

Experiment

Assessment of Adiposity And Proportional Weight of Coastal Area Adolescent Girls

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ABSTRACT

The purpose of this study was to estimate the actual adiposity of the adolescent girls by using anthropometric measurements. For this, four hundred (400) adolescent girls age ranging from 11 through 15 years from twenty (20) schools of Bhagwanpur – II Block of Purba Medinipur district, a coastal area of the south Bengal. To assess the O-Scale adiposity the skin fold measurements consist of triceps, sub-scapular, supra iliac, abdominal, thigh and calf sites according to ISAK International Standards for Anthropometric Assessment (2011) using the CESCORF Innovare-3 Skin fold Calliper. Collected skin fold thickness in mm was used to assess the %-Fat, total fat in kg and O-scale adiposity by using standard equations. Again the O-scale adiposity was converted into stanine scores from percentile norms. Analysing the collected data it was found that the O-Scale adiposity is increased according to age except at the age of 12 years as the subjects entered in to menarche resulting in routine blood loss.

INTRODUCTION:

Assessment of adiposity is a burning issue in the field of physical education as physical education is an endeavour to provide opportunity to maintain wellness throughout the lifespan. Adiposity leads obesity and nowadays it is endemic all over the world. Obesity is a product of an individual's heredity and lifestyle management. It is reported that the coastal people have a heavier amount of lean body mass and less percent body fat due to the nature of lifestyle. Most of the coastal people exert significantly greater amounts of physical labour as it is required for livelihood. The objective of this study was to estimate the actual obesity and proportionate body weight in respect of the total inhabitants of such group studied. Conventionally, proportions, indices or ratios of one body measurement to another have usually been bid to know the variations or differences in one body

measurement by keeping the other constant in the subjects compared.

MATERIALS AND METHOD:

Four Hundred (400) girls aged ranging from 11 years to 15 years were selected randomly for this study from twenty (20) schools of Bhagwanpur- II Block, twenty (20) subjects from each school served as sample.

The skin fold measurements consists of triceps, sub-scapular, supra iliac, abdominal, thigh and calf sites according to **ISAK International Standards for Anthropometric Assessment (2011)** using the **CESCORF Innovare-3 Skin fold Calliper**. All the measurements were recorded in mm and taken from the left side of the subject by the investigator herself. Skin fold was picked up at about one cm above the marked level, jaws of the skin fold calliper were applied at the

marked level and value was noted after about two seconds.

The main purpose of this study was to assess the %-Fat, total Fat in kg, O-Scale adiposity and the Stanine Score of adiposity of adolescent girls' age ranging from 11 years through 15 years of coastal area of West Bengal.

After collecting the skin fold thickness of the stated sites the percentage of body fat was estimated after the assessment of Body Density by the Brozek *et.al* (1963) equation. Then the assessment of total fat in kg was calculated through computer analysis, by the following equation:

$$\text{Fat in kg} = \text{Weight (kg)} \times \% \text{-Fat} / 100$$

As the assessment of the %-Fat and total Fat in kg is not the proper indication of adiposity so the investigation farther proceeded to assess the O-Scale of adiposity and to identify the individual in her homogeneous group the stanine score was allotted by using percentile norms.

RESULTS AND DISCUSSION:

Personal Data

Table 1 Mean and SD of personal data in different age groups of adolescent girls.

Variables	11 yrs. N=39		12 yrs. N =83		13 yrs. N= 109		14 Yrs. N= 93		15Yrs N=76	
	Mean	S D	Mean	S D	Mean	S D	Mean	S D	Mean	S D
Age in Years	11.69	0.22	12.48	0.301	13.45	0.316	14.44	0.270	15.59	0.532
Height in Cm	143.87	5.99	145.87	7.468	149.68	6.973	151.17	5.501	151.61	5.102
Weight in Kg.	35.55	7.64	34.39	8.157	39.07	8.006	42.23	7.572	41.85	6.527

Table 1 shows the Mean and SD of personal data in respect of age, height and body weight. Analysing the data it appears that the height of the subjects is increasing accordingly at par with the age. But in the case of body weight at the age of 12 years there was deterioration as they entered into puberty again at the age of entering in 15 years may be due to health consciousness.

Height

Table 1 also shows the Mean and SD of the height of the subject aged 11 - 15 years. Analysing the data it appears that the Mean height was found to be 145.87 ± 5.99 , 145.87 ± 7.468 , 149.68 ± 6.973 , 151.17 ± 5.501 and 151.61 ± 5.102 respectively. (Vide Fig.1)

Weight

Again the **Table 1** shows the Mean and SD of height of the subject age 11 - 15 years. Analysing the data it appears that the Mean height was found to be 35.55 ± 7.64 , 34.39 ± 8.157 , 39.07 ± 8.006 , 42.23 ± 7.572 and 41.85 ± 6.527 respectively. (Vide Fig.2)

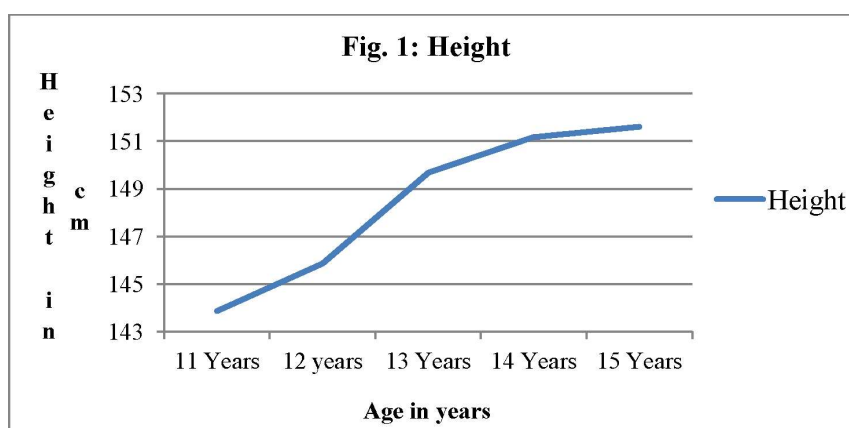


Fig. 1: Graphical representation of Mean height of the subjects according to age.

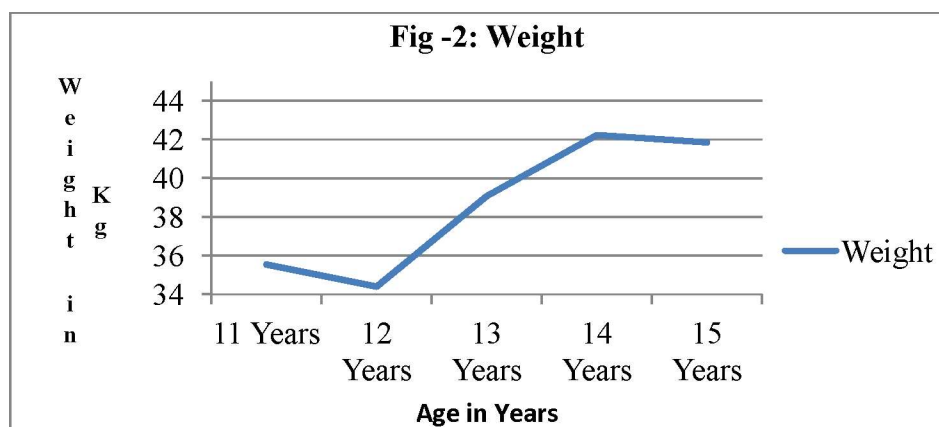


Fig. 2: Graphical representation of Mean of body weight in Kg according to age.

Skinfold Measurement:

Table 2 Mean and SD of Skin fold Measurement of different sites according to age

Variables (Skinfolds)	11 yrs. N=39		12 yrs. N =83		13 yrs. N=109		14 Yrs. N= 93		15Yrs N=76	
	Mean	S D	Mean	S D	Mean	S D	Mean	S D	Mean	S D
Biceps	5.24	1.82	4.71	2.03	5.65	2.66	5.76	2.36	5.31	1.70
Triceps	10.32	4.20	8.801	3.41	10.68	4.39	11.39	4.33	10.86	3.68
Abdomen	13.53	6.47	11.59	6.10	14.76	6.77	16.16	6.00	15.07	5.58
Supra iliac	9.45	5.17	8.37	4.83	10.15	5.63	11.35	5.49	10.65	5.54
Sub-scapular	11.37	6.87	8.92	4.52	12.51	11.26	12.92	6.44	13.17	5.77
Thigh	18.08	7.58	16.16	7.10	19.52	7.42	22.54	10.36	21.32	6.95
Calf	11.31	5.22	9.81	4.61	11.78	5.16	12.61	5.06	12.64	4.52

Table 2 shows the mean and standard deviation of skin folds of the Triceps, Sub-scapular, Supra iliac, Abdomen, Thigh and Calf sites according of all samples as a whole. Analysing the data it appears that the thickest skin fold was found at the thigh site which was quite natural as per developmental process. Interestingly the thickest skin fold of all sites were found at the age of 15 years except the calf skin fold and it may be due to the way of maturity in physique. (Vide Fig. 3 & Fig. 3.1). These findings are corroborated by the study of Wang Y and Lobstein T (2006)

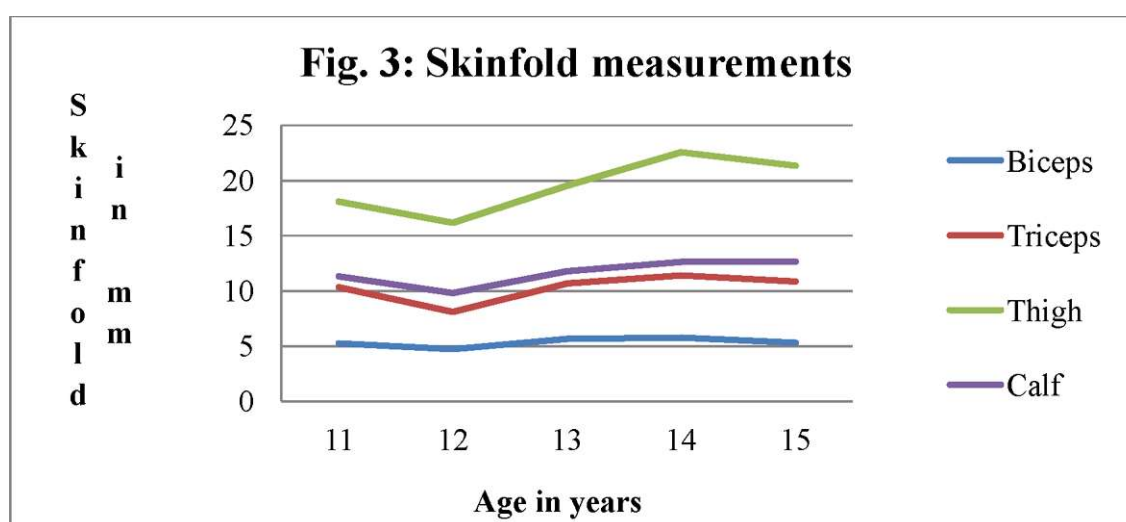


Fig. 3: Graphical representation of Mean of Skin fold measurement according to age

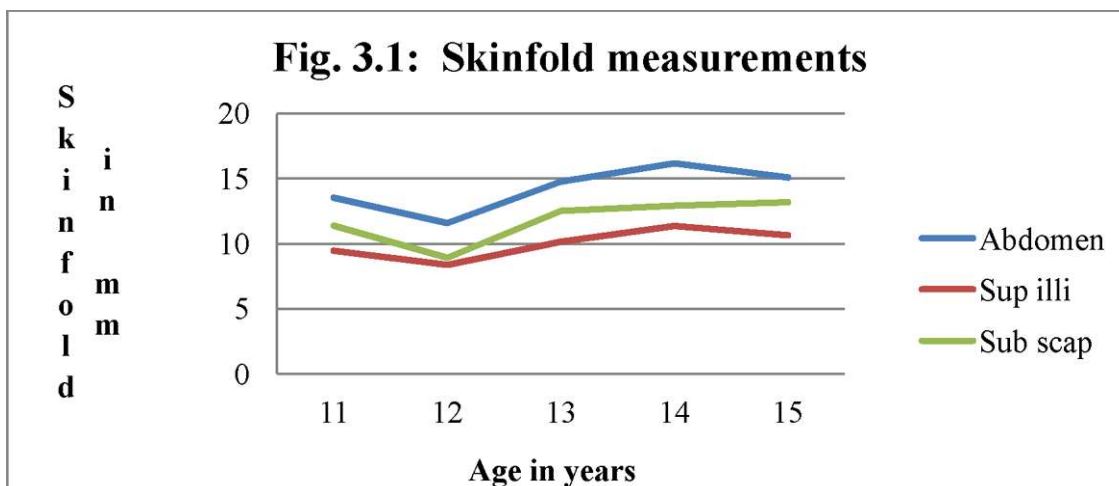


Fig. 3.1: Graphical representations of Mean of Skin fold measurement according to age

Table 3 Mean and SD of %-Fat and Fat in kg according to age.

Variables	11 years		12 years		13 years		14 years		15 years	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
% - Fat	15.79	4.97	14.31	4.56	16.70	5.04	18.19	4.99	17.46	4.32
Fat in Kg	5.92	3.07	5.20	2.95	6.85	3.56	7.97	3.51	7.48	2.67

Table 3 shows the mean and standard deviation of %-Fat and Fat in Kg. The mean and SD value of Fat percentage was $15.79 \pm .968$ was found for 11 years age group 14.31 ± 4.562 for the age of 12 years age group, 16.70 ± 5.037 was found for 13 years age group, for 14 years age groups this value was 18.19 ± 4.916 and according to 15 years age groups the mean and SD value of Fat percentage was 17.46 ± 4.322 . The mean and SD of Fat in kg were found 5.92 ± 3.07 at the age of 11 years, 5.20 ± 2.95 at the age of 12 years, 6.85 ± 3.56 at the age of 13 years, 7.97 ± 3.51 at the age of 14 years and 7.48 ± 2.67 at the age of 15 years respectively. The lowest %-Fat was found at the age of 12 years and the reason behind it was the starting of menarche resulting sudden periodical blood loss from the body. On the other hand the highest %-Fat was found at the age of 15 years and thereafter a decline as the subjects approached femininity (Vide Fig. 4 & Fig. 5). The similar nature was found in fat weight stated as Fat in kg.



Fig. 4: Graphical representation of Mean of Fat % of adolescent girls

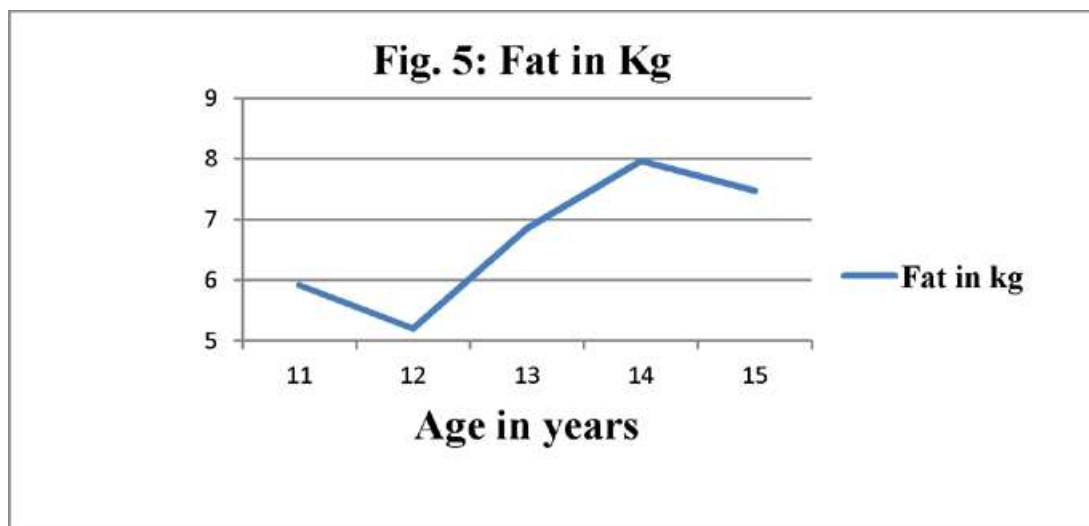


Fig. 5: Graphical representation of Mean of Fat in kg of adolescent girls

Table 4 Mean and SD of O-scale Adiposity and Stanine Scores according to age.

Variables	11 years		12 years		13 years		14 years		15 years	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
O-scale Adiposity	86.11	37.67	73.79	30.65	90.09	37.46	97.89	35.98	94.22	31.64
Stanine Score	5.85	5.69	4.34	2.03	5.31	2.14	5.87	1.94	5.65	1.68

Table 4 shows the O-Scale adiposity and the stanine scores of the subjects according to age. The highest adiposity was found at the age of 14 years and the stanine score was also found at this age. The lowest of O-scale adiposity and the stanine score were found at the age of 12 years. It is due to entering into the menarche age after the completion of childhood. But the divergence of the volume of adiposity was found greater at the age of 12 years and the lowest divergence was found at the age of 15 years as they are in the way of stagnation of physical growth as well as entering into femininity (Vide Fig. 6)

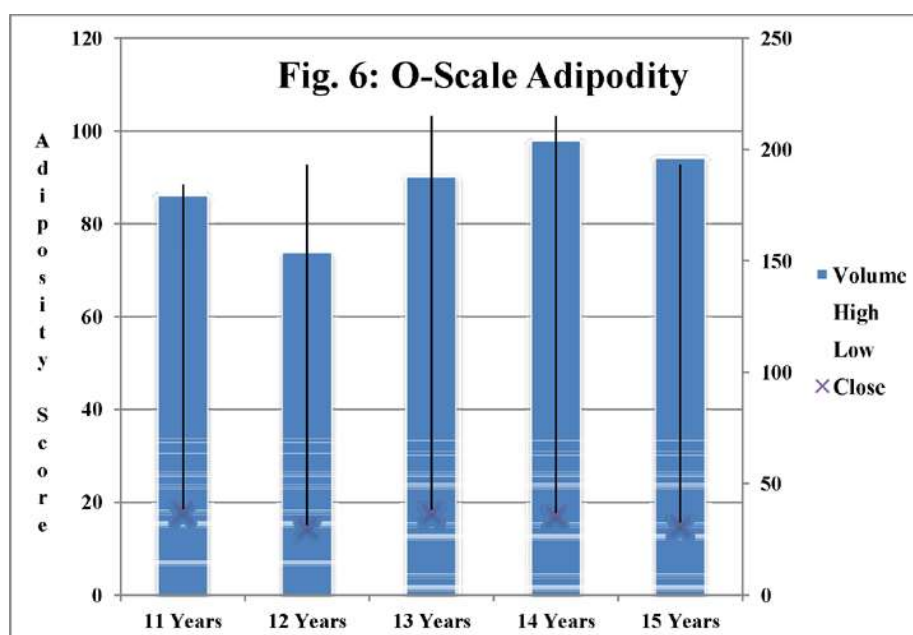
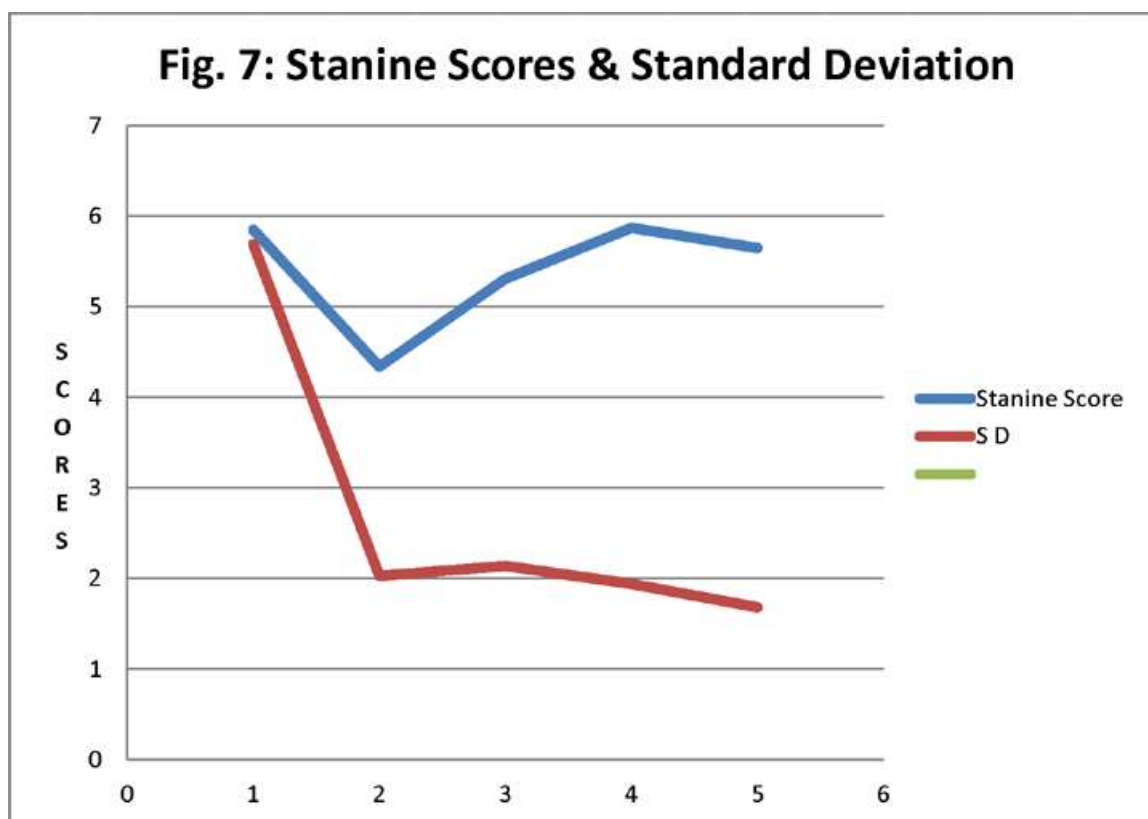


Fig. 7 shows the fluctuation of stanine scores and their standard deviations. Here the distance between stanine score and its standard deviation is increasing proportionately with age which indicates the turning of maturity.



CONCLUSIONS:

Within the limitations of this study, it may be concluded that the adolescent girls of the coastal area of Bengal tend to secure completion of physical growth in respect of percentage of body fat and fat weight and entering into femininity by the age of 15 years.

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