

STUDY TO DETERMINE THE MENARCHEAL AGE OF SCHOOL GOING GIRLS AT JHALAWAR DISTRICT, RAJASTHAN

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ABSTRACT

Background: The onset of menstruation is part of the maturation process. However, variability in menstrual cycle characteristics and menstrual disorders are common. This variability depend on many factors.

Aims & Objectives: The objectives of this study was to determine the menarcheal age of school going girls and also to evaluate the effect of factors like Socio-economic status, Nutritional status, and Participation in games/ physical activity on menarcheal age in school going girls in Jhalawar.

Materials and Methods: A cross-sectional descriptive study was carried out on school going girls with age ranging from 12 to 16 years. Menarche data were obtained by the status-quo method regarding menarcheal age by asking a girl of her current status that is she has had her first menses by the time of assessment. Data were collected using a self-administered structured questionnaire on menstruation. Questionnaire included general demographic information, socioeconomic data, food habit and physical activity.

Results: Out of 353 numbers of girls 58.07% (205) were from government school and 41.93% (148) from private school. 53.46% girls form government school and 77.03% girls from private school got menarche at <13 years of age.(<0.001) Similarly girls residing in pose locality and upper socioeconomic status get early menarche than slum and lower socioeconomic status. Girls eating non-vegetarian food, milk and eggs got early menarche than the vegetarian eating girls. Also girls who took active participation [150 (84.27 %)] in games got early menarche i.e. before 13 years of age. ($p<0.001$)

Conclusion: Girls with good nutrition and from good socioeconomic class gets early menarche than girls from lower socioeconomic and with poor nutrition. Also girls who took part in games and physical activity got early menarche. Also there are several other factors which may influence the onset age of menarche such as ethnic origin, inheritance, health status education, sexual stimulation, housing, physical activity and nutrition.

Key Words: Menarcheal Age; Nutritional Status; Physical Activity; Socioeconomic Status

Introduction

Menarche is a milestone in a woman's life as it denotes the start of reproductive capacity. The onset of menstruation is part of the maturation process. However, variability in menstrual cycle characteristics and menstrual disorders are common. Like that the timing of starting of menstruation cycle which is also called as menarche is different in each girl.

Menarche is achieved by 30% of girls by SMR3 and by 90% by SMR4 (95% of girls reach menarche at 10.5-14.5 year of age).^[1] Menarche usually follows approximately 1 year after the growth spurt begins. It is very common for cycles to be anovulatory during the first two years after menarche. The timing of menarche, which is not completely understood, appears to be determined by genetics as well as by factors such as adiposity, chronic illness and exercise.^[1,2] In developed countries, the average age at menarche has decreased in the past century, perhaps in response to better nutrition and less physical activity before menarche. The uterus achieves a mature configuration and vaginal lubrication increases.

Menarcheal age is regarded as a sensitive indicator of physical, biological and psychological environment. Menarcheal age is closely associated with many factors like nutritional status, physical activity, socioeconomic status, height, weight, BMI, geographic profile, environmental factors, culture, genetics, stress and weather. Various factors have been postulated to affect the age at menarche like the socioeconomic status, diet, exercise, environment, religion, genetic and hereditary factors, ethnicity, psychological stress, migration and chronic illnesses with opinions both supporting and rejecting it.^[2-4]

So, the objectives of this study was to determine the menarcheal age of school going girls.(age group 12 year to 16 year) and also to evaluate the effect of factors like Socio-economic status, Nutritional status, and Participation in games/ physical activity on menarcheal age in school going girls in Jhalawar.

Materials and Methods

A cross-sectional descriptive study was carried out on 353 school going girls with age ranging from 12 to 16

year. The approval from local Human Research Ethical Committee was taken. Girls interviewed were from both government schools like Government girls senior secondary school Jhalarpatan and Jhalawar, and private schools like Modern secondary school Jhalawar and Adarsh School, Jhalawar. Menarche data were obtained by the status-quo method. In the status quo method data regarding menarcheal age could be obtained by asking a girl of her current status that is she has had her first menses by the time of assessment and her birth date. Written informed consent was taken before taking the data. Institution ethics committee permission was taken well in advance before the starting this project.

Inclusion and Exclusion Criteria: The sample of 353 population had been constituted of healthy, unmarried school going girls of age group 12 to 16 years. Subjects having a history of malnutrition, anaemia, and family history of menstrual disorder were excluded from present study.

Data were collected using a self-administered structured questionnaire on menstruation. Data were entered and analyzed by using SPSS software. The questionnaire included age, weight, height, parents occupation and income, household composition, participation in games/physical activity, food habit(veg/non veg), number of brothers and sisters excluding the subject, school(government/private) and number of earning members and number of dependents.

Results

Total numbers of 353 girls were interviewed from 12 to 16 years of age for their menarcheal age. Out of that 205(58.07%) were from government school and 148 (41.93%) from private school. Out of 221 Hindu girls 219 and, 132 Muslim girls 131 got menarche at the time of interview. Distribution according to onset age of menarche & age of studied subjects is described in table 1. That shows that most common age of onset of menarche is 12 years i.e. 37.11% (131). However the Second and third most common ages are 14 years (26.06 %) and 13 years (24.64 %) respectively. So, 222 (63.43%) girls had menarcheal age was 13 years or less, while 128 (36.57 %) had menarcheal age was above 13 years. Girls from private school (77.03%) get early menarche than government school (p<0.001). Table 2 and 3 shows the relation between menarcheal age and socioeconomic status. Girls from posh locality and upper socioeconomic status get early menarche than slum and lower socioeconomic status.

Table-1: Distribution according to onset age of menarche & age of studied subjects

Age group (Years)	Onset age of menarche						Total
	11	12	13	14	15	No	
12	4 (40.00)	6 (60.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	10 (100.00)
13	0 (0.00)	28 (87.50)	4 (12.50)	0 (0.00)	0 (0.00)	0 (0.00)	32 (100.00)
14	0 (0.00)	14 (31.82)	19 (43.18)	10 (22.73)	0 (0.00)	1 (2.27)	44 (100.00)
15	0 (0.00)	41 (25.00)	46 (28.05)	60 (36.58)	15 (9.15)	2 (1.22)	164 (100.00)
16	0 (0.00)	42 (40.78)	18 (17.48)	22 (21.36)	21 (20.39)	0 (0.00)	103 (100.00)
Total	4 (1.13)	131 (37.11)	87 (24.64)	92 (26.06)	36 (10.20)	3 (0.85)	353 (100.00)

Table-2: Distribution according to onset age of menarche & type of locality of studied subjects

Type of Locality	Onset age of menarche		Total
	≤ 13	> 13	
Posh	56 (93.33)	4 (6.67)	60 (100.00)
Middle	157 (70.40)	66 (29.60)	223 (100.00)
Slum	9 (13.43)	58 (86.57)	67 (100.00)
Total	222 (63.43)	128 (36.57)	350 (100.00)

P < 0.001 (Highly Significant)

Table-3: Distribution according to onset age of menarche & SES of studied subjects

SES	Onset age of menarche		Total
	≤ 13	> 13	
Lower	37 (30.58)	84 (69.42)	121 (100.00)
Middle	130 (77.84)	37 (22.15)	167 (100.00)
Upper	55 (88.71)	7 (11.29)	62 (100.00)
Total	222 (63.43)	128 (36.57)	350 (100.00)

P < 0.001 (Highly Significant)

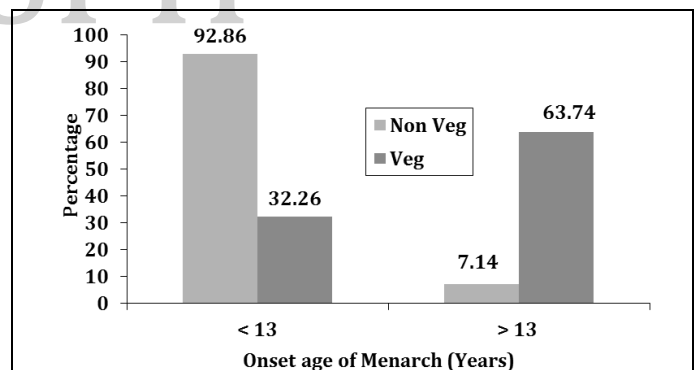


Figure-1: Distribution according to onset age of menarche & dietary habit of studied subjects

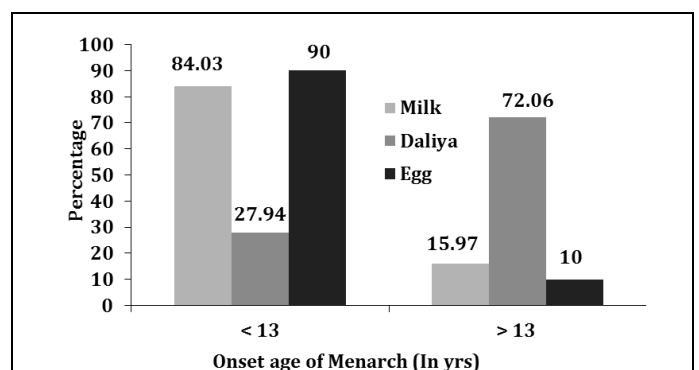


Figure-2: Distribution according to onset age of menarche & type of breakfast intake of studied subjects

According to figure 1 and 2 girls eating non-vegetarian food, milk and eggs got early menarche than the vegetarian eating girls. Also girls who took active participation [150 (84.27 %)] in games got early menarche i.e. before 13 years of age. Likewise girls who got menarche before 13 years of age have good Body mass index i.e. 16.97 ± 1.80 than who got late menarche i.e. 16.10 ± 2.44 ($p < 0.05$).

Discussion

Many factors influence menarcheal age among girls. These factors are living conditions, family size, nutrition, health, genetic influences (race/ethnic group, family heredity) and regional change in some of these factors known to cause an increase/decrease in onset of menarche.

In our study the percentage of age groups was between 12-16 years (Table 1) with the highest number are in 15 years age group i.e. 164 of study subjects. However Merzenich H et al (1993) reported menarcheal age group between 8-15 year while the study by Warren MP (1980) shows age group between 13-15 year.^[5,6] The Indian study by Rao S et al (1997) have age group 9-16 years.^[7] A study by Bralic I 2012 have nearly similar age in his study group.^[8] Ersoy B et al (2004) studied in Turkish female student in summer and winter the highest and lowest mean age of menarche in these subjects was significant ($p < 0.05$). The mean age group with SD number of subjects were compared these age group similar study reported by Ersoy B.^[9]

Menarche is an important factor in the process of growth and maturation of girls of different religion. In our study the mean value of menarche of Hindu girls was 13.37 ± 0.98 (mean \pm SD). However in Muslim girls it was 12.58 ± 0.95 (mean \pm SD). Other workers reported the regional based study such as Roumi Deb (2009) described menarcheal age of Assamese and Bengali girls of Guwahati in Assam. When both values were compared P value was statistically significant ($p < 0.01$).^[10] Abioye-Kuteyie EA et al (1997) showed that a significant finding that the age at menarche was lowest in girls from higher socioeconomic household and school girls shows the upper socioeconomic class reached menarche 11 month earlier than the lower socioeconomic counter parts.^[11]

In present study the numbers of girls in the group with onset age of menarche in ≤ 13 years age group were 222 girls and group with > 13 years of menarche were 131

girls. The age of menarche in government school ≤ 13 was 53.46% and in private school it was 77.03%. While Menarcheal age of > 13 years of in girls of government school was 46.53% and in private school it was 22.97%. which is statistically significant ($p < 0.001$). The difference in menarcheal age of private and govt. school may be due to different social classes, nutrition factor and exposure to modern life style. Similar results showed by Rao S et al (1998).^[7] However Bralic I et al (2012) described social and economic status was analyzed according to years of education completed, parents occupation and the number of children in family.^[8]

Age of menarche and type of locality of subjects in posh, middle and slum area of age group ≤ 13 and > 13 were correlated, a highly significant result found ($p < 0.001$). Curie c et al 2012 studied type of locality in relation to social and economic status, an important factor of menarche age.^[12] According to Ayatollahi SM et al (2008) reported that socioeconomic status had the most significant in variation of menarcheal age.^[13] According to Ersoy B et al (2004) the socioeconomic status is a strong predictor of menarche and describe that menarche age was found to be lower in girls of higher socioeconomic status. While Gharavi AM et al (1999) reported that there was no significant difference in menarche age in the different socioeconomic class.^[7,14] According to Abioye-Kuteyie EA et al (1997) the age at menarche was lowest in girls from high socioeconomic households and girls from the upper socioeconomic class reached menarche 11 month earlier than the lower socioeconomic counter parts.^[11] In our study, the correlation between different socioeconomic status i.e. lower, middle and upper, a highly significant value was observed. Rokade SA et al (2009) reported the secular trend in the age of menarche was well demonstrated. The mean age of menarche observed in their study possibly indicate the stabilization of the secular trend. They conclude that the age of menarche is strongly associated with socioeconomic status but not with type of diet and day to day physical activity.^[15]

Dietary habits is also most important factor regarding age of menarche of school going girls which include obesity, life style, vegetarian and non-vegetarian. Figure 3 & 4 showing food habits of school going girls. Among the girls with menarcheal age ≤ 13 year non vegetarian girls are more i.e. 156 study subjects (92.86%) and vegetarian it was 66 (32.26%). However in > 13 year menarcheal age group 12 subjects (7.14%) are non-vegetarian and 116 study subjects (63.74%) are

vegetarian. We have correlated these groups and found statistically high significant ($p < 0.001$), which is comparable with study by Rao S et al (1998).^[17] Under-nutrition delays onset of adolescent events in terms of chronological ages but neither sequence of events nor the time between two consecutive events. Shifts in adolescent growth due to under nutrition may result in delay in considerable post menarcheal skeletal growth and which is special concern for girls from poor communities. Satyanarayan K et al (1979) reported girls have early menarche who were tall at age 5 than who were short. Which is sign to severe under nutrition and none of the tall had these, it shows shortness and late menarche are both attributed to under nutrition.^[16] Age of menarche according to dietary habits of study subjects in non-vegetarian ($n=168$) and vegetarian ($n=182$) with mean \pm SD were found 12.44 ± 0.74 and 13.66 ± 0.92 respectively. Correlation of these two value calculated by student t test a highly significant correlation observed ($p < 0.001$). According to Delavar MA et al 1990 reported that girls from high socioeconomic class and staple food as non-vegetarian have significantly lower mean menarcheal age and similarly Orden AB et al 2009 found that advancement of menarche is associated with improved living condition.^[17,18] Whincup PH et al (2001) reported geographical, social and ethnic variation were small, suggested that non response bears in menarcheal age was likely to be limited.^[19]

Freedman DS et al (2003) reported that childhood obesity influences both menarcheal age and adult obesity. And this association may be mediated by various interrelationship among hormone, sexual maturation and body fat.^[21] Milk and milk product directly related to childhood obesity and timing of menarcheal age with an early puberty possibly resulting in changes in eating habits or physical activity. Correlation of difference breakfast such as milk, daliya and egg were found statistically highly significant when compared these values ($p < 0.001$). We also compared the relation between onset age of menarche and regular intake of milk by study subjects and compared in ≤ 13 and > 13 year of study population and it was found statically highly significant ($p < 0.001$).

Physical activity is important parameter for study of menarcheal age. In present study we have evaluated the relationship between age of menarche and game activity of study subject. We have compared data age group ≤ 13 and > 13 years girls who were engaged in game activity others hand no game activity, a highly significant

statistical data observed ($p < 0.001$). Weight, height, body mass index and abdominal girth and supriliac skin fold were inversely associated with age of menstruation. Girls who participated in dance, gymnastic, figure skating, synchronized swimming or diving competition had a lower risk of reaching menarche at an early age. Moisan J et al (1991) reported onset of menarche in relation to change in physical measurement that take place during adolescence that is height and change in body fat.

According to Proos LA et al (1991) factors associated with rapid transition from an under privileged to a privileged environment are probably involve in onset of menarche besides just genetic determinants. The serious medical, social and emotional consequences of very early pubertal development necessitate further classification of the underlying mechanism.^[22]

We had not come across any study in this region where effect of the various factors on menarche is studied. In this study effect of all the major factors controlling menarche is studied thus this study will our health policy maker to take decision about various factors controlling reproductive health in this region.

Conclusion

Menarche is the milestone in a woman's life as it denotes the start of reproductive capacity. Menarche is the rather late events in puberty and usually occurs 6 month after peak height velocity is achieved. The age at menarche varies and is dependent on the interaction between genetic and environmental factors. In our study girls from good socioeconomic class and with good nutrition and gets early menarche than girls from lower socioeconomic and with poor nutrition. Also girls who took part in games and physical activity got early menarche. Also there are several other factors which may influence the onset age of menarche such as ethnic origin, inheritance, health status education, sexual stimulation, housing, physical activity and nutrition.

Limitation of the Study

This was questionnaire based study, so it depend purely on the answers given by the subject. We should have cross checked it with their parents however because time constraint we could not do it. Also we had studied only schools so uneducated girls were missed completely, so in coming future we would recommend studies where these girls will be included.

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