

Study on Age at Menarche and Factors Affecting it

Roopa B. Mangshetty*, Jyoti B. Sarvi**, Sharanagouda Patil***

*Associate Professor, Dept. of Pediatrics, Mahadevappa Rampure Medical College, Gulbarga 585101, Karnataka, India.

** Resident, Dept. of Pediatrics, Mahadevappa Rampure Medical College, Gulbarga 585101, Karnataka, India.

***Professor, Dept. of Pediatrics, Mahadevappa Rampure Medical College, Gulbarga 585101, Karnataka, India.

Abstract

Background: Menarche is viewed as an excellent physiological marker of adolescent maturation.[1] It is apparent that the age at menarche is a developmental milestone, which is highly variable and highly sensitive to a variety of internal and external forces. 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 etc and to decide the appropriate age at which the topics like the sex education, contraception and sanitary practices can be incorporated in schools. The present study attempts to find the age at menarche in girls from Gulbarga city of Karnataka. We also investigated whether the age at menarche is associated with mother's menarcheal age, socioeconomic status, BMI. The findings are reported here. **Design:** Observational cross sectional study. **Methods:** the study was conducted among school going girls aged between 10 and 16 years. 246 girls participated in the study on voluntary basis. A predesigned questionnaire was administered and girls were briefly examined. Data collected was analysed using MS excel and EPI info version 4. **Results:** Out of 246 cases studied 152 cases were having menstruation, most frequent age of menarche being 12 years when 46 cases (18.7%) had its onset and 13 years when 46 cases (18.7%) had its onset. The lowest age was 10 years and highest was 14 year. Mean age at menarche was found to be 12.14 (\pm 1.086). There seems to be definite association of various factors which modify the age at menarche like mother's menarcheal age, socio-economic status. **Conclusion:** There was a positive correlation between menarche and maternal age at menarche and socioeconomic status.

Key Words: Mean age at menarche; Body mass index; Menarche; Socio-economic status.

Introduction

Menarche is considered a distinct benchmark for sexual maturation. It is also considered as an indicator of quality of life of a population since a number of biological & socio-economic factors influence.[2]

Menarche is affected by genetic factors, race, environmental conditions, nutrition,

physical activity, geographic location, urban or rural residence, health status, psychological factors, body mass index (BMI), family size, socioeconomic status, parental educational level, occupation of parents, loss of parents, child sexual abuse, physical stress, tea consumption, and passive smoking.[3]

There have been reports that there is a fairly good correlation between the age of menarche

Corresponding Author: Dr. Roopa B. Mangshetty, Associate Professor, Dept. of Pediatrics, Mahadevappa Rampure Medical College, Gulbarga-585101, Karnataka, India. E-mail: rbmangshetty@yahoo.in

of mothers' and their daughters'.[4,5]

Variation in the timing of puberty (onset/ timing of menarche) are marked between well of and under privileged population with a marked delay in menarche reported in under privileged girls.[6]

Girls with early menarche were more likely to be overweight at ages 7, 11, and 16 years than those with late menarche, although early menarche was also reported by girls who were underweight or of average weight.

These findings support the hypothesis that in well nourished populations the relation between menarche and body size is largely regulated by genetic factors and that nutrition is less important.[7]

The present study aims at reporting the mean age at menarche among the girls of Gulbarga, Karnataka and to assess the influence of parameters like mother's age at menarche, socioeconomic status and body mass index.

Methods

The present study was conducted among 246 adolescent girls in age group of 10 and 16 years, randomly selected from schools of Gulbarga. 246 schools girls were selected from July 2014 to august 2014, thus completing sample size of 246. The present study was undertaken to study the mean age at menarche and effect of factors like mother's monarchical age, socioeconomic status and BMI on the onset of menarche among girls of Gulbarga. Every case was examined physically to exclude the presence of any disease. The girls were interviewed separately and privately. Their ages were recorded and their weight & height taken. Information regarding their socio-economic status was calculated according to Modified Kuppaswamy Scale. This is cross sectional descriptive study.

Results

Table No.1 shows age distribution of cases having menstruation, girls from 10 to 16 years were examined and out of total 246 cases, 152 cases having menstruation and 94 cases not having menstruation were reported. At 10 years of age only 10 cases (4.1%) were having menstruation like this at 11 years i.e 35 cases (14.2%) ,at 12 years and 13 years ,46 cases(18.7%) each at 12 and 13 years and at above 14 years, 15 cases (6.1%) having menstruation

Table 1: Girl's age at menarche

Girl's age at menarche	Number of girls	Percentage
10 years	10	4.1%
11 years	35	14.2%
12 years	46	18.7%
13 years	46	18.7%
= 14 years	15	6.1%
Total	152	61.8%

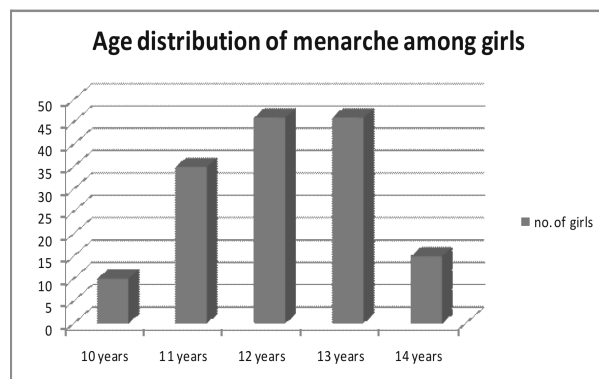


Table 3: Showing distribution of mother’s menarcheal age

Mother’s age at menarche	Number of mothers	Percentage
= 11 years	10	4.1%
12 years	44	17.9%
13 years	79	32.1%
14 years	56	22.8%
15 years	40	16.3%
16 years	13	5.3%
17 years	3	1.2%
18 years	1	0.4%
Total	246	100.0

Table 4: Comparing girl’s menarcheal age with that of mother’s menarcheal age

Mother’s age at menarche (in years)	Girl’s age at menarche (in years)				Total
	11	12	13	14	
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
11	3 (37.5)	0 (0.0)	8 (100.0)		
12	7 (26.9)	1 (3.8)	26 (100.0)		
13	9 (18.0)	4 (8.0)	50 (100.0)		
14	27 (39.7)	10 (14.7)	68 (100.0)		
15	16 (30.3)	15 (9.9)	152 (100.0)		

^a<0.01

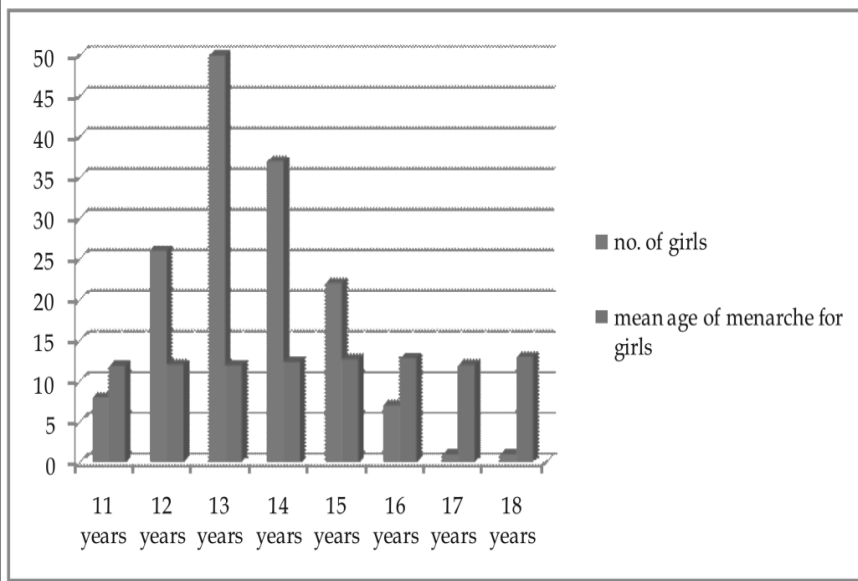


Table 5: Showing association between girls menarcheal age and socioeconomic status

SES	Girl's age at menarche (in years)				Total
	11	12	13	14	
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
class 1	15 (28.8)	15 (28.8)	18 (34.6)	4 (7.7)	52 (100.0)
class 2	27 (35.5)	18 (23.7)	22 (28.9)	9 (11.8)	76 (100.0)
class 3	2 (14.3)	6 (42.9)	6 (42.9)	0 (0.0)	14 (100.0)
class 4	1 (10.0)	7 (70.0)	0 (0.0)	2 (20.0)	10 (100.0)
Total	45 (29.6)	46 (30.3)	46 (30.3)	15 (9.9)	152 (100.0)

$\chi^2 = 17.491$, $df=9$, $P<0.01$

Table 6: showing girls mean menarcheal age among different socioeconomic classes

SES	No. of girls	Mean (\pm SD) age at menarche (in years)
Class 1 (upper)	52	12.21 (\pm 0.957)
class 2 (upper middle)	76	12.17 (\pm 1.051)
class 3 (lower middle)	14	12.29 (\pm 0.726)
class 4 (upper lower)	10	12.30 (0.949)
Total	152	12.20 (0.979)

Table 7: showing association between girls menarcheal age and BMI categories

BMI categories	Girl's age at menarche (in years)				Total
	11	12	13	14	
	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
1	25 (37.3)	18 (26.9)	17 (25.4)	7 (10.4)	67 (100.0)
2	15 (22.4)	23 (34.3)	22 (32.8)	7 (10.4)	67 (100.0)
3	5 (27.8)	5 (27.8)	7 (38.9)	1 (5.6)	18 (100.0)
Total	45 (29.6)	46 (30.3)	46 (30.3)	15 (9.9)	152 (100.0)

$\chi^2 = 4.705$, $df=6$, $P>0.01$

The most frequent age of menarche is between 12 and 13 years when 46 cases (18.7%) had their onset. The lowest age of menarche was found to be 10 years & the highest age was 14 years. Only one case had its onset at 15 years. Mean age of menarche was found to be 12.14 (± 1.086).

The most frequent age of menarche among mothers is at 13 years when 79 cases (32.1%) had their onset. The lowest age of menarche was found to be 10 years & the highest age was 17 years. Only one case had its onset at 18 years. Mean age of menarche was found to be 13.52 (± 1.315).

The above table shows that there is a positive correlation between girls menarcheal age with that of mother's menarcheal age.

Socio-economic status is assessed according to Modified Kuppuswamy Scale, mean age at menarche among girls of class I, II, III, IV is 12.21 (± 0.957), 12.17 (± 1.051), 12.29 (± 0.726), 12.29 (± 0.726) years respectively.

The above table shows that menarcheal age was earlier in higher socioeconomic class compared to lower socioeconomic class.

Similarly body mass index is measured by taking the weight & height of girls, mean age at menarche in underweight, normal, overweight & obese girls is 12.09 (± 1.026), 12.31 (± 0.941), 12.22 (± 0.943) respectively.

Discussion

The mean menarche age in the present study is 12.14 (± 1.086). This is in agreement with Purushathan[8], Amrita *et al*[9] and Banerjee *et al*[10] they found the mean age at menarche as 12.78 years, 12.6 years and 12.3 years respectively.

In present study findings are consistent between 10 to 15 years in which maximum incidence is seen between 12 to 13 years when 92 cases (37.4 %) had its menarche.

Table 8: showing girls mean menarcheal age among different BMI categories

BMI categories	No. of girls	Mean (\pm SD) age at menarche (in years)
1	67	12.09 (± 1.026)
2	67	12.31 (± 0.941)
3	18	12.22 (± 0.943)
Total	152	12.20 (0.979)

Factors Affecting Age at Menarche:

1. *Mother's menarcheal age:* The mean age at menarche of mothers involved in the study was significantly higher [13.52 (\pm 1.315)] than the mean age at menarche of their daughters 12.14 (\pm 1.086). A secular trend towards an earlier age at menarche has been regarded as a positive indicator of a population's health status.[11,12]

A positive correlation was observed between menarcheal age of mothers and their daughters.

2. *Socio-economic status:* The Age at menarche in different socio-economic groups were studied according to Modified Kuppaswamy Scale. This study shows that age at menarche in higher socioeconomic classes i.e. class I is 12.21 (\pm 0.957), class II is 12.17 (\pm 1.051) was found to be earlier compared to lower classes i.e. class III is 12.29 (\pm 0.726) & IV&V is 12.30 (0.949) respectively. This figure is an agreement with study conducted in central India by Dambhare DG *et al* according to which age of menarche in higher class is 12.89 + 1.22 years and in lower classes is found to be 13.48 + 1.35years[13] and also in agreement with study conducted by Ray S *et al.* in west Bengal.[14]
3. *Body mass index:* This study shows that mean age at menarche in obese is 12.22 (\pm 0.943) in underweight is 12.09 (\pm 1.026) and in normal is 12.31 (\pm 0.941) therefore body mass index does not significantly influence the mean age at menarche.

No significant association between BMI and average age of menarche was found in a study conducted by Cuatero G B *et al.*[15]

No significant statistical relationship between weight and age of menarche was found in a study conducted by Khakbazan Z *et al.*[16]

Conclusion

In present study there were 246 girls, the menstruation had started in 152 girls and 94 girls did not have menstruation. The mean age at menarche is 12.14 (\pm 1.086). The lowest age of menarche is 10 years and highest is 15 years.

A positive association is found between girls menarcheal age with that of mother's menarcheal age.

The effect of socio-economic status is studied, the mean age at menarche is earlier in class III and IV group and delayed in class I and II socio-economic group. This is in agreement with ICMR[17], Bai & Vijaylaxmi[18], and Sidhu.[19]

Thus the trend of lowering of age at menarche is well marked as we moved from lower and middle to higher socioeconomic stratum.

Body mass index is found to be insignificantly associated with age at menarche.

In the present study there seems to be a definite association between Bio-Social factors and mean age at menarche.

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