

Original Research Article

A community based study on age of menarche among adolescent girls in Aligarh

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ABSTRACT

Background: Age at menarche reflects the health status of a population. This marks the beginning of sexual maturation and is affected by various factors. This study measured the menarcheal age of adolescent girls in Aligarh and explored factors that could influence the onset of menarche.

Methods: A descriptive cross-sectional study in schools under Aligarh Muslim University, Aligarh was undertaken. A total of 422 girls were taken by systematic random sampling with probability proportionate to size. Data was analysed statistically by ANOVA and post hoc Scheffe test using SPSS Version 20.

Results: Majority of the study population (69.9%) had attained menarche between 12-14 years. The mean age of menarche is 12.52 ± 1.415 . On analysis of variance (ANOVA) testing, the age of menarche was significantly associated with socioeconomic class ($p=0.002$). On applying post hoc Scheffe test there was a significant difference in the mean age of menarche between class 1 and class 5 ($p=0.01$).

Conclusions: In this study most of the girls attained menarche between 12-14 years. Socio economic class and birth order had influenced the age of menarche. Mothers were main source of information on attainment of menarche.

Keywords: Menarche, Adolescent, Aligarh

INTRODUCTION

Adolescents (10-19 years) constitute 21.3% i.e. nearly 1/5th of total population of India.¹ Adolescence in girls has been recognized as a special period which signifies the transition from girlhood to womanhood. This transitional period is marked with the onset of menarche, an important biological milestone.² The menarcheal age is clinically very important in the diagnosis of delayed puberty and pathological and hormonal disorder. The health status of a population depends on age at menarche. The variation in menarcheal ages recorded across the world could be attributed to the study participants as well as the measurement instrument. However, several factors have been found to significantly influence menarcheal

age and they include genetics, environmental conditions, body stature, family size, body mass index, socioeconomic status, and the level of education.³⁻⁵

Objectives

- To determine the age of menarche in the study population.
- To study its association with sociodemographic profile.

METHODS

The present study was a community based cross sectional study conducted in Secondary and higher Secondary

Schools (Girls) of Aligarh Muslim University, Aligarh for a period of one year i.e. July 2015 to June 2016.

Study population

The study was conducted among the students of class 6th to 12th standard from each of the university girl schools namely Senior Secondary School Girls, AMU Girls High School and AMU ABK High School (Girls).

Sampling unit

Classes in the selected schools.

Study unit

Randomly selected students from different classes (6th to 12th).

Inclusion criteria

- All students studying in class 6th to 12th standard from the selected schools and had attained menarche.
- A student who gave consent.

Exclusion criteria

- Students who did not give consent to participate in the study.
- Students who were absent on the day of data collection.

Sampling design

After obtaining respective sample sizes to be drawn from each of the selected schools and classes by probability proportion to size (PPS), Systematic random sampling was used to draw the desired samples from each class.

Sample size calculation

Using formula $n = \frac{3.84pq}{l^2}$

P= Anticipated prevalence= 50% since there was a paucity of studies conducted at Aligarh, the anticipated prevalence was taken as 50% for maximum sample size. (Lwanga and Lemeshaw, 1991).⁶

l= Allowable error= 5%

Non-response= 10%

Sample size (n)= $384 + 384 \times 10/100 = 422$.

It was decided to take 422 students from selected schools of AMU.

Menarcheal age measurement

The menarcheal age of the participant was determined using recall method. Participants were requested to state to the nearest whole year, how old they were when they first experienced menstruation.

Data analysis

Data entry and analysis was done using SPSS software version 20. For quantitative variables, mean±SD were calculated, t- test and ANOVA were used to find statistical significance. Post hoc Scheffe test was used for comparison between each pair of groups. For qualitative variables, frequency and percentages were calculated. A value of $p < 0.05$ was taken as significant.

Ethical considerations

- The study protocol was approved by Institutional Ethics Committee, JNMCH, AMU, Aligarh.
- Written informed consent from the participating schools was obtained.
- An informed oral assent was taken from all the participants, after explaining the purpose of the study and prior consent from parents was taken.
- Confidentiality was maintained throughout the study.
- Health education and adequate counselling was provided to all the individuals who participated.

RESULTS

The present study was conducted in schools which are under Aligarh Muslim University. A total of 422 girls participated in study and gave a response rate of 100%. Table 1 shows the socio-demographic details of study subjects. Majority of the respondents, (50.2%), were aged between 10-14 years, while remaining were of age range in 15-19 years (49.8%). Most of the respondents were following Islam (82.7%) by religion, rest were Hindu (17.3%). A large group of respondents were in 9-10th standard (39.1%) while 36% in 6th-8th and 24.9% in 11th-12th standard respectively. Almost 3/5th of respondents, father (59.2%) had completed graduation and above while 41.5% of respondents, mother had completed graduation and above. Almost equal numbers of respondents were in socioeconomic class 1 and 2, 36% and 36.3% respectively while only 4.3% respondents were in class 5 according to modified BG Prasad classification (2016).

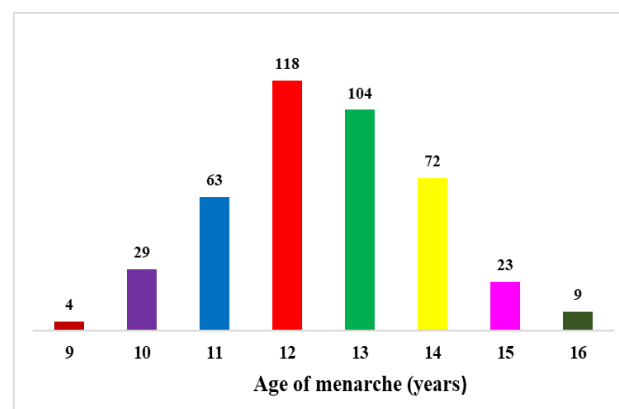


Figure 1: Distribution of respondents according to age of menarche (N=422).

Table 1: Sociodemographic profile of study population (N=422).

Characteristics	Frequency (n)	Percentage (%)
Age (years)		
10-14	212	50.2
15-19	210	49.8
Class		
6 th -8 th	152	36.0
9 th -10 th	165	39.1
11 th -12 th	105	24.9
Religion		
Islam	349	82.7
Hinduism	73	17.3
Family size		
<5	201	47.6
5-10	154	36.5
>10	67	15.9
Birth order		
1-2	193	45.7
3-4	171	40.5
>4	58	13.7
Education status of father		
Illiterate	18	4.3
Primary	12	2.8
Middle	30	7.1
High school	57	13.5
Intermediate	55	13.0
Graduate and above	250	59.2
Education status of mother		
Illiterate	47	11.1
Primary	21	5.0
Middle	41	9.7
High school	62	14.7
Intermediate	76	18.0
Graduate and above	175	41.5
Socioeconomic class		
Class 1	152	36.0
Class 2	153	36.3
Class 3	53	12.6
Class 4	46	10.9
Class 5	18	4.3

Majority of the study population (69.9%) had attained menarche between 12-14 years. The mean age of menarche is 12.52 ± 1.415 . Figure 1 describes maximum number of girls had attained menarche at 12 and 13 years (28% and 24.6% respectively) while only 4 (0.9%) girls had reported menarche at 9 years of age.

As observed in table 2, 41% of the study population were aware about menstruation before its onset. Near about 1/3rd respondents (31%) encountered fear to first menstruation while 20% felt guilty/ bad, 19% were

embarrassed, 15% were anxious and 15% had shown no reaction to first menses.

Table 2: Knowledge and awareness regarding menstruation among adolescent girls (N=422).

Variable	Frequency	Percentage (%)
Awareness about menstruation		
Before menarche	173	41.0
After menarche	249	59.0
Experience at first menarche		
Fear	130	30.8
Embarrassed	80	19.0
Anxious	64	15.2
Guilty/bad	85	20.1
No reaction	63	14.9

Table 3: Source of information related to menstruation (N=422).

Source of information	Frequency	Percentage (%)
Mother	274	64.9
Sister	73	17.3
Friend	47	11.1
Teacher	12	2.8
Health worker	5	1.2
Mass media	6	1.4
Other	5	1.2

As shown in Table 3, Mother 274 (64.9%) was main source of information followed by sister 73 (17.3%) and friend (11.1%). Teacher, health worker and mass media constituted a minor role of 2.8%, 1.2% and 1.4% respectively.

Age at menarche of the girls of lower parity (12.21 ± 1.35) is found to be somewhat earlier compared to those born later i.e. 3rd-4th birth order (12.77 ± 1.26) and >4th birth order (12.79 ± 1.79) and the difference was found to be statistically significant as shown in table 4 ($p=0.00$). On applying post hoc scheffe test there was statistically significant difference between birth order 1-2 and 3-4 ($p=0.001$) and 1-2 and more than four ($p=0.02$). The mean age of menarche of respondents of socioeconomic class 1, 2, 3, 4 and 5 are 12.30 ± 1.37 years, 12.45 ± 1.33 years, 12.67 ± 1.52 years, 12.86 ± 1.42 years and 13.55 ± 1.58 years respectively. On analysis of variance (ANOVA) testing, the age of menarche was significantly associated with socioeconomic class ($p=0.002$). On applying post hoc Scheffe test there was a significant difference in the mean age of menarche between class 1 and class 5 ($p=0.01$).

Age of menarche was increasing as the family size increased in size but the difference was not found to be statistically significant. Menarcheal age was not found to be statistically significant with religion, education status of either of parents (Table 4).

Table 4: Association between sociodemographic profile and age of menarche.

Sociodemographic profile	Age of menarche (Mean±SD)	Anova/ t test
Religion		
Islam	12.52±1.37	t=0.005, p=0.996
Hindu	12.52±1.59	
Family size		
<5	12.40±1.24	F=1.906, p=0.150
5-10	12.55±1.48	
>10	12.79±1.70	
Birth order		
1-2	12.21±1.35	F=8.485, p=0.000
3-4	12.77±1.26	
>4	12.79±1.79	
Education status of father		
Illiterate	13.00±1.23	F=1.249, p=0.285
Primary	12.25±1.86	
Middle	12.06±1.36	
High school	12.64±1.63	
Intermediate	12.45±1.21	
Graduate and above	12.54±1.39	
Education status of mother		
Illiterate	12.78±1.45	F=0.837, p=0.524
Primary	12.14±1.55	
Middle	12.31±1.60	
High school	12.48±1.42	
Intermediate	12.57±1.26	
Graduate and above	12.53±1.40	
Socioeconomic class		
Class 1	12.30±1.37	F=4.346, p=0.002
Class 2	12.45±1.33	
Class 3	12.67±1.52	
Class 4	12.86±1.42	
Class 5	13.55±1.58	

DISCUSSION

In the present study majority of the study population (69.7%) had attained menarche between 12- 14 years. The mean age of menarche is 12.52±1.415. Similar findings were reported by other authors also.⁶ Paria et al in rural and urban school of west Bengal among girls of 13-18 years reported the mean age of menarche as 12.24±0.7261.⁷ Barthalakshmi et al conducted a school based cross sectional study in Chidambaran on girls from class 8th to 12th with a mean age of menarche was 12.9±1.2 years.⁸ Verma et al in a higher secondary school in Varsnasi with maximum number of girls in 15-16 years of age (57.5%) reported 12.98±0.77 years as the mean age of menarche.⁹ Bhattacharjee et al in a slum area of Siliguri, West Bengal among adolescent girls found out 12.6±1.4 years.¹⁰ A cross sectional study was undertaken in urban slum area among 12-19 years by Mohite et al reported lowest and highest age at menarche was 11 and 16 years respectively with the mean age at

menarche of 12.8±1.06 years.¹¹ Sachan et al in urban as well as rural schools of Lucknow found out 12.84±1.4 years as the mean age of menarche.¹² There is a wide variation of age of menarche. It may be due to difference in general health, nutritional status, genetic factors and socioeconomic status of the study population.

Prajapati et al in rural area of Kheda district among girls of age of 13-18 years found that 47.5% of the participants were aware about menstruation before menarche and the most common source of the information were mothers in 54% girls.¹³ Jailkhani et al reported 63.43% girls had knowledge about the menstruation before they achieved the menarche. The main source of information was mother (45.5%).¹⁴ A study by Kansal et al in rural Varanasi reported one third were aware about menarche before its onset and sisters (55%) played major role while teacher had a minor role.¹⁵ Karout et al in Saudi Arab, Jan et al in Pakistan, Oche et al in Nigeria, Lawan et al in Nigeria, Poureslami et al in Tehran highlighted mother as main source of information and teacher playing a minor role.¹⁶⁻²⁰ However, few studies quoted teachers and friends as the main source of information. Kumar et al in urban area of Garhwal, Uttarakhand reported friends were the first informant in case of 196 (46.75%) girls and it was followed by mother (26.8%).²¹ This could be due to lack of proper communication between mother and daughter owing to traditional taboos, they feel awkward and embarrassed to discuss on this subject. While Thakre et al in Mumbai, Mitra et al in Gujrat highlighted teacher as the main source of information.^{22,23} It may be due to reason that most of the respondents were educated till High school.

Typically, the onset of menstruation is a traumatic and fearful for young girls in India. In this study, fear was most common reaction reported by 30.8% of girls. Observation of the present study is supported by two different study by Srinivas et al and Pokhrel et al which reported fear as most common reaction by 23.5% and 33% of the girls respectively.^{24,25} Hence, girls studying in school must be educated about menarche and menstruation as a part of school curriculum by the teachers.

Amongst the factor affecting menarche, socioeconomic class had a statistically significant association with age of menarche. There is a decreasing trend in mean age of menarche on moving from lower to higher socio-economic class. Higher socioeconomic status improves nutrition and consequently favours early menarche. This is consistent with the finding reported by other studies namely Mane et al and Dambhare et al.^{26,2}

CONCLUSION

The mean age of menarche of the respondents in present study is 12.52±1.415. Majority of the study population (69.7%) had attained menarche between 12-14 years. The lowest age of menarche is 9 years and highest age of menarche is 16 years. Age at menarche was significantly

associated to socio-economic status of the study group. The respondents from higher socio-economic group, experienced early menarche than those from lower income group. In the present study there seems to be a definite association between Bio-Social factors and mean age at menarche.

Recommendations

There is a need for information on menstruation, especially about menarche before its onset and all mothers should be encouraged to discuss about menstruation with their daughters before attainment of menarche in order to allay fear associated with menarche. The facts about menstruation, its physiological implication and significance should be included in school curriculum so that girls can be educated about it.

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