in athletes as their weight was very much less than controls.

**Introduction**

In the endeavour to achieve excellence in sport, all of the possible concomitants of performance have been subject to scientific research. Modern sport science is characterized by the purposefulness of its endeavour to improve the elite athletes and to discover talents as precisely as possible. There is evidence to support the concept that an individual's physique greatly limits or enhances successful participation in physical activity. Elite and world class athletes have different physique than individuals in the nonathletic population.

**Objectives**

- To assess the lean body mass and fat mass of university and state level long distance runners.
- To assess the lean body mass and fat mass of age matched controls.
- To compare these parameters in study group and control.

**Inclusion criteria**

Regularly practicing daily for 2-3 hrs for 6 days a week .  
Playing at university or state level.

**Exclusion criteria**

Having any major illness.  
Those who are doing other type of exercises.

**Material and methods**

The present study was carried out in thirty male long distance runners playing at university and state level, in the age group from 16-20 yrs with an average age of 17.2 yrs.

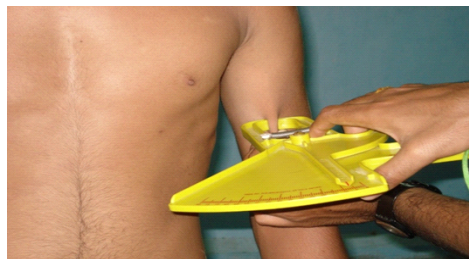
30 age matched subjects taken as control group.

Body composition was assessed by measuring the skin fold thickness at standard anatomical sites using skin fold caliper.

The parameters studied

- 1) Body fat: in %
- 2) Fat mass: in Kgs
- 3) Lean body mass: in Kgs

**1) Bicep:** On the arm midway between tip of acromion and the cubital fossa.



**2) Tricep :** On the back of arm midway between Acromion process and olecranon process.



**3) Subscapular :** Below the inferior border of scapula. Skinfold parallel to the border.



**4) Suprailiac:** Just above the iliac crest and parallel to the bone below.



The sum skin fold thickness of all the four sites was done and then **body fat percentage** was determined with **fat-o-measure kit**.

Fat Mass (kgs) = Total body weight X (% body fat / 100).  
 Lean body mass(kgs) = total body weight - fat mass.

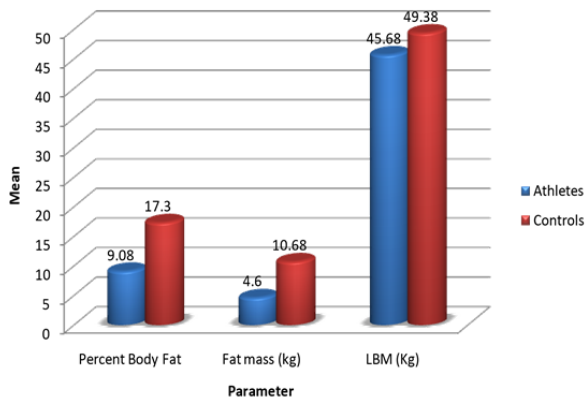
**Observation and results**

Data was analyzed by Unpaired t test

Parameter	Athletes Mean ± SD	Controls Mean ± SD	P value	Significance
Percent Body Fat	9.08± 3.09	17.30 ± 4.16	<0.001	HS
Fat mass (kg)	4.60±1.84	10.68±4.007	<0.001	HS
LBM (Kg)	45.68. ± 2.95	49.38±6.24	<0.05	Significant

**Body composition:**

2)



**Discussion**

The body composition is assessed by percentage body fat(PBF), Fat mass (FM) and lean body mass or fat free mass (FFM)

In present study we recorded highly significant lower values of body fat percentage in athletes (9.08%) as compared to controls (17.30%) and highly significant lower values of fat mass recorded in athletes (4.60kgs) than controls (10.68kgs). Lean body mass in athletes was significantly lower (45.68kgs) than in controls (49.38kgs).

H.S Sodhi and L.S Sidhu observed more or less similar values of average body fat percent in an indian athlete ( 9%).

About lean body mass similar observations made by Dr.Vandana Daulatabad etal, they observed significant lower values of lean body mass in athletes(47.9kgs) than controls(53.1kgs).

In comparative study of three group of runners by P.Bale etal, they recorded lower values of lean body mass in elite group than in good and average group of athletes.

It is expected that in athletes the lean body mass should be more

than nonathletes, But in present study and in abovementioned studies, values of lean body mass in athletes were less than controls.

In the present study total body weight of athlete(50.29 ± 3.44kg) is highly significantly less than control group(60.06 ± 9.60 kg ).This may be the reason for proportionately lower values of lean body mass was recorded in athletes than in control.

In runners as in present study, as lower body segment muscle size increases more than upper body Total lean body mass of both the segments may not increase much. as in runners lower segment muscles are exposed to endurance activities.

Also with continuous endurance exercise skeletal muscle size can be increased by 30-60%(Guyton 10<sup>th</sup> edition)

These may be reasons for significantly less values of lean body mass recorded in athletes in present study.

**Conclusion**

- 1) Body fat percentage of our athletes is less as compared to controls which may be due to the training regimens through which athletes are undergoing.
- 2) Lean body mass was significantly less in athletes as their weight was much less than controls.
- 3) from this we can conclude that body weight of runners mostly contributed by lean tissue than fat.

**References:**

- 1) Wilmore JH, Haskell WL. Body composition and endurance capacity of professional football players. 1972. J. Appl Physiol;33:564-71.
- 2) Wilmore JH, Brown CH, physiological profiles of women distance runner. 1974 Med.sci.sports.;6: 178-81
- 3) FoheyT,Larsen A ,Ralph R ,Body composition and vo2max of exeptional weight trained athletes.1975.J. Appl.Physiol.;39:559- 61.
- 4) Wikkiser JD, Kelley JM;The body composition of college football team.1975, Med.sci.sports.;7:199-202.
- 5) PipesTV. 1977.Body composition characteristics of male and female track and field athlete Res.Q.197;48:244-47
- 6) Bell W, Rhodes G,The morphological characteristics of the association football players. 1975,Brit J Sport Med ;195-200.
- 7) Essentials of exercise physiology: William D MacCardle, Frank I Katch, Victor L Katch, 3rd edition.
- 8) Sodhi HS, Sidhu LS, Physique and selection of sportmen.
- 8) Barry L, Johnson, Jack K. Nelson. Practical measurements for evaluation in physical education. 1988, NY. Surjeet publication, 3rd edition,
- 9) Choudhari SB.sept2005, Fat-o-measure kit, Self help, obesity management kit.
- 10) P BALE, Phd,BRADBURY,Bsc (Hons),E.COLLEY,MSC Anthropometric and training variables related to 10km performance. december1986,Brit.J. Sport Med – vol.20.No. 4 pp. 170-73.
- 11) Vandana.S.Dualatabad, Prafull A Kamble,P.S.Baji 2013.A comparative study between physical and physiological parameters in athletes and age matched controls.Int j Bio Med Res. ;4(1)2686-2691.