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Height weight triceps and calf skinfold among 14 to 17 year old school boys: A correlational study

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Abstract

The purpose of the study was to determine the relationship between height, weight, triceps skinfold and biceps skinfold. The subjects were selected from different schools of Delhi. The age of the selected subjects for this study ranged between 14 to 17 years. Height, weight was measured by stadiometer, weighing machine respectively and triceps and calf skinfold was measured by skinfold caliper. Descriptive statistics and Pearson's correlation was applied to check the results. The results revealed that height and weight are positively correlated, triceps and calf skinfold were strongly positively correlated and triceps and calf skinfold were positively correlated with weight. The significant value was set at 0.05.

Keywords: Height, weight, triceps skinfold and calf skinfold

1. Introduction

Relative weight and skinfold measurements have been used frequently among adults and children to estimate adiposity. Both classes of measures have limitations (Ruiz *et al.*, 1971; Berry 1974; Rauh & Schumsky, 1968) [12, 2, 10] but the research to date has suggested that skinfold measurements are the best of the non-laboratory methods currently in use (Cronk & Roche, 1982) [4]. Measures of relative weight cannot distinguish between adiposity, muscularity. Fat percentage obtained from skinfolds measurements has had a wide acceptance among sports researchers. This is due to the fact that F% obtained from the anthropometrical technique is quite well associated and does not differ significantly from the F% obtained from the hydrostatic weighting (Sloan 1967; Jackson *et al.*, 1980; Thorland *et al.*, 1984) [13, 14], which is considered as validation criterion for other techniques. Fat in relation to the former ones (Gaziano 1998; Eckel 1997; Rippe *et al.*, 2001) [6, 5, 11]. Different reference criteria may be obtained in the scientific literature in order to evaluate body fat in relation to health. For children and adolescents, the AAHPERD presents reference criteria for the sum of triceps and calf skinfolds (TR + CA) and for BMI. Scientists suggest the use of the skinfold method, the measurement of subcutaneous fat, in field setting as an alternative to laboratory methods. Currently it is the most widely adopted field method for measurement of body fat in children (Heyward, 2006) [7]. Since the instruments used are portable, inexpensive and non-invasive, skinfold method can be readily applied in clinics, laboratories and schools. It also has high correlation with percent body fat (Billisari & Roche, 2005).

2. Methodology

For the purpose of this study 452 school boys studying in various schools of Delhi were selected. The selected subjects were from different zones of Delhi. The age of the selected subjects was ranging between 14 to 17 years. Height was measured by stadiometer, weight was measured by weighing machine while triceps and calf skinfold was measured by skinfold caliper. Descriptive statistics and Pearson's correlation was applied to check the results. The significant value was set at 0.05.

3. Result and analysis

The result of the study has been presented in table 1 and 2. Table 1 reveals the descriptive statistics of study while table 2 displays the Pearson's correlation of the selected variables.

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Table 1

Descriptive Statistics			
	Mean	Std. Deviation	N
Height	160.97	8.77	452
Weight	51.75	10.60	452
Triceps	7.75	3.44	452
Calf	6.72	3.13	452

The table no. 1 reveals the descriptive analysis of height, weight, triceps and calf in 14 to 17 years school going boys. It was found that the mean value of height, weight, triceps and calf in schools going boys are 160.97 ± 8.77 , 51.75 ± 10.60 , 7.75 ± 3.44 & 6.72 ± 3.13 respectively.

Table 2: Pearson Correlation

		Height	Weight	Triceps	Calf
Height	Pearson Correlation	1	.592**	-.031	.003
	Sig. (2-tailed)		.001	.509	.954
	N		452	452	452
Weight	Pearson Correlation		1	.356**	.336**
	Sig. (2-tailed)			.001	.001
	N			452	452
Triceps	Pearson Correlation			1	.724**
	Sig. (2-tailed)				.001
	N				452
Calf	Pearson Correlation				1
	Sig. (2-tailed)				
	N				452

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

Table 2 resulted that height and weight were strongly positively correlated, $r(452) = .592$, $p = .001$. Triceps and calf skinfold were strongly positively correlated with weight, $r(452) = .356$, $p = .001$ & $r(452) = .336$, $p = .001$ respectively. Further, triceps and calf skinfold were strongly positively correlated, $r(452) = .724$, $p = .001$.

4. Discussion

The results revealed that height and weight are positively correlated, triceps and calf skinfold were strongly positively correlated and triceps and calf skinfold were positively correlated with weight.

Skinfold measurements are frequently used as one criterion for testing the usefulness of various measures of relative weight in estimating adiposity among children and adults (Killen *et al.*, 1978). Limited evidence is currently available concerning how well these height and weight correlate with more direct measures of body fat such as skinfold thicknesses, and whether the same measure of weight for height found to be generally superior for adults is the most appropriate for children. Little is also known as to whether a single weight for height measure is applicable for all children or whether variations exist by age, sex, race, and measures of social class. Earlier research with children has found that adiposity is related to height, (Killen *et al.*, 1978) and it may be the case that any index of adiposity among children will necessarily be related to height within certain age ranges. Since the triceps skinfold is a measure of fat weight, the observed variation in the correlations may represent different combinations of fat weight and fat-free weight that cannot be distinguished by a body mass index. Birth weight accounts for a small percentage of the variance in relative subcutaneous fat

distribution at school age, while a larger BMI and SOS, i.e., overall fatness, are more associated with the accumulation of proportionally more subcutaneous fat on the trunk at school age. However, the ratio of weight and height is the significant predictor of relative fat distribution in boys. And, in a longitudinal study of Belgian adolescent boys, boys advanced in maturation (age at peak height velocity) had proportionally more subcutaneous fat on the trunk not only through adolescence (13-18 years), but also at 30 years of age (Beunen *et al.*, 1994)^[3].

5. Conclusion

The conclusions from the study are summed up as follows:

1. Height and weight are positively correlated between 14-17 years old Delhi school boys.
2. Triceps and calf skinfold are positively correlated between 14-17 years old Delhi school boys.
3. Triceps and calf skinfold are positively correlated between 14-17 years old Delhi school boys.

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