

Influence of Socio-Economic Status on the Nutritional Status of Rural Adolescent Girls

Dr.Kankana De*

Vidyasagar University, Medinipur, West Bengal, India

*Corresponding author: Dr Kankana De, Vidyasagar University, Medinipur, West Bengal, India, Tel: 9474714273; E-mail: dekankana@gmail.com

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Abstract

Background: Puberty is the process of physical changes through which a child's body matures into an adult body capable of sexual reproduction. It is initiated by hormonal signals from the brain to the gonads: the ovaries in a girl, the testes in a boy. In response to the signals, the gonads produce hormones that stimulate libido and the growth, function, and transformation of the brain, bones, muscle, blood, skin, hair, breasts, and sex organs. Nutritional status is a condition of the body in those respects influenced by the diet; the levels of nutrients in the body and the ability of those levels to maintain normal metabolic integrity. General adequacy is assessed by measuring weight and height. Kinanthropometry is defined as the study of human size, shape, proportion, composition, maturation, Anthropometry, the systematic collection and correlation of measurements of the human body. Socioeconomic status (SES) is an economic and sociological combined total measure of a person's work experience and of an individual's or family's economic and social position in relation to others, based on income, education, and occupation.

Materials and methods: Subjects are Adolescents girls aged 10-19 years, they belongs to Salboni Block which is one of block of Paschim Medinipur, West Bengal. Participant's socioeconomic data are collected through structured questionnaire, anthropometric data are collected through different instruments, and cross section study is done on 1009 girls.

Results: In Tables 1 and 2, it was found that age wise there is an increase in the weight, Height of adolescent girls but BMI increases from 13 years to 17 years. In this study girls belongs to mostly agriculture based family, in this study girls experience menarche 12.1 to 12.9 years of age, and their parents depend on agriculture based economy. Among 112 girls, 80 girls parents are service holders, 72 girls come from daily wage labour they experience delayed menarche at 14.1-14.9 years. Table 4 represents that 785 girls postmenarcheal girls belong to skilled labour parents but Pearson chi square represents that socio-economic status and menarcheal status do not have any significant relation. Similar trend was observed in weight and body mass index, which was ranged from 35.61 ± 3.41 to 42.79 ± 5.02 cm and 16.76 ± 2.31 to 18.18 ± 2.00 cm respectively. In this study it shows that skilled labour parents' girls mean weight is 44.54(5.08) and mean height is 151.02(4.82) ,Mean height of unskilled labours parents' girls is mean height is 150.82(5.04) , mean weight is 44.42(5.50).

Keywords: Socio-economic; Body mass index; Menarchy

Introduction

Puberty is the process of physical changes through which a child's body matures into an adult body capable of sexual reproduction. It is initiated by hormonal signals from the brain to the gonads: the ovaries in a girl, the testes in a boy. In response to the signals, the gonads produce hormones that stimulate libido and the growth, function, and transformation of the brain, bones, muscle, blood, skin, hair, breasts, and sex organs. Physical growth—height and weight—accelerates in the first half of puberty and is completed when an adult body has been developed. Until the maturation of their reproductive capabilities, the pre-pubertal physical differences between boys and girls are the external sex organs. Adolescence (from Latin *adolescere*, meaning "to grow up") [1] is a transitional stage of physical and psychological human development that generally occurs during the period from puberty to legal adulthood (age of maturity). Nutritional status is a condition of the body in those respects influenced by the diet; the levels of nutrients in the body and the ability of those levels to maintain normal metabolic integrity. General adequacy is assessed by

measuring weight and height; the result is commonly expressed as the body mass index [2], the ratio of weight (kg) to height [2] (m). Body fat may also be estimated, by measuring skinfold thickness, and muscle diameter is also measured.

Kinanthropometry is defined as the study of human size, shape, proportion, composition, maturation, Anthropometry, the systematic collection and correlation of measurements of the human body. Now one of the principal techniques of physical anthropology, the discipline originated in the 19th century, when early studies of human biological and cultural evolution stimulated have an interest in the systematic description of populations both living and extinct. In the latter part of the 19th century, anthropometric data were applied, often subjectively, by social scientists attempting to support theories associating biological race with levels of cultural and intellectual development. Socioeconomic status (SES) is an economic and sociological combined total measure of a person's work experience and of an individual's or family's economic and social position in relation to others, based on income, education, and occupation [3]. When analyzing a family's SES, the household income, earners' education, and occupation are examined, as well as combined income, versus with an individual,

when their own attributes are assessed or more commonly known is to depict an economic difference in society as a whole.

Materials and Methods

Subjects are Adolescent's girls aged 10-19 years who belong to Salboni Block of Paschim Medinipur, West Bengal. Participant's socioeconomic data are collected through structured questionnaire, anthropometric data are collected through different instruments, and for this study 1009 Adolescent girls' measurements are taken. For this study, different types of anthropometric measurements were taken like

Weight, Height, Height is measured through Anthropometric rod; Weight is taken by weighing machine. Biceps skinfolds and Triceps skinfolds measurements are taken by skinfold Calliper. Height is measured to the nearest 0.1 cm and weight to the nearest 0.5 kg. Each subject was weighed with minimum clothing and no footwear.

Results

In table 1 it found that in age wise increase in weight and height of Adolescent girls but BMI increases from 13 years to 17 years.

Age		Mean	Std. Deviation
10	Height (cm)	146.01	4.943
	Weight (kg)	38.86	4.658
	BMI (kg/sqm)	18.23	2.0344
11	Height (cm)	148.078	3.765
	Weight (kg)	41.634	5.29
	BMI	18.96	2.19
12	Height (cm)	149.8	3.829
	Weight (kg)	42.062	4.251
	BMI	18.729	1.708
13	Height (cm)	150.44	3.76
	Weight (kg)	43.309	4.09
	BMI (kg/sqm)	19.124	1.574
14	Height (cm)	151.53	4.414
	Weight	45.084	4.03
	BMI	19.651	1.76
15	Height cm	152.18	3.67
	Weight	45.997	3.92
	BMI	19.866	1.6
16	Height (cm)	152.483	3.525
	Weight (kg)	46.53	4.456
	BMI	20.00678	1.682
17	Height(cm)	152.801	4.783
	Weight(kg)	46.86	3.56
	BMI	20.024	1.219
18	Height (cm)	153.15	4.97
	Weight (kg)	47.352	4.452
	BMI (kg/sq m)	20.16	1.299
19	Height	153.55	4.41
	Weight	47.62	3.62

	BMI	20.17	1.051
Total	Height	151.028	4.817
	Weight	44.56	5.073
	BMI (kg/ sq m)	19.5	1.75

Table 1: Age wise change of mean height (cm), Weight (kg), BMI (kg/sq m) of Adolescent girls.

Mean age at menarche	Cultivation	Business	Daily wage laborers	Service	Driver	Other
9-9.9	4	-	-	-	-	-
10-10.9	7	4	2	37	1	-
11-11.9	77	17	6	27	34	25
12-12.9	112	15	15	84	23	27
13-13.9	10	9	20	42	9	4
14-14.9	100	9	28	10	-	13
15-15.9	86	9	-	14	-	5
16-16.9	2	1	1	-	-	2
17-17.9	27	-	-	-	-	-
Total	418	64	72	214	67	61

Table 2: As per parent occupation mean age at menarche of studied sample.

Dependent variable	Skilled occupation	Unskilled occupation	Other	F
Weight (kg)	44.54 (5.08)	44.42 (5.50)	45.2 (3.87)	0.72
Height (cm)	151.02 (4.82)	150.82 (5.04)	151.57 (4.08)	0.133
MUAC (cm)	21.69 (2.86)	22.20 (2.49)	21.17 (3.05)	0.166
TSF (mm)	8.94 (2.00)	9.160 (2.17)	9.53 (2.26)	0.16
BSF (mm)	6.12 (1.54)	6.09 (1.50)	6.37 (1.61)	0.61
Chest Circumference (cm)	74.49 (7.08)	75.27 (6.29)	72.61 (8.39)	0.173
waist Circumference (cm)	78.28 (6.43)	79.16 (6.00)	77.55 (4.82)	0.311
Hip Circumference (cm)	84.81 (6.65)	85.58 (6.15)	84.47 (5.55)	0.583
BMI (kg/sqm)	19.49 (1.75)	19.50 (2.03)	19.65 (1.14)	0.368
Waist -Hip ratio	0.92 (0.062)	0.92 (0.051)	0.91 (0.51)	0.869
waist height ratio	0.51 (0.041)	0.52 (0.038)	0.51 (0.030)	0.229
FFM (kg)	9.31 (1.99)	9.50 (2.26)	9.85 (2.26)	0.227
FFMI (kg/sqm)	34.21 (4.39)	34.27 (4.25)	34.24 (3.40)	0.979
FM (kg)	14.98 (1.62)	15.05 (1.62)	14.93 (1.18)	0.244

In studied condition girls belong to mostly agriculture based family, few have their own Agriculture land few of them are agriculture labour only, In this study girls experience menarche 12.1to12.9 years of age, and their parents depend on agriculture. Among study groups 112 girls, 84 girls of service holder parents experience menarche on 13-13.9 years, 28 girls of daily wage labour they experience delayed menarche at 14.1-14.9 years. Table 4 represent that 785 girls post menarcheal girls belong to skilled labour girls but Pearson chi square represent that socioeconomic status and menarcheal status have no significant relation. 86 girls had experienced menarche on 15.1-15.9 years of age their father's economic condition depends on cultivation.

Similar trend was observed in weight and body mass index, which ranged from 35.61 ± 3.41 to 42.79 ± 5.02 cm and 16.76 ± 2.31 to 18.18 ± 2.00 cm respectively. In this study it shows that skilled labourers parents' girls mean weight is 44.54(5.08), mean height is 151.02(4.82), Mean height of unskilled labour parents' girls is 150.82(5.04), mean weight is 44.42(5.50).

In table 3 it shows that any kind of occupation of parents' do not effect height, weight and any other any anthropometric variables and they are not significantly related, even menarcheal not affected by socio- economic status, but skilled labour parents girls experience early menarche.

FMI (kg/sqm)	4.071 (0.75)	4.11 (0.860)	4.27 (0.718)	0.908
Arm Muscle Area (sqmm)	2800.24 (753.90)	2883.48 (703.09)	2623.01 (676.06)	0.223
Percent body fat (%)	21.31 (3.02)	21.53 (3.29)	22.20 (3.085)	0.192
Arm Fat Area (sq mm)	885.31 (258.55)	933.29 (296.99)	921.76 (271.76)	0.24
Arm Muscle Circumference (mm)	185.63(27.090)	188.85 (24.11)	179.92 (24.72)	0.252

Table 3: Anova table which represent mean anthropometric variable based on occupation of parent.

Menarcheal status	Different kinds of Occupation			Total
	Skilled labour	Unskilled labour	Other	
Post-menarcheal girls	785	65	34	884
Pre-menarcheal girls	112	10	3	125
Total	897	75	37	1009
Pearson Chi-Square= 0.694, Df=2, Asymptotic (2 tailed)=0.707				

Table 4: Cross tabulation of menarcheal status and different occupation of studied adolescent girls.

Discussion

A study conducted by Deshmukh et al. [4] on nutritional status of adolescents in rural Wardha showed that 53.8 per cent of the adolescents were thin, 44 per cent were normal and 2.2 per cent were overweight. Zanvar et al. [5] compared 500 adolescents (13-18 years) from urban, rural and tribal areas of Marathwada region; found that urban adolescent girls had better height (152.26 ± 8.6 cm) than rural and tribal counterparts (150.19 ± 7.11 , 145.51 ± 9.38 cm respectively) [6-9]. Similar trend was observed in weight and body mass index, which ranged from 35.61 ± 3.41 to 42.79 ± 5.02 cm and 16.76 ± 2.31 to 18.18 ± 2.00 cm respectively. In this study it shows that studied adolescent girls mean height is 151.02 (4.8) and weight is 44.56 (5.07), whose parents are skilled labour there mean weight 44.54 (5.08) mean height 151.02 (4.82), Mean height of unskilled labour girls are 150.82 (5.04) 44.42 (5.50) mean weight of girls who belongs to unskilled labour parents. Unskilled labour due to poor economic condition have lack of knowledge nutritive of food, but Table 1 represents that in overall nutritional status of studied girls their weight, height increases in every age. Socioeconomic status does not affect their nutritional status and menarche [10]. According to Babar et al., Children with BMI <5th percentile were 41% in lower class while in upper class it was 19.28%. Prevalence of malnutrition was 42.3% among children of illiterate mothers as compared to 20% in those of literate mothers. Despite all these important considerations, adolescent girls did not receive adequate attention in rural areas in our country, and only recently few studies have been carried out in this population group [11-13], Pratibha Patanwar et al. studied that out of the total 500 selected adolescent girls, 53.8% of the adolescent girls were thin ($BMI \leq 18.5$). The prevalence of chronic energy deficiency based on BMI (grade I, II and III) were 26.0%, 14.4%, and 13.4% respectively. None of the girls was found to be obese. Only 3.6 percent girls were overweight and 42 percent girls were found normal. Due to low socio-economic status adolescent have no sanitary toilets and latrine so they go for open defecation; Due to open defecation suffering from worm

infestation cause iron deficiency in 2011, Government of West Bengal launched a program called WIFS to supplement iron folic acid and albandazole to fight against anemia.

Conclusion

Mid-day meal scheme is now running on most of govt. schools [14] who are regular goer of schools get sufficient food which support their nutritional status, In this study it shows that socioeconomic status has no significant relation in anthropometry. Socio-economic status does not only improve nutrient intake but also improve healthy habit and hygiene, Due to open defecation hookworms infestation shows that adolescent become susceptible to under nutrition and anemia, Proper health education can help them aware about such things. It was found that on Rothak Haryana the mean weight and mean BMI of adolescents in the 13-14 years age group was more in rural areas (38.83 kg and 16.97) than in urban areas (38.59 kg and 16.95) by BM Vashist. In present study rural girls have mean Height 151.02 (4.81), 44.56 (5.07).

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