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A Study of Age at Menarche the Secular Trend and Factors Associated with it: Rivers State, Nigeria.

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ABSTRACT

Menarche is the time of the first menstrual period. The steady decline in age at menarche among girls was studied in young girls in Obio-Akpor Local Government Area of Rivers State. Two hundred (200) young girls between ages of 9-16years were contacted in the study. Thy were classified thus:- early menarche (between 9 to 11years of age), ideal menarche (between 12 to 13 years of age), and late menarche (between 15 to 16 years of age). The mean results and the percentage of the correlation studies of age at menarche and socio-economic status, diet and exercise were as follows: early menarche (9-11) years were (37%), ideal (12-14) years were (48.5%) and late age (16-15) years (14.5%). The mean age of menarche (12.16) observed in our study possibly indicate that the secular trend has not been stabilized. The result suggests that there was a decline in the age at menarche within the study population. The age at menarche is strongly associated with socioeconomic status, and diet thus was statiscally significant. Knowledge of the age at menarche will help the government to design and implement programmes about reproductive health of women to set laws about age at marriage, family planning, abortion and to decide the appropriate age at which the topics like the sex education, conception and sanitary practices can be incorporated in school.

INTRODUCTION

Menarche, strictly defined, is the time of the first menstrual period: the established of the menstrual function. It is the most important biological signals in the life of a female[1]. It marks completion of the first cycle of the system, though the first several cycles usually do not include ovulation[2]. It has been reported that the menarche occurs when a critical weight of about 50kg is attained[3]. According to [4]menarche begins with the confirmation that girls have had a gradual estrogen-induced growth of the uterus, especially the endometrium, and that the 'outflow tract' from the uterus, through the cervix to the vagina. Justifying this assertion[5] examines the relationship of intrauterine growth, measured by size and maturity at birth to age at menarch, and concludes that the study provides additional evidence of fetal programming of later health outcomes by showing the future growth and maturation trajectories established in utero. Furthermore, rapid postnatal growth potentiates the effects of size at birth and is related independently to earlier pubertal maturation. [6]in his research on growth difference by age menarche in African and white girls concluded that it is one of the few longitudinal studies of difference in growth by timing of menarche that includes data on girls younger than 5 year with large samples of both African-American and white girls.

The health professionals have a greater role to play to complement the current efforts made by parents to accurately educate their daughters about menstruation. [8]in their study of interaction between calcium intake and menarcheal age on bone mass gain: An eight year follow-up study from prepuberty to post menarche concludes that the level of calcium intake during pepuberty may influence the timing of menarche, which in turn, could influence long-time bone mass gain in response to supplementation. Thus, both determinants of early menarcheal age and high calcium intake may positively interact on bone mineral mass accrual. [10]on the study of age at menarche in relation to adult height concluded that based on time trends, more recent birth cohorts have their menarche earlier and grow taller. However, women with earlier menarche reach a shorter adult height compared with women who have menarche at a later age. [8]study early age at menarche associated with cardiovascular disease and mortality concluded that early age at menarche (before age 12 years) was associated with increased risk of cardiovascular disease events, cardiovascular disease mortality and overall mortality in women, adjusted for age, physical activity, smoking, alcohol, educational level, occupational social class, oral contraceptive use, hormone replacement therapy, parity, body mass index and waist circumference, and this association appeared to be only partly mediated by increased adiposity. [9]studies vitamin D deficiency and age at menarche: A Prospective study shows that Girls in the vitamin D-

deficient group reached menarche during follow up compared with girls in the vitamin-sufficient group. The probability of menarche was twice as high in vitamin D deficient girls than in girls who were vitamin D-sufficient and thus vitamin D deficiency is associated with earlier menarche. Similarly, [11]who studied the common genetic influence on body mass index and age at menarche concluded that a bivariate twin analysis of age at menarche and body mass index indicated that 37% of the variance in age at menarche can be attributed to additive genetic effects, 37% to dominance effects and 26% to unique environmental effects. The correlation between additive genetic effects on age at menarche and body mass index was 0.57, indicating a substantial proportion of genetic effects in common. Again [12]investigate age decline in the onset of menarche in southern Nigerian population. Their report documents that there was a decline in the onset of menarche within the period under study (1975-1997), and thus the sample population is evident and also concluded that parents, health care providers and social workers should be sensitized towards preparing even younger girls for woman-hood. This is important for helping them cope with potential problems that may occur as result of their early development and maturation. [12,11,*10,13,14,*] carried out a research on the timing of normal puberty and the age limits of sexual precocity. Variation around the world, secular trends and changes after migration, the results shows that the variations in age at onset of puberty involve different components in including the average timing, the pattern of age distribution and the variability, which is the difference between average and upper/lower age limits and they concluded that this individual variability, which involves familial, ethnic and gender patterns, is likely to depend on the genetic control of the expression of signals or signal receptors in the hypothalamus.

Windham *et al*.[16] investigated gestational weight gain and daughter's age at menarche, their results shows that among 32,218 respondents, 7% reported age at menarche < 11, 90% aged 11-15 years and 3% > age 15. [17]investigated age at menarche in relation to material use of tobacco, alcohol, coffee and tea during pregnancy in their result stated that among 994 female offspring interviewed as adolescents, 98% had started their menstrual periods at a mean age of 12. [18]investigated maternal pre-pregnancy BMI, gestational weight gain and age at menarche in daughters, their results showed that pre-pregnancy overweight/obesity and excess gestational weight gain were associated with daughters' earlier menarche, while inadequate gestational weight gain was not, they concluded that the association between maternal pre-pregnancy weight and daughters' menarcheal timing was not mediated by daughter's birth weight, prepubertal BMI or maternal gestational weight gain. Maternal factors, before and during pregnancy, are potentially important determinants of daughters' menarcheal timing and are amenable to invention. Nutrition has always been considered a major influential factor in puberty growth period. A study by [19]on Maharashtrian girls observed a positive correlation between the age of menarche and Non-vegetarian diet. Other Factors that affect the age at menarche include environment, sibship, religion migration, genetic and hereditary factors, ethnicity, geographical background [19]body mass index [20]psychological stress and chronic illness, with opinions both supporting and rejecting it [21,22] exercise [23]Intra-uterine growth, and birth size have also been reported to affect the onset of menarche[24]. It is a known fact that there are variations in the age at menarche in this part of the world, it motivates me to thoroughly carry out this research to find out the effect of exercise, diet, socioeconomic status and others factors on age at menarche in order to arrest any life threatening disease that may occur later life.

The aim of the study is to establish the current trend in age at menarche. The objectives of this study is to determine: the variation in age at menarche on girls if there is stability in the secular trend on age at menarche on the study population, the effect of Diet on the age at menarche on the study population, the effect of socio-economic status of the family on the age at menarche in the study population.

MATERIALS AND METHODS

This study on factors associated with age at menarche in Rivers State was conducted with the use of sample collected from the socio-economic variables of girls in randomly selected two government and two private owned secondary schools Obio/Akpor Local Government Area. These schools were selected using simple random sampling technique. Data were collected from two hundred females with the use of research instrument (questionnaire) known as FAAM which represent the subject matter.

The socio-economic variables upon which data were sourced are per capita income, occupation of parents, family per capita income and education. The students were thus classified to be upper, middle and lower socio-economic status. They were also classified into vegetarian and mixed diet. The method adopted in this study was descriptive survey design and methods of data analysis were descriptive status on bar charts and simple percentage statistical tool.

RESULTS

Table 1 shows the age at menarche of the female used and their frequency. The age is categories into six ranging from 9-16 years. The frequency of the 9(28), 10(26), 11(20), 12(31), 13(42), 14(24), 15(18), 16(11).

Table 2 shows the distribution of subjects according to early, ideal and late on set of menarche where the early age ranging from 9-11 years, ideal (12-14) years and late (15-16) years with the total percentage of 37%, 48.5% and 14.5% respectively. The mean deviation of

individual years is 9(12±-3.16), 10(12±-2.16), 11(12±-1.16), 12(12±-0.16), 13(12±0.86), 14(12±1.84), 15(12±2.84) and 16(12±3.84).

Table 3 shows the correlation between age at menarche and sosio-economic status. The socio-economic status is classified in upper, middle and lower status. The percentage of the upper status is (22%), middle (52%), lower (26%).

Table 4 shows the correlation between age at menarche and diet. The diet was classified into two vegetarian and mixed and the percentage of the vegetarian is 15.5% and 84.5% for the mixed.

Table 1: Frequency table showing age group wise distribution of subjects

Age group (years)	**No of Subject (F)**
9	28
10	26
11	20
12	31
13	42
14	24
15	18
16	11
Total	**200**

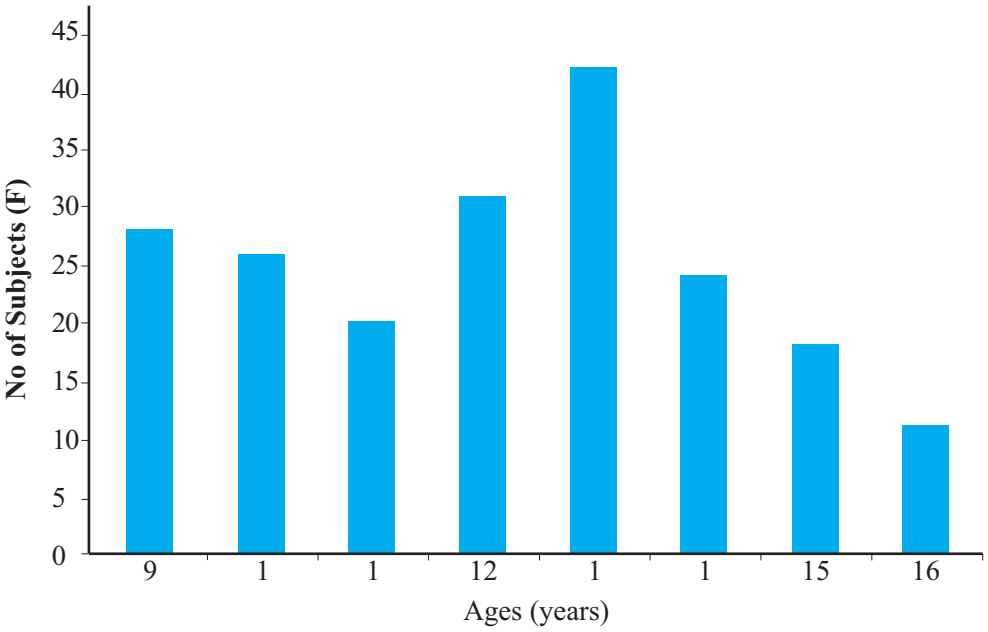

Figure 1: Bar chart showing age group distribution of subjects

Table 2: Frequency table showing the distribution of subjects according to early, ideal and late on-set of menarche.

Age (years)	No at Menarche	% at Menarche	Total at Menarche	Mean age at Menarche	Mean deviation from the age of menarche	Total % at Menarche	Cumulative percent
9 (early)	28	14	74		-3.16	37	37
10 (Ideal)	26	13			-2.16		
11 (Ideal)	20	10			-1.16		
12 (Late)	31	15.5	97		-0.16	48.5	85.5
13 (Late)	42	21		12.16	0.86		
14 (Late)	24	12			1.84		
15 (late)	18	9	29		2.84	14.5	100
16 (late)	11	5.5			3.84		
Total	**200**	**100%**	**200**			**100%**	

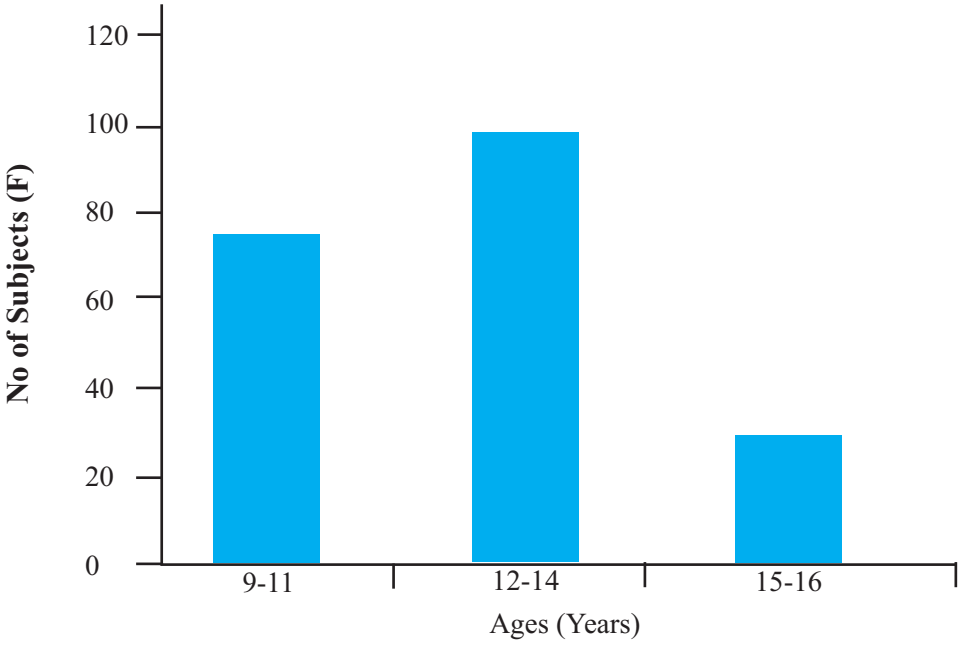

Figure2: Bar chart showing distribution of subjects according to early, ideal and late menarche

Table 3: Frequency table showing correlation between age at menarche and socio-economic status.

Ages (years)	No at Menarche	Socio-economic status			Total no of menarche
		Upper	Middle	Lower	
Early 9	28	9	11	8	74
10	26	6	12	8	
11	20	4	12	4	
Ideal 12	31	9	15	7	97
13	42	9	25	8	
14	24	4	13	7	
Late 15	18	2	10	6	29
16	11	1	6	4	
Total	200	44	104	52	
Percentage	100	22%	52%	26%	100%

Table 4: Frequency table showing correlation between age at menarche and diet

Age (years)	No at menarche	Vegetarian	Mixed	Mean of age of menarche	Mean deviation	Total
Early 9	28	4	24		-3.16	74
10	26	5	21		-2.16	
11	20	3	17		-1.16	
Ideal 12	31	6	25		-0.16	97
13	42	8	34	12.16	0.84	
14	24	3	21		1.84	
Late 15	18	1	17		2.84	29
16	11	1	10		3.84	
Total	200	31	169			200
Percentage	100	15.5%	84.5%			100%

DISCUSSION

The results support the age at menarche is associated with socio-economic status and diet. From the results shown, the total percentage of the early menarche from 9-11 years is 37%, ideal menarche from 12-14 years is 48.5% and the late menarche from 15-16 years is 14.5 with the same mean value 12.16 which is in line with the work done by Kaprio *et al*.[11] on the common genetic influence on body mass index and age at menarch indicated that 37% will be attributed to dominance effects and 26% to unique environmental effects but were not in agreement with the position of Kaprio *et al*.[11] which investigated gestational weight gain and daughters age at menarche which shows 7% less than 11 years, 11-15 years 90% and 3% age at 15.

From the results shown in correlation between age at menarche and socio-economic status, the percentage of upper socio-economic status is 22%, middle is 52% and lower 26% which shows that the middle stage of socio-economic status exhibit high percentage of menarche. From the mean difference it shows a negative increase from 9-12 years and a positive increase from 13-16 years, the negative increase could be associated with the exposure to pesticides and other estrogen-like chemicals, increase incidence of childhood obesity, low birth weigth, not breast-feeding, experience pre-eclampsia in the womb, high conflict relationship.

CONCLUSION

The knowledge of age at menarche in a given population is a pressing need of the society as no law about the age of marriage, age of consensual sex, abortion, family planning, rape and other aspects of female reproductive life can be made without it. The study will help the government to decide to appropriate age of children, at which the topics like sex education, contraception, sanitary practices etc. can be incorporated in schools, and to design and implement the various health programmes related to reproductive health of women of appropriate age. As the early age at menarche is one of the few established risk factors for breast carcinoma, the knowledge of if in a given population may help the clinicians for deciding high risk patients for breast carcinoma leading to its early detection and hence prompt and effective treatment.

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