



The Factors Altering the Age of Onset of Menstruation among Adolescent Girls in Wardha Region

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Introduction: Several studies have found that the most common age of menstruation onset has come down dramatically over the previous century, and that there has been a profane (with respect to time) tendency toward early menstruation onset in most metropolitan countries.

Emerging economies, such as India, have also suffered a drop in recent years.

The purpose of our study was to determine how diet and socioeconomic status influenced menarche age in this location.

Methods: Following a simple random sampling among the schools, 100 girls between the ages of 10 and 15 were volunteered for this study.

The girls were given a pre-designed questionnaire after receiving clearance and agreement from the school principal/class teacher.

The female doctor gave the girls a brief examination.

The age of the mother during menarche, as well as the family's socioeconomic situation and other characteristics, were all enquired about in depth.

Results: Our study shows that the age of onset of menstruation in higher socioeconomic classes is lower as compared to Lower Socioeconomic class. No significant relation between BMI & type of food and usual age of onset of menstruation was seen in this study.

Conclusions: As we progress from a lower to a better socioeconomic level, we see a trend of

lowering the age of first menstrual flow. Because such data is scarce in this portion of India, more research must be conducted among girls from other parts of the state before the data can be compared to national figures.

Keywords: Menarche; socioeconomic status; age; BMI.

1. INTRODUCTION

Unlike men, a female's reproductive system goes through cyclic changes on a regular basis, which might be considered as cyclic groundwork considering gravidness and fertilisation.

In primates and humans, the cycle is a menstrual cycle, with episodic vaginal bleeding caused by uterine mucosa shedding as the most obvious feature (menstruation).

From the initiation of one cycle to the start of another one, the menstrual cycle can last anywhere from 14 to 28 days.

Beginning with the first day of menstruation, the days of the cycle are counted. It starts at puberty, which happens between the ages of ten and sixteen, and ends with menopause, which occurs at the average age of 51.

When hormone levels decline, the endometrial layer, which has been changing during the menstrual cycle, is incapable to assist itself. This is called menstruation, and it begins on the first day of the cycle and lasts till the fifth day of the next menstrual cycle. Menstruation can occur for a few days and can go on for even few weeks. The majority of menstrual blood is arterial, with venous blood auditing for just 25% of the total amount. There are prostaglandins, tissue remnants, and a large portion of fibrin breakdown from endometrial tissue. Because clots are broken up by the breakdown of fibrin, menstrual blood seldom includes clots unless the flow is unusually heavy. Menstrual flow usually lasts three to five days, although it can last as little as one day or as long as eight days in a healthy woman. Blood loss might range from little spotting to 80 ml, with 30 ml being the normal. A blood loss of more than eighty mL is deemed abnormal. Medications, endometrial thickness, blood diseases, and blood coagulation disorders, among other things, can all impact the volume of blood flow [1].

Menarche is the onset of menstruation the important event in life of adult woman. Unlike other teenage changes that are moderate and

nonstop, menarche is different, even with sudden onset [2,3].

Menarche, or the beginning of menstruation, normally happens between the ages of 11 and 13, but it may occur sooner or later in a few apparently healthy youngsters. The commencement of menarche signifies the beginning of a woman's fertility years. A girl has experienced her first ovulation starting soon before her first menstrual cycle. The first menstruation, also known as menarche, is caused by the first ovulation. If menstruation has not begun by the age of 16, a gynaecological examination is recommended. Other symptoms of estrogenic action such as expansion of the breasts and uterus, as well as the growth of pubic hair, occur before menarche. At initially, the ovarian reaction to gonadotropic hormones may be incompatible, resulting in irregular or excessive bleeding, although this irregularity almost invariably resolves on its own. It is closely related with other pubertal characteristics and is therefore a sign of sexual maturation.

Menarche occurs when the hypothalamic-pituitary-ovarian (HPO) axis matures. Normal hypothalamus and role of pituitary, good female reproductive anatomy, normal nourishment, and the overall absence of other chronic disorders are also basics. It's a sign that a woman's reproductive system is in good shape. Menarche is documented by the majority of women as their bodies' crucial assertion of fertility. Amenorrhea is the lack of regular menstrual cycles that is not caused by pregnancy. By the age of fifteen primary amenorrhea is defined as the total absence of menstruation. Secondary amenorrhea occurs when a woman's period stops for three months or more after it began. It is usual for irregular cycles to occur in the first two to three years after the commencement of menses, with teenagers frequently missing menses for many months. Because of inadequate early control of hormonal interactions between hypothalamic, pituitary, and gonadal hormones, many of these irregular menstrual cycles may be without ovulation. Menstrual cycle tracking on a paper calendar or using a smartphone app can help identify if teenage

menstrual cycles are getting more regular and anticipate when ovulation is most likely to occur. This knowledge can be useful for both pregnancy planning and pregnancy prevention [4].

In both developed and developing countries, the average age of menstruation beginning has decreased as a result of increased health and nutrition. Analogous patterns in the onset of menstruation at a younger age have been identified in the bulk of Indian research. There is a noticeable difference in the date of puberty (onset/timing of menarche) between the advantaged and non-advantaged populations, with a delay in menarche observed among underprivileged girls [5]. The onset of menstruation has an important role in female infertility. It also has an impact on long-term outcomes, such as cancers of the reproductive organs. Nutrition, physical activity, race, genetic factors, environmental conditions, geographic regions, built-up or rural residence, emotional factors, blindness, BMI, family size, socioeconomic status, parental educational level, occupation of parents, loss of parents, child sexual abuse, physical stress, tea consumption, and passive smoking are all factors that influence menarche [6].

The current fading and early beginning of menstruation observed throughout the world has been related to higher risks of heart disorders such as hypertension, coronary heart disease, stroke, and elevated blood sugar in women, as well as increased BMI, insulin resistance, and a harmful lipid profile [7,8,9]. Furthermore, women who reach menarche before the age of 12 have a 23% greater chance of having breast cancer than those who begin menstruating at the age of fifteen or later [9]. Late menstrual onset, on the other hand, comes with its own set of health risks, since it has been connected to osteoporosis, depression, and social anxiety issue [10].

Aim of the study was to get an idea of the age at menarche and various factors related with age at menarche mainly, Type of Nutrition and social and economic status of the study. The subjects were females residing in and around the localities of JN Medical College, Sawangi.

2. METHODOLOGY

The research was carried out in the Anatomy department. After a simple random sampling throughout the schools near JNMC Sawangi, a

total of 100 girls aged 9 to 14 participated in the study on a voluntary basis. A predesigned questionnaire was administered after receiving permission and approval from the school Principal/class teacher, and girls were momentarily inspected by a female doctor. The participants' and their parents' personal information was collected in order to determine the mother's age at the commencement of menstruation, as well as the family's social and economic condition and other details. 50 girls from private school and 50 girls from municipal school were chosen. Data was collected from school girls of private as well as municipal school. Consent from principle and parents will be taken before detailed Interview and performing clinical examination. Study was carried out for period of 3 months in 2019.

Teachers and girls were sensitised in regional and English language, as well as the nature and relevance of the study, throughout the early stages of the research.

Parents of students who agreed to participate in the study were given a written informed consent form to read and sign, outlining the project's scope and privacy.

In addition, they were given a pre-structured questionnaire to complete with the help of their parents.

Date of birth, present age in years and months, month and year of menarche, age at menarche, history of chronic disease and medicine usage, socioeconomic position, mother's age at menarche, and dietary patterns were all included in the questionnaire. School data were used to confirm the birth dates. The kids' consents and questionnaires were collected during the next meeting, which was scheduled by the school administration. The menarche age of the individuals was calculated using the recollection method. When they first started getting menstrual flow, they were asked how old they were.

Data collected was analyzed using MS excel and EPIinfo version 4. Along with SPSS Version 20. Chi square test of significance was used to test for relationship between various factors. A P value of ≤ 0.05 was considered for statistical significance.

3. RESULTS

A total of 100 girls between the ages of ten and fourteen were enrolled in the study.

The average age of the respondents in this study was 12.39 years, with a standard deviation of 1.152.

Age of menarche in relation to the type of food consumed, BMI, and socioeconomic status were the three main variables investigated.

BG has been changed. The Prasad scale 13, which is widely used in health studies to determine social and economic status, has been updated for the most recent Consumer Price Index (CPI) for January 2019. In community health-related studies in India, researchers commonly employ State-specific CPI to modify the study area's social and economic condition specifically.

The Modified BG Prasad Classification levels are divided into two classes for simplicity of calculation. Level 1 was assigned to the upper socioeconomic status, while the remainder of the levels with low values were assigned to the lower socioeconomic class.

Age of Menarche with Food Habit.

The P is 0.589, hence age of menarche was not related with the type of food in our study.

Table 1 reveals that chi square value at 3 degrees of freedom is 1.92 and its p value is

0.589, which indicates that data is not significant. e. age of menarche with their food habit, is not significant. Hence we conclude that food habit is not associated with age of menarche i.e. there is no effect of being the non vegetarian or vegetarian.

Table 2 reveals that chi square value at 3 degrees of freedom is 19.995 and its p value is 0.000, which indicates that data is significantly i.e. age of menarche, is associated with their socio status. Socioeconomic status is related with age of menarche. Menarche appeared early in girls having High Socioeconomic status.

4. DISCUSSION

Menarche has a fairly predictable onset. Menstruation usually starts between the ages of two and three years after the initial development of breast bud [2]. Between the onset of breast buds and the onset of menarche, girls may have skin outbreaks. It's also a period when females may become moodier and begin to argue with their parents. Typically, a girl's growth spurt occurs a few months before menarche. Menarche is a natural part of a girl's development process, as are the other physical changes that occur throughout puberty. Menarche must occur at a specific time. Precocious puberty is a condition in which a young girl has her first period before the age of eight [11].

Table 1. Association of Age with type of Food

Age of Menarche	Food Nature		Total
	Non Veg	Veg	
Not Started	12 48.0%	13 52.0%	25 100.0%
11-12	5 55.6%	4 44.4%	9 100.0%
12-13	12 57.1%	9 42.9%	21 100.0%
13-14	7 43.8%	9 56.2%	16 100.0%
Total	36 50.7%	35 49.3%	71 100.0%

Pearson Chi-Square 1.920, PValue -0.589

Table 2. Showing Association of the age of Menarche with Socio Economic Status

Age of Menarche	Social Status		Total
	Low Social Status	High Social Status	
Not Started	7 (28.0%)	18 (72.0%)	25 100.0%
11-12	0 (0%)	9 (100.0%)	9 100.0%

Pearson Chi-Square 19.995, P=0.0001

The mean age of onset of menstruation in the present study is twelve years with their standard deviation of 1.152. This is in accord with Purushotham (1978), Amrita et al(2000) [2] and Banerjee et al (2007) they noted the mean age of onset of menstruation as 12.78 years, 12.6 years and 12.3 Years respectively.

In 2005, Indian women's average age at menstruation commencement was 13.76 years (95 percent confidence interval: 13.75, 13.77). It dropped three months, from 13.83 years (95 percent CI: 13.81, 13.85) for women born between 1955 and 1964 to 13.62 years (95 percent CI: 13.58, 13.67) for those born between late 1985 and 1989. However, these national averages mask significant regional variation, with mean age at menarche ranging from 15.0 years in Himachal Pradesh between 1955 and 1964 (95 percent confidence interval: 14.89–15.11) to roughly 12.1 years in Assam between 1985 and 1989 (95 percent confidence interval: 11.63–12.56).

The Modified BG Prasad Scale was used to investigate the age at which women began menstruating in various social and economic categories. According to our findings, the age at which women begin menstruating is lower in higher socioeconomic levels than in lower socioeconomic classes. Dambhare D G et al did a study in the central region of India that supports this number.¹⁷ According to this study, the average age at the onset of menstruation in higher classes is 12.89 + 1.22 years, whereas the average age in lower classes is 13.48 + 1.35 years, which is also consistent with a study conducted by Ray S et al. in West Bengal [12,13].

In our research, there was no significant link between BMI and diet type and the average age of menstruation onset. In a study conducted by Cuatero G B et al as well as previous studies undertaken by the ICMR (1972), B.K. Chandrashekar reddy Et al. and Sidhu (2002) there was no significant relationship between BMI and average age of commencement of menstruation [14,15].

As we progressed from low to high socioeconomic groups in this study, the trend of lowering the age of menstruation onset was clearly visible. The ICMR (1972) study found that as a family's per capita income rises, the age at which menstruation begins decreases. Higher social and economic status is frequently

connected with small family norms, better living conditions, and sufficient nutrition, which could explain the early beginning of menarche by causing earlier growth spurts and improved physical and psychosexual ripeness in females [16].

The restrictions of this study were the recall bias related with reported age at menarche.

5. CONCLUSION

This study adds to data on age at menarche in girls from various regions of India.

On the subject of menarche, there is a major gap in both literature and evidence. We see a tendency that is rapidly waning, possibly faster than in higher-income countries, and that is strongly linked to socioeconomic status. Menarche questions should be included in more nationally representative surveys, and current data should be used more effectively, according to this study, due to its influence on life-course health in fast-aging countries. The utility of menarche age as a worldwide health indicator will need to be investigated further in future research.

As we progress from lower to middle to higher social and economic levels, the age of first menstrual flow (menarche) tends to decrease. Because such data is scarce in this part of India, more research on females from other parts of the state is required before the data can be used to Indian statistics. The mean age at menarche has been dropping or stagnating over time within and between nations. The determinant modelling results reveal that the link between wealth and income evolves over time, but not consistently across nations. In previous polls, poorer women had earlier menarche, but now wealthy women have earlier menarche.

CONSENT

As per international standard, parental written consent will be collected; respondents' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

The Institutional Ethical Committee of JNMC, Sawangi, gave their approval.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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