COMPARAISON OF HEALTH OF HEIGHT-WEIGHT MATCHED YOUNG-ADULT FEMALE ATHLETES OF HILLY AND PLANE REGIONS IN SELECTED ANTHROPOMETRIC MEASUREMENTS

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ABSTRACT

Height and weight are the major two determinants for various anthropometric properties at any age in life. People of different racial origins and geographical locations have specific anthropometric features. Purpose of this study was to compare health status of height-weight matched young-adult females of hill and plane regions through selected anthropometric measurements. Sixty (N=60) 18–25 years female, thirty from each of the hill and plane localities were the subjects. The height range was 157.5 – 162.5 cm and weight was 52.5 – 55.5 kg. Seven skin-folds, six body circumferences and three body composition measures, namely – body mass index (BMI), waist-to-hip ratio (WHR) and body fat percentage (%BF), derived from respective anthropometric measurements, all were the variables of the study. Out of seven skin-folds, plane subjects were significantly higher (P>0.05) at only biceps site and hilly subjects at sub-scapula, suprailiac, abdomen and thigh but no difference existed at triceps and calf. Among the seven body circumferences, hilly girls were superior at upper limb, lower limb and waist circumferences; however, at thigh, calf, abdomen and hip sites there was no any significant difference between the groups. Among the three body composition measures, only %BF and WHR was higher in hilly subjects. But LBM and BMI did not differ in both groups.

Keywords: Anthropometric profile, health, young-adult females, plane and hilly region;

INTRODUCTION

Height and weight are the major two determinants for various anthropometric properties at any age in life. People of different racial origins and geographical locations have specific anthropometric features. Human beings can be classified in many ways. Each and every people have certain unique characteristics in their form, action and their thought. Researchers, who keen to focus their work in determining and understanding those characteristics to know the highest form of the living being in a better way. Study findings reveal that there are lot of differences exists between the plane and hill people. These differences are due to the life style pattern of the both groups.

Anthropometric and morphological parameters are the sensitive indicators for sport persons and people of all walks of their lives in terms of their physical growth and nutritional status [1]. These indicators depend largely on genetics, correlated with age, sex, socio-economic status, ethnicity, altitude, nutritional status, personal hygiene and exercise practice. Proper evaluation of these parameters projects the quantification of morphological characteristics of elite athletes which can be vital in relating the body structure and sports performance [2]. Anthropometry comprises techniques that readily contribute to a more in-depth understanding of body composition and nutritional status, allowing the quantification of observations and the changes with time. Championship performances no longer occur at random or as a result of chance alone. International sports performance in various disciplines is influenced by many factors, such as, level of physical, physiological and psychological abilities. Body measurements help to talk about nutritional status and highlight the changes due to physical activities [3]. Purpose of this study was to compare the anthropometric profiles of height-weight matched young-adult female athletes of hilly and plane regions.

METHODOLOGY

A total of sixty (N=60) young-adult females 30 from each of Hill and Plane area and the age between 18-25 years with similar height and weights were selected as the subjects of this study. All the subjects were athlete. Height range of the subjects was 157.5 to 162.5 cm and weight of the subjects was between 52.5 to 55.5 kg. Anthropometric profile was the criterion for this study to predict the health status of two groups.

Seven skin-folds were – biceps, triceps, sub-scapular, supra-iliac, medial calf, mid-thigh and abdomen. Six body circumferences considered were thigh, calf, upper limb, lower limb, waist, abdomen and hip. Three body composition variables were – body mass index (BMI), waist-to-hip ratio (WHR), lean body mass and body fat percentage (%BF).BMI was derived from height-weight ratio (weight in kg/height in m^2). WHR predicted from waist circumference divided by hip circumference. Body fat percentage predicted by skin-fold method [4].Tools used for this study was to measure different dimension of anthropometric measurements. For example, for height and circumferences - anthropometric tape; for weight - weighing machine and for skin-folds – skin-fold caliper were used. Measurements were taken following appropriate guidelines. Mean, standard deviation (SD) and independent t- test were the statistics used in this study for data interpretation. Level of significant difference between two groups was set at $p<0.05$.

Results and Discussion

Table-1 represents the means, SDs and t-values of height, weight and the four body composition variables on two groups of subject.

As the subjects of this study were selected within the specific sample of height and weight, consequently, no difference was observed in group mean height, weight and BMI of two groups.

Table-1: Mean, SD and t-value on height, weight and body composition variables

Variables	Plane Athlete Group Mean	Hilly Athlete Group Mean $\pm$	t- value
Height (cm)	155.83 ± 4.04	155.97 ± 3.30	0.15^{NS}
Weight (kg)	49.60 ± 4.53	51.20 ± 3.51	1.53^{NS}
BMI(Kg/m^2)	20.43 ± 1.68	21.09 ± 1.87	1.44^{NS}
% BF	17.60 ± 4.08	20.72 ± 3.44	3.20^*
LBM(Kg)	40.77 ± 2.88	40.55 ± 2.62	0.312^{NS}
WHR	0.76 ± 0.06	0.79 ± 0.04	2.04^*

*Significant at the .05 level, $t_{0.05 (58)} = 1.645$, NS = Not significant

There was significant difference at BF% of these two groups. However, the LBM did differ between the two groups. WHR of the hilly girls were higher (0.79) than the plane girls (0.76).

Table-2: Mean, SD and t-value of seven skin-fold sites

Variables	Group	N	Mean $\pm$ SD	t – value
Biceps	PAT	30	6.43 ± 2.91	1.64^*
	HAT	30	5.44 ± 1.53	
Triceps	PAT	30	11.87 ± 4.13	0.58^{NS}
	HAT	30	12.45 ± 3.61	
Sub-scapula	PAT	30	10.23 ± 3.50	6.02^*
	HAT	30	16.33 ± 4.31	
Suprailiac	PAT	30	13.20 ± 5.09	4.72^*
	HAT	30	19.37 ± 5.02	
Abdomen	PAT	30	15.23 ± 4.84	3.58^*
	HAT	30	19.65 ± 4.72	
Thigh	PAT	30	17.77 ± 4.26	2.08^*
	HAT	30	20.08 ± 4.38	
Calf	PAT	30	11.60 ± 4.55	0.73^{NS}
	HAT	30	12.03 ± 2.76	

*Significant at the .05 level, $t_{0.05 (58)} = 1.645$

Table-2 represents means, SDs and t-values of the seven skin-fold sites. Significant difference between two groups' skin-fold sites were observed at biceps, sub-scapular, suprailiac, abdomen, thigh sites. However, at the remaining skin-fold sites i.e., triceps and calf there was no difference between the two groups.

Table-3: Mean, SD and t-value of seven girth sites

Variables	Group	N	Mean $\pm$ SD	t $-$ value
Thigh	PAT	30	48.78 $\pm$ 5.38	1.02^{NS}
	HAT	30	49.92 $\pm$ 2.84	
Calf	PAT	30	31.25 $\pm$ 3.64	1.40^{NS}
	HAT	30	32.61 $\pm$ 3.90	
Upper limb	PAT	30	34.19 $\pm$ 16.79	11.14*
	HAT	30	68.73 $\pm$ 2.58	
Lower limb	PAT	30	39.59 $\pm$ 19.97	11.75*
	HAT	30	83.38 $\pm$ 4.17	
Waist	PAT	30	67.85 $\pm$ 7.04	1.73*
	HAT	30	70.36 $\pm$ 3.69	
Abdomen	PAT	30	72.88 $\pm$ 6.19	1.03^{NS}
	HAT	30	74.41 $\pm$ 5.34	
Hip	PAT	30	88.94 $\pm$ 6.00	0.17^{NS}
	HAT	30	89.16 $\pm$ 3.07	

*Significant at the .05 level, $t_{0.05\ (58)} = 1.645$

Table-3 represents the six girth measurements of the two groups in the form of mean, SD and t-value. It is observed that out of these six circumferences significant difference existed at upper limb, lower limb and waist region. Out of the three sites there was no significance difference existed.

CONCLUSION

Within the limited scope of the study the following conclusions were drawn on young-adult females with similarity in height and weight.

i) Young adult athletes' %BF of the hilly females was more than the plane females.
ii) Waist-to-hip ratio of the hilly females was higher than the plane females.
iii) Plane females were superior at triceps, supra iliac, sub-scapular, abdomen and calf skin-fold sites.
iv) In girth measurements, hilly females were superior at upper limb, lower limb and also at waist sites.

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