
Impact of Socio-Economic Status on Age at Menarche

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ABSTRACT:

The first menstrual bleeding is known as Menarche. It marks the beginning of the reproductive phase in a woman's life. It serves as an intermediate health outcome that affects the women's wellbeing at later stages of life. It is also considered as an indicator of quality of life. This study was a cross sectional retrospective (i.e. recall) study carried out in Ghaziabad, Uttar Pradesh India. Multistage sampling technique was used to identify the sampling units. The data was collected from adolescent students (aged 10-19 years) from grade 7-12. Adolescent girls born in U.P and experiencing menstruation were selected for the study. The study estimated the age at menarche. The estimated average age at menarche was 12.24 years \pm 1.15 years (95% CI, 12.11 years -12.38 years). The menarche ages ranged between 10 and 12 years for about 49%, and between 13 and 14 years for 51%. It was seen that a maximum number of girls experiencing an earlier onset of menarche (between 10-12 years) belonged to middle socio-economic stratum. The results support the trend of lowering of age at menarche as one move from lower and middle, to higher economic group.

Key words: *Age at Menarche; Socio-economic status; Cross-sectional study; Adolescent; Ghaziabad*

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INTRODUCTION

Growth is a physical change in the body that can be measured. Development is psychological and social changes to the person such as attitude and outlook. Growth and development are two complimentary processes that together make up an individual. The rate of development and growth varies; it depends on many factors such as nutrition, socio-economic status, geographical and genetic disposition.

Puberty is one of the factors which contribute to the growth & development; it is the most valuable time in individual's life when most of the physical as well as psycho-social changes take place. It comes during adolescence period. Changes that occur at the time of puberty among girls are:

- On average, most girls tend to reach puberty before boys.
- Oestrogen, a female hormone is secreted by the ovaries, begins to enlarge the breasts which will be later used by the baby to feed on.
- Growth is increased and accelerates over the teenage years as a result of increases in the secretion of growth hormone.
- On average, 20 centimetres are gained in height from puberty

- The menstrual cycle is initiated by the thickening of the uterus caused by the cyclical changes in the presence of oestrogen. This is shed every 28 days and is known as a period. At this point, the female is fertile and able to reproduce¹

The first menstrual bleeding is known as Menarche. It marks the beginning of the reproductive phase in a woman's life. It serves as an intermediate health outcome that affects the women's wellbeing at later stages of life. It is also considered as an indicator of quality of life of a population since a number of bio-social factors influence its occurrence (Prado et al., 1995). Girls experience menarche at different ages. The timing of menarche is influenced by various factors like socio-economic status, genetics, environment, nutrition etc. The average age of menarche has declined over the last century but the magnitude of the decline and the factors responsible remain subject of conflict. Although research usually overlooks intermediate health outcomes, age at menarche is gaining more attention as a considerable body of evidence & a critical biomarker in the reproductive life of women (Adair LS, 2001).

Several studies have scrutinized the relationship between socioeconomic status and age at menarche. From these studies it has been concluded that higher socio-economic status results in earlier age at menarche. Socioeconomic level is compounded of many factors, such as nutrition, public and individual health, family size and urban versus rural living. Age at menarche in developed and developing countries is higher. Girls living in urban areas & those having father of higher occupational class and having parents with higher educational levels are associated with earlier menarche. One explanation postulated for the earlier menarche is that girls in urban areas does less physical activity compared with those from urban areas. Earlier menarche among higher socio-economic status females is may be because higher socio-economic status improves nutrition and consequently favours early menarche. It revealed that low family income predicts the young initiation of pubertal development. A possible explanation for this relationship is that high socio-economic status reduces stress level and hence early menarche.

The accurate average age at menarche is very difficult to estimate, and it varies according to region, physical activity of girl, race, caste, season, nutritional diet, socio-economic status.

REVIEW OF LITERATURE:

Roumi Deb of Amity University (2009) studied the variation in the age at menarche of the Assamese and Bengali girls of Guwahati and observed that improvements in the quality of life during early childhood could result in earlier menarche. While on the other hand, Chandra Prakash, et.al (2010) also estimated age at menarche in Uttarakhand girls and concluded that the mean age of onset of menarche was 13.6 (+ 1.1) years. The monthly occurrence of menarche had peaks in May-June. The meanmenarcheal age of girls belonging to plain area was 13.18+ 1.31 years, which showed significantly earlier onset as compared to girls from hilly area (14.21 + 1.46 years). It might be due to more physical activity & poor nutrition in hilly areas.

Likewise, several studies investigated the relationship between age at menarche and socio-economic as well as biological factors. Studies showed that the advancement of menarche is associated with improved living conditions and menarcheal age could be used as an indicator

¹http://www.biology-online.org/7/5_growth_development.htm. Accessed on 10 February, 2014

of socioeconomic development. In addition to this, it was stated that genetics & heredity could play an important role for age at menarche (Ersoy, 2003; Pacarada, et.al, 2008; Orden, et.al. 2011).

METHODOLOGY²

This study was a cross sectional retrospective (i.e. recall) study carried out in two schools of Ghaziabad. Multistage sampling technique was used to identify the study participants. In first stage, selection of schools was done. Due to time and cost constraints, quota sample of two schools were used. The schools were randomly selected from the list of schools compiled after a desk review. Second stage involved identification of study participants. The data was collected from adolescent students (aged 10-19 years) from grade 7-12. Adolescent girls born in U.P and experiencing menstruation were selected for the study.

The data was collected through self-administered schedule. The schedule was validated and the research was approved by the department head of the academic institution. The schedule included questions on girls' demography and socio-economic profile (date of birth, age, state, districts, religion, number of siblings and education level, income and occupation of the family members).

Before the data collection took place, consent was obtained from the head of the schools. The study and its objectives were explained to participants in local language and thereby participation into interview was completely voluntary. The schedules were handed over to students to fill out. Finally, data were collected from all the eligible adolescents of each grade in both the schools. The sample consisted of 300 eligible adolescent girls from both the schools.

Since the dependent variable was age at menarche, therefore the girls were asked to fill as precisely as possible the age of menarche or their first menstrual bleeding (at least the month and the year) or to leave blank if they did not know. Some of the independent variables included were socio-demographic characteristics of study participants (age, residence, and religion) and their parents (marital status, educational level, occupation and income); and number of siblings. The family income was divided into three groups: ` 0 – Rs. 10,000; ` 10,001 – ` 20,000 and more than ` 20,000.

RESULT

Menarche occurred between 10 to 15 years in girls. The mean age of menarche in girls was 12.24 years \pm 1.16 years. Most of the girls attained age at menarche at 13 years.

Of the total 300 girls, 30% of them were born in the year of 1996. While year 1995, 1997 & 1998 accounted 20% each (Table 01)

Table 01: Frequency and percentage distribution of year of birth of the subjects (girls)		
Year of Birth	N	Percentage
1994	30	10
1995	60	20
1996	90	30
1997	60	20

² Due to ethical & confidentiality consideration, names of academic institutions are covered up.

1998	60	20
Total	300	100

90% of them were Hindu and remaining was from Muslim and Christian religions (Table: 02). Majority (27.33%) of them belong to four members' family followed by 5 members' family (20%). The average household size was 5.35. In about 43% of the total families were headed by subjects' father. Families were dominantly approximate 73% headed by male member.

Table 02: Frequency and percentage distribution of religion among the subjects (girls)

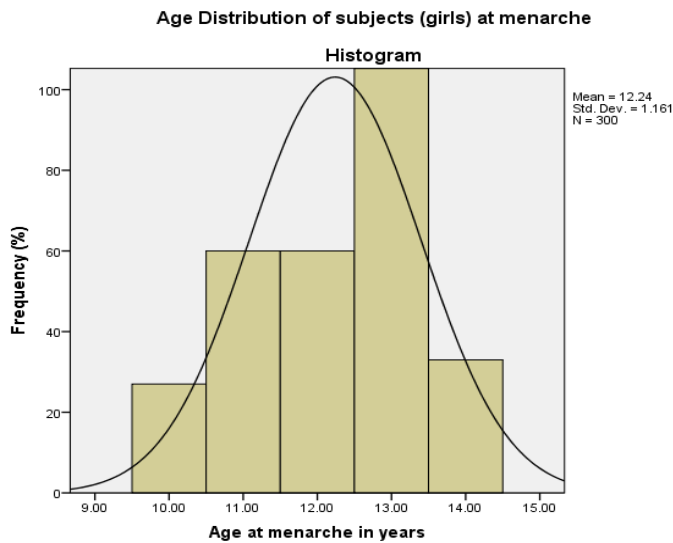
Religion	N	Percentage
Hindu	270	90
Muslim	15	5
Christian	15	5
Total	300	100

Majority of families of girls had income group between `20,000-`40,000 per month (50%). While 30% family of girls lied in income group between <`20,000 per month and only 20% girl's family had income group more than `40,000 per month (Table 03). Since majority of the sampled households lies in lower and middle income group, it is therefore easy to explain why 80% of the total households had small house with common bathroom while remaining households had separate bathrooms.

Table 03: Frequency and percentage distribution of income group of family among the subjects (girls)

Income group	N	Percentage
<`20,000	90	30
`20,000-`40,000	150	50
>`40,000	60	20
Total	300	100

Fig 1 shows the age distribution of subjects by the time of their menarche. The mean age of menarche was 12.24 years \pm 1.16 years (95% CI, 12.11 years -12.38 years). The menarche ages ranged between 10 and 12 years for about 49%, and between 13 and 14 years for 51%.



DISCUSSION

In developing countries, menarche tends to appear earlier in life as the social, nutritional and economic condition of society improves. From this study, it is concluded that majority of the girls were born in the year 1996 and belonged to middle class family. Most of them were younger (about 40%) in their family. The average age at menarche was calculated to be 12.24 years \pm 1.16 years (95% CI, 12.11 years - 12.38 years) with majority of the families' income falling into income group of `20,000-`40,000 per month.

The results support the trend of lowering of age at menarche as one moves from lower and middle, to higher economic group. It was further seen that a maximum number of girls experiencing an earlier onset of menarche (between 10-12 years) belonged to middle socio-economic stratum.

Age at menarche is an important developmental milestone known modified by social and environmental factors. Socio-economic conditions have a composite effect on the age at menarche and it is not possible to separate these conditions from other related factors. There are various components associated with socioeconomic status (family size, living conditions, and nutrition supplement) which are usually associated positively with early menarche (Zacharias, L., and Wurtman, R.J., 1969). The relationship between age at menarche and socio-economic status investigated in India (ICMR, 1972; Bai and Vijayalakshmi, 1973) revealed that the mean menarcheal age steadily increased with the decrease in per capita income. In later study the socio-economic differences were, however, non-significant. It is now generally accepted that protein-rich diet induces an earlier onset of menarche. Apparently, nutrition cannot be the only influential factor. The use of different criteria by different authors for a socio-economic class makes any attempt difficult (variations in currency exchange rates, when the rupee is devaluing very fast, inflation, etc.), so it is high time to categorize people on the basis of their profession rather than their income, especially to establish the lower socio-economic status. All hamals, laborers, housemaids, etc., can easily be put under the lower economic group and so on. Defining social status on the basis of parental occupation has been used quite often recently (Eiben 1972; Miller et. al. 1972; Danker-Hopfe 1986). Ersoy et al, (2003) found that although the menarche age was found to be lower in girls with higher socioeconomic status and menarche was most common in the summer and in fall than in spring and winter.

Singh (1972) showed the relation between the family size and the age of menarche. There was a definite correlation between the size of the family and the age of menarche. Similar correlation was also found between the number of sisters a girl had and the age of menarche. Sera Israel found no relation between the rank in family and the age of menarche. As Singh emphasized the need for further evaluation of these factors, further study in a larger population would help to evaluate and confirm the findings of the present study.

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