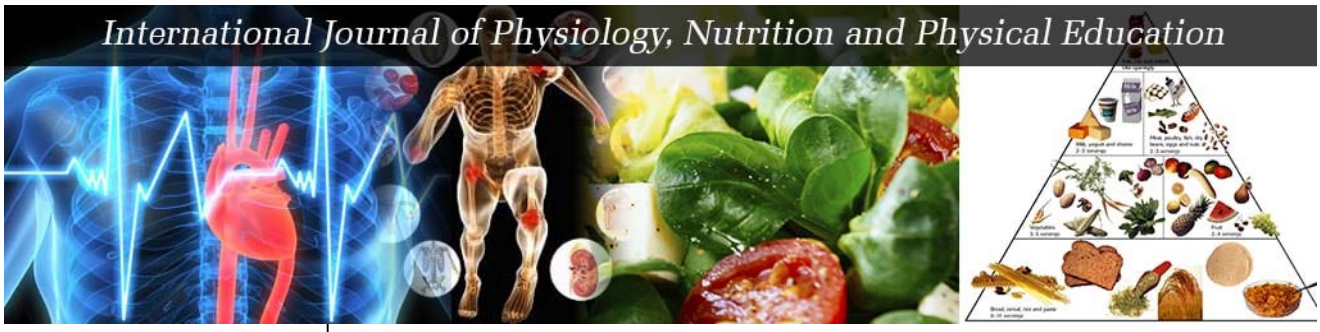

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A relationship study between socio economic status and growth status of school students

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Abstract
Objectives: The objective of the study is to investigate the relationship between socio economic status and growth status of adolescent school students.
Methods: Total four hundred and fifty (n=450) adolescent male school students were selected as subjects from Paschim Medinipur, Hooghly and Howrah district of West Bengal. Socio economic status and anthropometric measurements were considered as variables. Socio economic status was measured through questionnaire developed by Sunil Kumar Upadhyay and AlkaSaxena. Anthropometrical profile was assessed by standard anthropometric instruments. Descriptive statistics viz. mean, standard deviation, standard error of mean and further correlation coefficient were also used for generalizing the statistical significant relationship between socio economic status and growth status.
Results: Present result shows that positive relationship exists between socio economic status and growth patterns in respect of high average, average and below average socio economic groups. Whereas negative relationship is found in anthropometric measurements with respect of high and low socio economic groups.
Conclusions: The high average, average and below average socio economic statuses help to promote the physical growth of an individual or a society. Whereas high and low socio economic statuses do not support positively the adolescent growth pattern and it may create some kind of health hazards.

Keywords: Socio economic status; Growth status; Adolescent; Anthropometry

Introduction
In every society, there is a collection of inherited cultures that is accepted in the different areas of life which indicates the nature of this society and its lifestyle [1]. Modern life style leads to greater physical inactivity and low fitness in adolescents that rises health hazard globally [2,3]. At the starting age of infancy and childhood, the children interact with the environment and society. It enables to programme mental software in order to solve problems, make decisions, think rationally, judge correctly, assimilate ideas, innovate and creativity [3]. Whereas researchers reported that adolescent students have lower level of stress [4] because some possible contributing factors are included like healthy educative programmes, cognitive and mental stimulating activities [5–7], having better enjoyment circumstances, eating healthier, and spending more time participating in physical activities [8].
The scouting of fit people needs different anthropometric measures, physical tests and muscular activity [9,10]. The anthropometric growth trend is an important factor in determining the current status of active citizens and can also influence the socio-economic growth status of school children. Phalangeal growth pattern (ring and index finger) is a type of anthropometric test that is linked with visual-spatial ability [11]. So the mature anthropometric growths even the finger lengths (digit ratio) [12] are likely to be associated with psychological variables in school boys. Anthropometrical characteristics of children and adolescents during the starting of growth and development are very susceptible indicators of an individual's health and nutritional status as well as a mirror of the country's social and economic prosperity [13]. Growth is a biological process. Anthropometric measurements are effective and reliable method to estimate the health and nutritional status of the society and the individual. To identify the definite priorities of child health within a society, it is necessary to determine the associations between individual variables and health-related factors in a child population [14].
Socioeconomic status is a combination of economic and sociological measure of a person's

working experience or family's economic and social position in relation to others based on income, education and occupation [15]. Socio-economic status encompasses not only income but also educational attainment, occupational prestige and subjective perceptions of social status and social class. Socioeconomic status can encompass quality of life attributes as well as the opportunities and privileges afforded to people within society [16]. Poverty specifically is not a single factor but is characterized by multiple physical and psychosocial stressors. However it is a consistent and reliable predictor of a vast array of outcomes across the life span, including physical and psychological health. Therefore the present researcher is interested to investigate the characteristics of growth pattern in relation to different socio-economic status.

Objectives

The objective of the study is to investigate the relationship between anthropometric growth pattern and socio-economic status among different adolescent school students.

Materials and Methods

Participants

In this investigation total four hundred and fifty (n=450) adolescent male school students were interested to participate. For the purpose of the present study three districts were selected purposively for data collection i.e. Paschim Medinipur, Hooghly and Howrah. The average age of the participants ranged from 12-14 years. Homogeneity test was also acquired before the randomization for subjects' participation. Demographic data was also taken from the participants i.e. resting heart rate, respiratory rate, blood pressure etc.

Variables Studied

In this present investigation socio economic status and anthropometric parameters were considered as variables. Socio economic status was measured by standardized close ended questionnaire which was developed by Sunil Kumar Upadhyay and AlkaSaxena. It is a popular tool used by the sociologist for measuring socio economic status. According to the individual socio-economy, this questionnaire consists of five different dimensions; i.e. high socio economy, high average socio-economy, average socio-economy, below average socio-economy and low socio-economical status. The reliability of the questionnaire is 0.83 and validity 0.78. The questionnaire was constructed with 31 statements with two alternatives. Whereas anthropometrical profile including weight, height, body mass index, femur bi-condylar diameter, humerus bi-condylar diameter, calf circumference, waist circumference, abdomen circumference, upper arm circumference, triceps skinfold, biceps skinfold, supra iliac skinfold and sub-scapular skinfold was considered as variables. All the components were measured by using standard anthropometrical instruments.

Statistical Analysis

The obtained data was analyzed by descriptive statistics viz. mean, standard deviation, standard error of mean and further correlation coefficient was also used for generalizing the statistical significant relationship between socio economic status and anthropometric profile.

Results

The result of the present study shows that there is a trend to increase the anthropometrical performance of high socio economic group and to decrease low socio economic group in comparison to other groups. Details descriptive results of socio economic status and anthropometric profile are given in Table 1, Table 2 and Figure 1 respectively. Further correlation coefficient statistics was used to understand the actual relationship between different socio economic groups and anthropometric profile.

Negative relationship is found in weight (0.186), height (0.066), body mass index (0.185), humerus bi-condylar diameter (0.176), waist circumference (0.112), abdomen circumference (0.202), upper arm circumference (0.093), triceps skinfold (0.091), biceps skinfold (0.18), supra iliac skinfold (0.356), sub-scapular skinfold (0.49) in respect of high socio economic group (Table 3). Whereas positive relationship is found in high average socio economic group in respect of weight (0.434), height (0.39), body mass index (0.325), femur bi-condylar diameter (0.071), humerus bi-condylar diameter (0.199), calf circumference (0.384), waist circumference (0.388), abdomen circumference (0.310), upper arm circumference (0.315), triceps skinfold (0.344), biceps skinfold (0.207), supra iliac skinfold (0.288) and sub-scapular skinfold (0.344) (Table 4). However positive relationship is also found in average socio economic group in weight (0.001), height (0.005), body mass index (0.032), femur bi-condylar diameter (0.077), humerus bi-condylar diameter (0.008), calf circumference (0.028), triceps skinfold (0.106), biceps skinfold (0.071), supra iliac skinfold (0.065) and sub-scapular skinfold (0.113) (Table 5). Same positive relationship trend has been observed in below average group in respect of weight (0.143), height (0.155), body mass index (0.078), calf circumference (0.098), waist circumference (0.124), abdomen circumference (0.079), upper arm circumference (0.111) and supra iliac skinfold (0.011) (Table 6). In case of low socio economic group, negative relationship is found in weight (0.158), body mass index (0.198), femur bi-condylar diameter (0.088), calf circumference (0.155), waist circumference (0.139), abdomen circumference (0.1), upper arm circumference (0.159), triceps skinfold (0.063), biceps skinfold (0.051), supra iliac skinfold (0.111) and sub-scapular skinfold (0.032) (Table 7).

Table 1: Descriptive statistics of different socio economic status

Socio Economic Status	Mean	SD	SEM
High	76.31	2.96	0.5
High average	63.12	1.69	0.27
Average	53.66	3.47	0.27
Below average	43.51	2.91	0.24
Low	34.3	3.88	0.51

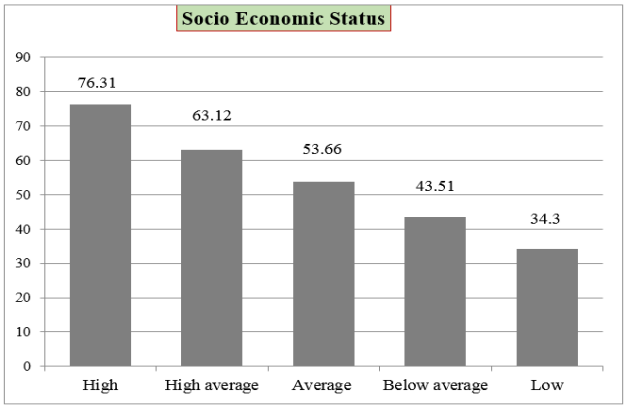

Fig 1: Comparison of different socio economic status of school children

Table 2: Descriptive statistics of anthropometric profile of different socio economic groups

Anthropometric profile	High	High average	Average	Below average	Low
Weight	52.25	39.79	37.55	36.39	34.19
Height	1.58	1.45	1.47	1.48	1.47
Body mass index	20.85	18.44	17.11	16.39	15.68
Femur bi-condylar diameter	8.84	8.4	8.73	8.39	8.23
Humerus bi-condylar diameter	6.01	5.71	5.67	5.54	5.46
Calf circumference	33.34	29.63	28.73	28.45	27.44
Waist circumference	75.07	68.41	66.52	66.11	64.08
Abdomen circumference	75.43	68.22	65.26	63.68	61.19
Upper arm circumference	24.36	21.8	20.88	20.61	19.63
Triceps skinfold	13.6	10.67	10	8.62	7.51
Biceps skinfold	7.64	5.85	6.1	5.05	4.59
Supra iliac skinfold	15.59	9.46	10.39	8.1	6.65
Sub-scapular skinfold	12.02	9.14	9.1	7.02	6.95

Table 3: Relationship between high socio economic status and anthropometric profile

Independent Variable	Dependent Variables	Mean	SD	SEM	r
High socio Economic status	Weight	52.25	11.37	1.92	-0.186
	Height	1.57	0.08	0.01	-0.066
	Body mass index	20.85	3.96	0.67	-0.185
	Femur bi-condylar diameter	8.84	0.92	0.16	0.121
	Humerus bi-condylar diameter	6.01	0.46	0.08	-0.176
	Calf circumference	33.34	3.24	0.55	0.066
	Waist circumference	75.07	9.89	1.67	-0.112
	Abdomen circumference	75.43	12.09	2.04	-0.202
	Upper arm circumference	24.36	3.09	0.52	-0.093
	Triceps skinfold	13.6	6.29	1.06	-0.091
	Biceps skinfold	7.64	4.39	0.74	-0.18
	Supra iliac skinfold	15.59	9.23	1.56	-0.356*
	Sub-scapular skinfold	12.02	7.37	1.25	-0.49*

*Significant at 0.05 level of confidence, 'r'0.05 (33) =0.325

Table 4: Relationship between high average socio economic status and anthropometric profile

Independent Variable	Dependent Variables	Mean	SD	SEM	r
High average socio economic status	Weight	39.79	13.42	2.1	0.434*
	Height	1.45	0.13	0.02	0.39*
	Body mass index	18.44	3.5	0.55	0.325*
	Femur bi-condylar diameter	8.4	1.07	0.167	0.071
	Humerus bi-condylar diameter	5.71	0.8	0.12	0.199
	Calf circumference	29.63	4.61	0.72	0.384*
	Waist circumference	68.41	9.27	1.45	0.388*
	Abdomen circumference	68.22	11.17	1.74	0.310*
	Upper arm circumference	21.8	3.37	0.53	0.315*
	Triceps skinfold	10.67	6.73	1.05	0.344*
	Biceps skinfold	5.85	4.26	0.66	0.207
	Supra iliac skinfold	9.46	8.26	1.29	0.288
	Sub-scapular skinfold	9.14	7.66	1.2	0.344*

*Significant at 0.05 level of confidence, 'r'0.05 (39) =0.304

Table 5: Relationship between average socio economic status and anthropometric profile

Independent Variable	Dependent Variables	Mean	SD	SEM	r
Average socio economic status	Weight	37.55	10.57	0.81	0.001
	Height	1.47	0.09	0.01	0.005
	Body mass index	17.11	3.55	0.27	0.032
	Femur bi-condylar diameter	8.73	0.77	0.06	0.077
	Humerus bi-condylar diameter	5.67	0.58	0.04	0.008
	Calf circumference	28.73	3.55	0.27	0.028
	Waist circumference	66.52	9.09	0.7	-0.087
	Abdomen circumference	65.26	10	0.77	-0.085
	Upper arm circumference	20.88	2.94	0.23	-0.067
	Triceps skinfold	10	5.29	0.41	0.106
	Biceps skinfold	6.1	3.76	0.29	0.071
	Supra iliac skinfold	10.39	7.57	0.58	0.065
	Sub-scapular skinfold	9.1	5.54	0.43	0.113

*Significant at 0.05 level of confidence, 'r'0.05 (167) =0.195

Table 6: Relationship between below average socio economic status and anthropometric profile

Independent Variable	Dependent Variables	Mean	SD	SEM	r
Below average socio economic status	Weight	36.39	8.06	0.66	0.143
	Height	1.48	0.09	0.01	0.155
	Body mass index	16.39	2.61	0.21	0.078
	Femur bi-condylar diameter	8.39	0.77	0.06	-0.047
	Humerus bi-condylar diameter	5.54	0.65	0.05	-0.008
	Calf circumference	28.45	3.14	0.26	0.098
	Waist circumference	66.11	7.14	0.59	0.124
	Abdomen circumference	63.68	8.1	0.67	0.079
	Upper arm circumference	20.61	2.83	0.23	0.111
	Triceps skinfold	8.62	4.43	0.36	-0.103
	Biceps skinfold	5.049	3.17	0.26	-0.007
	Supra iliac skinfold	8.1	5.27	0.43	0.011
	Sub-scapular skinfold	7.02	3.31	0.27	-0.002

*Significant at 0.05 level of confidence, 'r'0.05 (146) =0.195

Table 7: Relationship between low socio economic status and anthropometric

Independent Variables	Dependent Variables	Mean	SD	SEM	r
Low Socio Economic Status	Weight	34.19	7.38	0.98	-0.158
	Height	1.47	0.1	0.01	0.021
	Body mass index	15.68	2.46	0.33	-0.198
	Femur bi-condylar diameter	8.23	0.81	0.11	-0.088
	Humerus bi-condylar diameter	5.46	0.82	0.11	0.092
	Calf circumference	27.44	2.95	0.39	-0.155
	Waist circumference	64.08	6.6	0.87	-0.139
	Abdomen circumference	61.19	7.51	0.99	-0.1
	Upper arm circumference	19.63	2.45	0.32	-0.159
	Triceps skinfold	7.51	3.98	0.53	-0.063
	Biceps skinfold	4.59	3.33	0.44	-0.051
	Supra iliac skinfold	6.65	4.16	0.55	-0.111
	Sub-scapular skinfold	6.95	6.71	0.89	-0.032

*Significant at 0.05 level of confidence, 'r'0.05 (55) =0.25

Discussion

The result of the present study shows that there was a positive relation between anthropometric growth patterns with respect of high average, average and below average socio economic status. It indicates that high average, average and below average socio economic status helps to promote the physical growth of an individual or a society. This pattern of growth improves not only the physical stamina but also promotes mental health. It may be cause of proper nutritional supplements, average economical support and more physical requirements.

Scientists reported that socio-economic variables positively associate anthropometric status and also indicate that children who have poor anthropometric status perform more poorly on measures of child development compared to peers with proper growth [17]. Another researcher found significant association between socioeconomic status and anthropometric status; and it has no direct effects on developmental outcomes. The weight, height and a lesser extent mid-upper arm circumference mediate the relationship between socioeconomic status and developmental outcome [18]. Scientists also noticed that height is positively associated with higher levels of parental education. Higher level of income per capita is associated with higher weight and BMI. The height, weight, BMI and waist are significantly and inversely associated with number of children in the family. Lower number of children in the family and higher level of income may increase overweight and obesity [13]. Abubakar and Vijver reported that parental socio-economic status influences child's physical growth which in turn affects their developmental outcomes. The anthropometric status of children living in poverty can be expected to improve developmental outcomes [17]. Their involvement in physical and cultural activities is a way to anticipate the happening which is because of every child is eager to participate in physical and sporting activities [19, 20]. The socioeconomic status and anthropometric indices both are related to mortality. However, the relationship of anthropometric indices is much stronger [21].

Whereas negative relationship is found in anthropometric measurements with respect of high and low socio economic groups. It indicates that high and low socio economic statuses do not support positively the improvement of adolescent growth pattern. It may be cause of malnutrition or over nutrition, physical inactivity, lack of health awareness, poor or over economical set up of the individual or family. Sometimes these adolescent children are suffering from health hazards like obesity, postural deformities, neuromuscular disorder, vitamins deficiency disease etc. Nowadays under nutrition is more common in primary school children. Parental employment, high number of siblings, high birth orders, low monthly income and female children are significantly associated with under nutrition among preschool children [14]. Young children are more prone to malnutrition than adults [14]. Insufficient dietary consumption and infectious diseases are major contributing factors for poor nutritional status of children [14]. Whereas researchers contradicted that participants with lower socio economic status gain more weight and waist circumference than those with higher socio economic status [22]. Another finding also contradicts that socioeconomic status has no significant relation in anthropometry [15].

Conclusions

The high average, average and below average socio economic statuses help to promote the physical growth of an individual or a society. Whereas high and low socio economic statuses do not support positively the adolescent growth pattern and sometimes it may create some kind of health hazards.

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