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COMPARATIVE STUDY OF PHYSIOLOGICAL AND ANTHROPOMETRIC VARIABLES OF COLLEGE LEVEL FEMALE LONG JUMPERS AND SPRINTERS

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ABSTRACT

The purpose of the study was to compare selected anthropometric and physiological variables of college level female long jumpers and sprinters. Fifteen female sprinters and fifteen female long jumpers of Post Graduate Government college sector-11 Chandigarh were tested by using standard instruments and following standard techniques. The range of age for all female sportspersons lies from 20 to 25 years. The selected anthropometric measurements like body height, body weight and lower limbs and physiological variables like resting heart rate, blood pressure and Vo2 max were taken. In order to ascertain significance of difference between the two group, student't' test was employed and the level of significance was set as .05 level of confidence. The 't' test values has shown significant differences for anthropometric variables (t test values for height & body weight 2.28 and 2.50 at 5% level, for lower limbs 5.37 at 1% level respectively) and non-significant for physiological variables (for resting heart rate 1.48, for blood pressure 0.03 and for Vo2 max 0.97 respectively) between female long jumpers and sprinters.

Keywords: Body Height, Weight, Lower limb length, Blood pressure, Resting heart rate and V (O_2) max.

INTRODUCTION:

The physical education seems to have taken a new turn in the form of sports science. The sports science in turn has their substance and methodology from various sports basic. For many years the research in sports was being undertaken within this basic science but with the advancement

of knowledge, the specialization and micro-specialization have taken a respectable position. As matter of fact, the research now a days, embraces knowledge from various discipline of human science. Now sportsman have been able to give outstanding performance because of involvement of new scientific substantiated training methods and means of execution of sports exercise such as sports technique as well as other component and condition of the system of training. Measurements of body include such descriptive information as height, weight and surface area, while measure of body proportion describes the relation between the height and weight among length, widths and circumference of various body segments. It has been found that the top athletes in some sports tend to have those proportions that biomechanically aid the particular performance required (Zeigler, 1982).

Sodhi (1991) & Sidhu et al (1990) studied that the long, high and triple jumpers were taller but lighter in weight with proportionately longer lower extremities and shorter trunks than those of other field athletes. However the Indian athletes were proportionately slender in hip width with narrow biacromial diameter and smaller chests. They had smaller bicondylar diameters with less of lean tissue area as well as the total body-fat than other athletes.

The main aim of this study is to explore the selected anthropometric and physiological parameters of female long jumpers and sprinters and also to compare with each other , which helps us to select female long jumpers and sprinters at early ages for talent identification and to make guidelines and counseling about their body morphological and physiology.

MATERIAL & METHODS:

The present anthropometric and physiological data have been taken on fifteen female long jumpers and fifteen female sprinters of Post graduate government college Sector-11, Chandigarh. The age of female sportspersons were ranging between 20 to 25 years.

Table-1
Sample Size of College level Female Long Jumpers and Sprinters

S. no	Sport Events	Sample Size
1	Long Jumpers	15
2	Sprinters	15
	Total	30

For the purpose of this study, following anthropometric (Weiner and Lourie, 1969 & Kansal, 2008) and physiological (Mcardle & Katch, 1996) measurements were taken by using standard instruments and following standard techniques.

ANTHROPOMETRIC VARIABLES:

1.) Height (cm): The height of the subject was taken with the help of stadiometer. The subject was asked to stand erect on the platform of the stadiometer, bare footed with heels, buttocks and back of the head touching the vertical stand of the stadiometer. The jaw of the stadiometer was place parallel to the apex of the head, and the measurement was record to the nearest half centimeter.

2.) Body weight (kg): If the measurement is being taken in the laboratory level balance is preferred except brief under garments the subject is asked to take off his/her shoes and clothing. The subjects stand erect on the platform of the balance with equal weight on the feet. The weight is usually recorded accurate up to 0.5 kg except in growth studying where accuracy up to 0.1 kg is maintains. The zero error of the machine is checked both before asking the subject to stand on its platform and after the subject get down.

3.) Lower leg length (cm): The subject was asked to stand erect on the horizontal platform bare footed with heels close together and press horizontal platform with equal press by both feet. Leg length was measured with anthropometric rod, from the greater trochanter (head of the femur) to ground.

Physiological variables

4.) Resting heart rate (beats/minutes):Resting heart rate has been taken two times early in the morning before any activity.

5.) Blood pressure (systolic) (mm of Hg)

The blood pressure has been measured with help of qualified medical person.

6.) V(o_2) max (ml/kg/minutes)

With the help of standard calculation,

$$Vo_2max = 15 \times \frac{\text{Maximum heart rate}}{\text{Resting heart rate}}$$

Maximum heart rate = 220 – age

Appropriate statistic (Mean, SD, SE, and student 't' test ratio) was used to analyze the data (Nelson and Johnson,1970).

RESULT AND DISCUSSION:

Table-2
Mean, SD, S.E. and T test values of Anthropometric Variables of College Female Long Jumpers and Sprinters

S. No	Anthropometric Variables	SPRINTERS (N=15)			JUMPERS (N=15)			
		MEAN	S.D	S.E	MEAN	S.D	S.E	T-RATIO
1	Body Height (cm)	159.2	6.54	1.68	168.26	13.88	3.58	2.28*
2	Body weight (kg)	55.2	9.26	2.39	62.8	7.23	1.86	2.50*
3	Lower limb(cm)	91.46	4.51	1.16	98.26	3.27	.84	5.37**

* Significant at 5% Level (29) = 2.10, * * Significant at 5% Level (29) = 2.76

Table-2 depicts that long jumper females were found taller with respect to female sprinters. Mean values of the height (cm) of the sprinters and long jumpers were 159.2cm and 168.26cm and S.D were 6.54 and 13.88 respectively. The calculated t-value for height of the female

sprinters and long jumpers was 2.28 significant at 5% level which was higher than the tabulated t- value.

Table-2 reveals that female long jumpers were reported heavier with respect to female sprinters. Mean values of the body weight (kg) of the sprinters and long jumpers were 55.2kg and 62.8kg and S.D were 9.26 and 7.23 respectively. The calculated t-value for body weight of the sprinters and long jumpers was 2.50, which were higher than the tabulated t- value of 2.10 required being significant at 0.05 levels.

Table-3 reveals that, Mean values of the lower limb (cm) of the sprinters and long jumpers were 91.46cm and 98.26cm and S.D were 4.51 and 3.27 respectively. Female jumpers were recorded larger leg length with respect to female sprinter. The calculated t-value for lower limb of the sprinters and long jumpers was 5.37 highly significant at 1% level.

Table-3
Mean, SD, S.E. and T test values of Physiological variables of College Female Long Jumpers and Sprinters

S. no	Physiological variables	SPRINTERS			JUMPERS			
		MEAN	S.D	S.E	MEAN	S.D	S.E	T-RATIO
1	Resting heart rate (beats/minute)	77.53	4.92	1.27	75.26	4.59	1.18	1.48(NS)
2	Blood pressure (systolic)(mm of Hg)	124.2	4.08	1.05	124.13	5.73	1.48	0.03(NS)
3	Vo_2max	38.23	2.44	.63	39.08	2.36	.60	0.97(NS)

* Significant at 5% Level (29) = 2.14, * * Significant at 5% Level (29) = 2.76

Table-3 reveals that, Mean values of the resting heart rate of the sprinters and long jumpers were 77.53 and 75.26 beats per minutes and S.D values were 4.92 and 4.59 respectively. The calculated t-value for resting heart rate of the sprinters and long jumpers was 1.31 which is less than the tabulated t- value of 2.10 hence, it can be stated that there was no significant differences between the sprinters and long jumpers in relation to their resting heart rate.

Mean values of the blood pressure (systolic) of the sprinters and long jumpers were 124.2 and 124.13 mm of Hg and S.D values were 4.08 and 5.73 respectively. The calculated t-value for blood pressure of the sprinters and long jumpers was 0.03 which is less than the tabulated t-value of 2.10. Hence, it can be stated that there was no significant differences between the female sprinters and long jumpers in relation to their blood pressure as shown in table-3.

Table-3 reveals that, Mean values of the Vo_2max of the sprinters and long jumpers were 38.23 and 39.08 ml/kg/minute and S.D is 2.44 and 2.36 respectively. The calculated t-value of Vo_2max of the sprinters and long jumpers was 0.97, which is less than the tabulated t- value of 2.10. Hence, it can be stated that there was no significant differences between the sprinters and long jumpers in relation to their Vo_2max.

CONCLUSION

From this study, it was concluded that:

1. Female long jumpers were found taller than sprinters. A significant difference was recorded between female long jumpers and sprinters height (cm) at 5% level (2.28).
2. Female long jumpers were recorded heavier with respect to sprinters. Weight(kg) has shown significant difference between female long jumpers and sprinters at 5% level (2.50)
3. Long jumpers were reported larger in leg length than sprinters. Lower limb (cm) has shown significant difference between female long jumpers and sprinters at 5% level (5.57).
4. Physiological variables (resting heart rate, blood pressure systolic and V (o_2) max has shown non-significant differences between female long jumpers and sprinters.

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