

Physical Growth and Relation of Menarche with Anthropometry

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Introduction

Menarche age is an important indicator of reproductive health of a woman or a community. In industrial societies, age at menarche has been declining over the last 150 years with a secular trend, and similar trends have been reported in some developing countries [1]. Menarche age is affected by genetic and environmental cues, including nutrition. Puberty is a natural developmental issue, common to nutrition, health and well-being as well as socioeconomic both man and woman [2]. The onset of sexual puberty in girls factors is associated with secondary sexual changes, i.e. There have been studies on the role of height, weight development of the nipple and later the growth of pubic and body structure on the menarche age; however, there are armpit hair; also the beginning of menarche is in disagreement on the role of these factors. Some indication of the maturity of internal genital organs, or the researchers consider some body fat necessary in female end of puberty. Puberty is common to the adolescence and a minimum weight requirement for the development of secondary sexual characteristics is starting with the menstruation. On the other hand, studies lead to the total differentiation of male and female; also, show that the childhood malnutrition can delay the onset of the final height and posture of the male and female of menstruation but does not prevent its occurrence. Adolescents are determined in this period. Puberty is the complex process by which children develop secondary sexual characteristics and reproductive competence. Normal puberty is initiated centrally, with gonadal function being driven by increased gonadotropin-releasing hormone (GnRH) and gonadotropin secretion. Among other factors, adequate nutritional status appears to be requisite for the central initiation of puberty [3]. BMI are more likely to have thelarche between ages 8.0 and 9.6 years compared to girls with normal BMI [4] and that age at menarche is negatively associated with BMI [5]. Body mass Index has increased progressively from 13 years to 19 years of age where overall increase was (1.89 kg/m²) from 10 to 19 years which is statistically significant [6,7].

Materials and Methods

Subject

The study area of Salboni Block is 25 km away from Medinipur town. Subjects are 10-19 years adolescent girl. The study were done on 1009 girls. For these 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. Structured questionnaires were followed to know details of socio-economic status of studied adolescents.

Statistical analysis

Data were entered in Microsoft excel 2007 and was analysed using SPSS 19.0. Descriptive statistics and chi square test were used wherever required, to test statistical significance. Statistical significance was set at p <0.05. Cox regression. The cross-sectional study was conducted on secondary and model, the covariate effects were expressed as hazard

ratio and 95% confidence intervals, cox regression model cox regression curve represent menarcheal status. BMI was classified into 3 categories: low weight); 18<BMI<24.9 (normal weight),BMI<=25.

Results

Linear regression weight and weight of different age group show that they are significantly related here weight is dependent variable and height is independently variable, it shows that weight increases when height increases. Table 1 shows that age at menarche has positive correlation with chest circumference, waist circumference, hip circumference. It represents higher anthropometric variables which influence early menarche. Postmenarcheal girls have high anthropometric values and they have significant relation, Table 2 represents that at age 10 years mean weight of girls is 41.48 kg and height is 147.96 cm and at age of 14 girls weight and height are higher i.e.152.48 cm and weight 45.37 kg. It shows puberty growth spurt of adolescent girls.

In this study it's found that Post menarcheal girls have higher body composition, body fat stimulate hypothalamus to release growth stimulating hormone which initiate pubertal surge, in this shows that menarcheal girls have higher Anthropometry, BMI is contributing

	Age at Menarche	Waist Circumference (cm)	Hip circumference (cm)	Waist-Hip ratio
Mean age at menarche	-	0.229	0.177	0.064
Waist circumference(cm)	0.229	-	0.656	0.43
Hip Circumference(cm)	0.177	0.656	-	-0.395
Waist-hip ratio	0.041	0.43	-.395	-

Table 1: Correlations between mean age at menarche and Waist Circumference, Hip circumference, Chest Circumference. (Significant at 0.001).

	Mean weight	Mean Height	Mean square regression	Mean square residual	F test
10	41.48	147.96	609.16	22.74	26.77*
11	42.06	149.82	381.37	14.36	26.54*
12	45.08	151.53	159.15	14.82	10.73*
13	45.99	152.18	206.11	13.45	15.31*
14	45.37	152.48	403.25	15.94	25.93*

Table 2: Linear regression weight on height for different ages of girls.

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Variable	Mean real status	N	Mean	Std. Deviation
BMI (kg/sqm)	1	884	19.86	1.42
	2	125	16.89	1.73
FM (kg)	1	884	9.66	1.89
	2	125	7.13	1.39
FFM (kg)	1	884	34.842	4.11
	2	125	29.94	3.34

1 = Post-menarchal, 2 = Pre-menarcheal

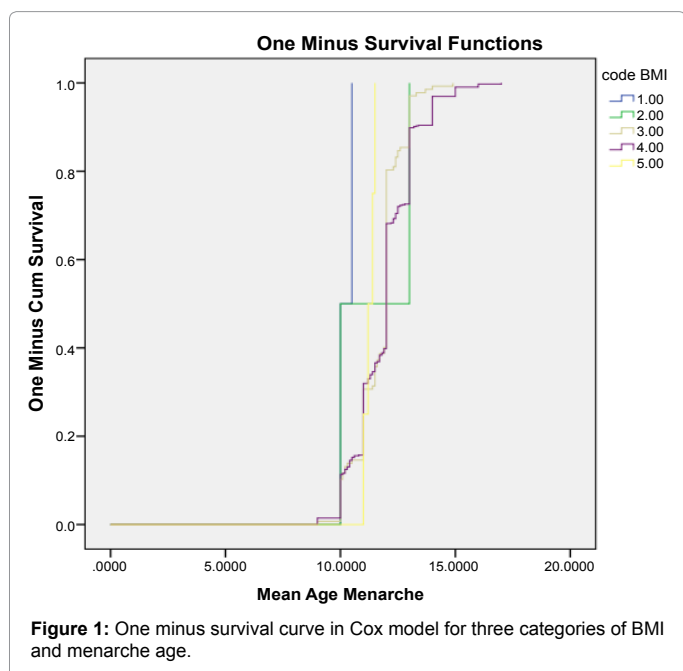
Table 3: Comparison postmenarcheal and premenarcheal girl's anthropometric variables.

CED Status	Frequency	Percent	Cumulative Percent
CEDI	164	16.3	16.3
CED II	38	3.8	20.0
CEDIII	42	4.2	24.2
Normal	761	75.4	99.6
Overweight	4	.4	1000

Table 4: Nutritional status of studied adolescent girls.

BMI	HR	95% CI HR		Kaplan Meier
Less than 18	2.863	.522	15.72	10
18-24.9	.402	.073	2.20	10
25	.458	.169	1.241	12

Table 5: Relationship between different BMI categories and menarche age in Cox regression model and Kaplan-Miere method.



factor onset of menarche [8]. 164 girls among studied group suffer from CEDI, 42 girls belong to CEDIII category, Mean age at menarche is influenced by hip Circumference and waist circumference 10 -18 years is adolescent age group which period adolescent growth spurt. Table 2 represents that weight will increase with height because F test result had shown weight and height have significant relation. The mean height of the menstruating participants in the study was 156.06 ± 11.35 cm, which is close to figures obtained in studies of other Iranian regions [9,10]. Urgent nutritional intervention programme should be given to them which 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). Table 5 shows relationship of mean age menarche and BMI by cox regression analysis.

Conclusion

Among 1009 24.2% is under nutrient which affect their mean age at menarche, higher anthropometric girls experience early puberty and their weight is increased with height which shows that they have significant relation, chest circumference, waist circumference effect mean age at menarche.

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