Original Research Paper

Physical Education

A STUDY ON SOCIO ECONOMIC STATUS AND ANTHROPOMETRIC CHARACTERISTICS AMONG DIFFERENT AGE LEVEL SCHOOL STUDENTS

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ABSTRACT **Background:** Anthropometrical characteristics acquired by children and adolescents during growth and development are the impressive indicators of an individual's health and nutritional status as well as a mirror of the social and economic betterment of a country. **Objective:** The objective of the study is to compare the socio economic status and anthropometric characteristics among the different adolescent school students. **Methods:** Total four hundred and fifty (n=450) adolescent male school students were considered as subjects from Paschim Medinipur, Hooghly and Howrah district of West Bengal. Socio economic status and anthropometrical characteristics were considered as variables. Socio economic status was measured by questionnaire and developed by Sunil Kumar Upadhyay & Alka Saxena. Anthropometrical profile was measured by standard scientific measurements technique. **Results:** The present outcome reveals that anthropometric characteristics among school students increase in respect of their age. **Conclusions:** Findings associated that anthropometrical characteristics among the school students are significantly differed and increased according to chronological growth of age during the adolescent stage.

KEYWORDS : Socio Economic Status; Adolescent; Anthropometry; School Students.

INTRODUCTION

Growth is a physical aspect of development, which refers to the increase in size, shape, volume and weight of the body, caused by biological process [1]. It can be viewed as physical changes that occur from conception to maturity [2]. Physical growth comprises of all morphological modifications that characterize the span of a biological organism [3], modification known to take place during human ontogeny including changes in kind, number, size, shape, position [4], pigmentation and texture of body components [5,6]. Adolescence is the period of transition from childhood to adulthood [7]. W.H.O defines adolescence as the period of life between the ages of 10 to 19 years when the adolescent struggles to develop his individuality while still conforming to societal norms [8]. In the process of becoming a young adult, a person grows and matures in many ways [9]. Adolescence brings major changes in the body [10] making a man out of boy and a woman out of girl. Each organ of the body grows at different rates and reaches the climax of growth at different times [1]. Therefore, the growth of a population can be described as a mirror of ethnic conditions in society [11].

Social status is usually an important determiner of growth [12]. If the income effects are substantial and persistent and if the better-educated parents have superior consumption skill and are better informed of long-range health effects of consumption patterns they will usually be able to take better care of their off-spring. Body height and weight acquired by children and adolescents during growth and development [13] are the impressive indicators of an individual's health and nutritional status as well as a mirror of the social and economic betterment of a country [14].

Research is being carried on the impact of the environment on the development and on getting hereditarily and digit ratio [15] obtained exception. Studies reveal the domicile, socioeconomic status and standard of living as vital factors affecting biological development and health in several stages of life —[1621]. During the second half of the twentieth century in a study of Poland it was noticed that there is a link between children's height and socio economic status of the family [22,23]. The study also showed multiplying appearances of overweight and obesity among children in Poland. In Poland,

prevalence of overweight extends up to 20% of primary school going children [24,25]. It is predicted that a family's socio economic status has an important role in overweight of the children —[2629].

OBJECTIVES

The objective of this study is to compare the socio economic status and anthropometric characteristics among the different adolescent school students.

MATERIALS AND METHODS

Participants

In this study total numbers of four hundred and fifty (n=450) male students were selected as subjects from different Secondary standard schools of West Bengal. Paschim Medinipur, Hooghly and Howrah districts of West Bengal were delimited to investigate for this study. All the selected adolescent male students were voluntarily involved as subjects in this study. The subjects' age ranged from 12 to 14 years. Before randomization of the subjects the homogeneity test was acquired. Demographic data including resting heart rate, respiratory rate, blood pressure etc. were also taken from each participant.

Variables Studied

In this present research socio economic status and anthropometrical profile were considered as variables. Socio-economic status was measured by standardized socio-economic questionnaire and developed by Sunil Kumar Upadhyay & Alka Saxena. Socio-economic status was categorized into following classification: high socio economic status, above average socio-economical status, average socio-economic status, below average socio-economic status, low socio-economic status. Socio-economic status scale is an accepted tool usually used by the sociologist for measuring socio economic status. The present scale is intended to measure the socio-economic status of both rural and urban areas. The scale consists of 31 items in five parts related to i) personal information, ii) family, iii) education, iv) income and v) others (cultural & material possessions). The validity of the questionnaire is 0.78 and reliability is 0.83. Anthropometrical profile was measured by standard scientific measurements

technique. The standing height was measured by the stadiometer and body weight was measured by OMRON HN-283-IN digital weight scale. The BMI was calculated by a formula (kg/mt^2) i.e. by measuring standing height in meter and weight in kilograms.

viz. mean, standard deviation (SD), standard error of mean (SEM) to understand the general trends of the data. Further one-way analysis of variance (ANOVA) was employed for generalizing the significant differences among the different adolescent students in respect of their socioeconomic status and anthropometric growth pattern.

Statistical Analysis

All the collected data was analyzed by descriptive statistics

RESULTS

Table-1: Descriptive statistics of 12 years school students

	N	Mean	SD	SEM	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Socioeconomic status	150	51.31	7.83	0.64	50.04	52.57	35	65
Height	150	1.41	0.07	0.01	1.4	1.42	1.26	1.59
Weight	150	33.03	7.86	0.64	31.76	34.3	21.5	65.1
Body mass index	150	16.48	2.93	0.24	16.01	16.95	11.73	27.1
Femur bi-condylar diameter	150	8.5	0.911	0.07	8.35	8.65	5.2	11
Humerus bi-condylar diameter	150	5.38	0.72	0.059	5.26	5.5	3	9.7
Calf circumference	150	27.27	3.08	0.25	26.77	27.77	19	38
Waist circumference	150	63.54	8.1	0.66	62.23	64.84	51	89
Abdomen circumference	150	62.29	8.98	0.73	60.85	63.74	48	97
Upper arm circumference	150	19.91	2.63	0.22	19.48	20.33	15.5	28
Triceps skinfold	150	9.77	5.18	0.42	8.93	10.6	3.4	28.2
Biceps skinfold	150	5.9	3.9	0.32	5.27	6.52	2	20.6
Supra iliac skinfold	150	8.78	6.68	0.55	7.7	9.86	2.4	30
Sub-scapular skinfold	150	8.36	6.09	0.5	7.38	9.34	3	50

Table-2: Descriptive statistics of 13 years school students

	N	Mean	SD	SEM	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Socioeconomic status	150	50.41	10.65	0.87	48.69	52.12	39	76
Height	150	1.48	0.09	0.01	1.47	1.5	1.29	1.72
Weight	150	38.04	9.67	0.79	36.47	39.59	22.2	67.6
Body mass index	150	17.11	3.21	0.26	16.59	17.63	11.01	28.16
Femur bi-condylar diameter	150	8.32	0.82	0.07	8.19	8.45	5.1	10.8
Humerus bi-condylar diameter	150	5.6	0.55	0.04	5.52	5.69	4.5	7
Calf circumference	150	29.07	3.75	0.31	28.46	29.67	23	40
Waist circumference	150	67.22	8.21	0.67	65.9	68.55	54	91
Abdomen circumference	150	65.47	9.96	0.81	63.86	67.08	49	97.5
Upper arm circumference	150	20.72	2.9	0.24	20.25	21.19	15	30
Triceps skinfold	150	9.22	5.03	0.41	8.41	10.03	3	30
Biceps skinfold	150	5.58	3.54	0.29	5.01	6.15	2	21.6
Supra iliac skinfold	150	9.45	7.35	0.6	8.26	10.64	2.4	36.6

Table-3: Descriptive statistics of 14 years school students

	N	Mean	SD	SEM	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Socioeconomic status	150	50.89	10.92	0.89	49.13	52.65	34	78
Height	150	1.55	0.08	0.01	1.54	1.57	1.37	1.74
Weight	150	43.1	11.7	0.95	41.21	44.98	6.7	97.1
Body mass index	150	17.7	3.94	0.32	17.06	18.34	2.72	34.4
Femur bi-condylar diameter	150	8.78	0.72	0.06	8.66	8.9	7.2	12
Humerus bi-condylar diameter	150	5.9	0.6	0.05	5.8	6	4.4	8.1
Calf circumference	150	30.21	4.21	0.34	29.53	30.88	3	46
Waist circumference	150	69.95	8.47	0.69	68.59	71.32	55.5	103.5
Abdomen circumference	150	68.03	10.22	0.83	66.38	69.68	51.5	110
Upper arm circumference	150	22.29	3.26	0.27	21.77	22.82	16	33
Triceps skinfold	150	9.66	5.65	0.46	8.75	10.58	3.4	35.4
Biceps skinfold	150	5.48	3.63	0.3	4.89	6.06	2.4	22
Supra iliac skinfold	150	10.15	7.13	0.58	9	11.3	3	43
Sub-scapular skinfold	150	8.41	5.27	0.43	7.56	9.26	3.8	36.4

Table-4: One way analysis of variance (ANOVA) among different adolescent school students

Variables		Sum of Squares	df	Mean Square	F	Sig.
Socioeconomic status	Between Groups	60.84	2	30.42	0.311	0.733
	Within Groups	43783.16	447	97.95		
Height	Between Groups	1.55	2	0.78	117.33	0.000
	Within Groups	2.95	447	0.01		
Weight	Between Groups	7603.49	2	3801.74	39.03	0.000
	Within Groups	43538.43	447	97.4		

Body Mass Index	Between Groups	111.63	2	55.82	4.87	0.008
	Within Groups	5123.96	447	11.46		
Femur bi-condylar diameter	Between Groups	16.08	2	8.04	11.98	0.000
	Within Groups	300.06	447	0.67		
Humerus bi-condylar diameter	Between Groups	20.4	2	10.2	25.76	0.000
	Within Groups	176.99	447	0.4		
Calf circumference	Between Groups	657.04	2	328.52	23.86	0.000
	Within Groups	6155.74	447	13.78		
Waist circumference	Between Groups	3109.75	2	1554.87	22.79	0.000
	Within Groups	30500.28	447	68.23		
Abdomen circumference	Between Groups	2479.2	2	1239.6	13.08	0.000
	Within Groups	42355.48	447	94.76		
Upper arm circumference	Between Groups	438.99	2	219.5	25.37	0.000
	Within Groups	3859.32	446	8.65		
Triceps skinfold	Between Groups	25.45	2	12.72	0.45	0.635
	Within Groups	12522.51	447	28.02		
Biceps skinfold	Between Groups	14.4	2	7.2	0.53	0.591
	Within Groups	6106.29	447	13.66		
Supra iliac skinfold	Between Groups	139.97	2	69.98	1.41	0.247
	Within Groups	22269.27	447	49.82		
Sub-scapular skinfold	Between Groups	0.82	2	0.41	0.01	0.987
	Within Groups	14380.1	447	32.17		

*<0.05 is considered to be significant.

Table-5: Schefee Post-hoc test for mean comparison among different adolescent school students.

	Groups		Mean Difference	Std. Error	Sig.
Height	12yrs	13yrs	0.07253*	0.0093	0.000
	13yrs	14yrs	0.07120*	0.0093	0.000
	14yrs	12yrs	0.14373*	0.0093	0.000
Weight	12yrs	13yrs	4.99800*	1.1396	0.000
	13yrs	14yrs	5.07067*	1.1396	0.000
	14yrs	12yrs	10.06867*	1.1396	0.000
Body mass index	12yrs	13yrs	0.63209	0.3909	0.272
	13yrs	14yrs	0.58765	0.3909	0.324
	14yrs	12yrs	1.21974*	0.3909	0.008
Femur bi-condylar diameter	12yrs	13 yrs	0.17867	0.0946	0.169
	13yrs	14yrs	0.45933*	0.0946	0.000
	14yrs	12yrs	0.28067*	0.0946	0.013
Humerus bi-condylar diameter	12yrs	13yrs	0.22387*	0.0726	0.009
	13yrs	14yrs	0.29600*	0.0726	0.000
	14yrs	12yrs	0.51987*	0.0726	0.000
Calf circumference	12yrs	13yrs	1.79667*	0.4285	0.000
	13yrs	14yrs	1.13867*	0.4285	0.030
	14yrs	12yrs	2.93533*	0.4285	0.000
Waist circumference	12yrs	13 yrs	3.68733*	0.9538	0.001
	13 yrs	14yrs	2.72800*	0.9538	0.017
	14yrs	12yrs	6.41533*	0.9538	0.000
Abdomen circumference	12yrs	13yrs	3.17400*	1.1240	0.019
	13yrs	14yrs	2.56467	1.1240	0.075
	14yrs	12yrs	5.73867*	1.1240	0.000
Upper arm circumference	12yrs	13yrs	0.81060	0.3402	0.060
	13yrs	14yrs	1.57167*	0.3396	0.000
	14yrs	12yrs	2.38227*	0.3402	0.000

*The mean difference is significant at the 0.05 level.

DISCUSSIONS

The present study reveals that anthropometric characteristics among school students increase in respect of their age. This may be cause of the maturity in respect of age, their involvement in physical and sporting activities as it is a way to anticipate the happenings for which every child is eager to participate in physical and sporting activities if offered by a given facilities and proper equipments to participate whole heartedly in different sporting programmes [30,31]. The age is gradually acquired higher physical fitness –[32] and their physical demands are more [33]. In the age of 14 years the neuro physiological factor develops and continues still

puberty ""[34]. In this stage physical action increases more which may be due to the effects of structural growth [35,36] on the myelination of neurons [37].

The previous study findings show that socio economic status helps to promote the BMI of an individual or a society, which may be a cause of proper nutritional supplements, parental education, family size, quality & quantity of food, morbidity, physical activity, healthy habits, and level of stress [24,38,39]. Scientists reported that socio-economic variables are positively associated with anthropometric status and also mentioned that the children having poor anthropometric status perform more poorly on measures of child development as compared to peers with proper growth [40]. Scientists also

noted that there is a significant relationship between height and higher levels of parental education. Research now tells us that height-weight ratio [41] has a direct positive relation with the family's size, education, income, resident, culture and life style of an individual or as a society. Higher level of per capita income is linked with higher weight and BMI. In addition to food consumption, physical activity may also act as a confounding factor in altering the body composition in adolescents [42]. Therefore, important social and cultural factors influencing the physical development of children and adolescents become a lifestyle, which is formed during socialization, as well as during later interactions of the individual, and is highly related to membership in a social class [24]. The above dissection corroborates the objectives of the present study.

CONCLUSIONS

Findings associated that anthropometrical characteristics among the school students are significantly differed and increased according to chronological growth of age during the adolescent stage.

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