ONSET OF MENARCHE IN GIRLS

by

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Menarche is the stepping stone from childhood to maturity. During puberty many complex changes take place. Most of these changes cannot be measured but the appearance of first menstrual flow can serve as a useful index to attainment of maturity in girls. Menarche is one of the dramatic events in life of women. It is an important landmark in the development of women and its timely appearance gives assurance that other less recognisable features of puberty are developing normally.

It is believed that women living in tropics mature earlier than women living in temperate or cold countries (Tilt, 1802). Mills (1937) concludes that in tropical regions of moist. heat, the body growth lags most, the menses is found to start distinctly later than in the invigorating temperate zones and sexual maturity in tropics comes 2 years later than in temperate zones. This finding is confirmed by various studies (Ellis, 1950).

Some workers, Mills (1937), Israel (1951) are of the opinion that there is a distinct shift towards lower age at menarche in all the countries as compared to menarche in previous generation.

In India there are references regarding menarche as early as 500 B.C., Sushruta Samhita mentions menarche at age of 12 years. Even Mahabharata written 2000 B.C. relates social implication of menarche in unwedded girls. Besides these early references, age at menarche in India has been mentioned in isolated studies from various parts of the country. Banerjee and Mukherjee (1961) mention such studies from 1940 to early 1960. Flint has summarized studies from 1945 to recent studies till 1974.

Various factors like climate, socio-economic status, height weight and nutrition have been studied in association with menarche. The secular trend is also studied by taking into consideration the age at menarche in mothers and daughters. In studies done (Table I), various groups of women interviewed, were college students or women attending various clinics belonging to age group of 10-50 years. The accuracy of age at menarche can not be taken as due to lapse of years exact age is foregotten especially in older women. The correct information can only be gained if the event is noted at the earliest, within the same year. This will give error of not more than few months but the fraction of months can be taken as nearer to the complete year of age of the girl. As no study gives details of factors affecting menarche in various communities more studies are required to be done.

Material and Methods

Keeping in view the draw backs of previous studies mentioned present study is taken up in school girls at Jabalpur city. Their ages are verified by birth certificates in the school. The girls who had

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TABLE I

Showing Mean and S.D. of Age at Menarche in Indian Women Reported by Different Investigators

Population or Community	Investigator	Number	Mean age at menarche	Range	S.D.
Bombay, Gujarat, Karwar, Belgaum, C.P.	Purandare (1945)	100	13.6		
Gujarati College	Shah (1958)	2391	14.9		1.1
Poona H. S.	Shah (1961)	2370	14.06		
Maharaja Sayajirao University	Shah (1950-52)		13.08		
Bombay	Peters & Shrikande (1957)	1037	14.5	11-16	1.3
Bombay	Kamat & Kamat (1959)	320	13.3		
All over India	Israel (1959)	2227	13.4	11-16	0.36
Assam (& Burma)	Foll (1961)	1150	13.2 (Assam)		1.6
West Bengal	Mukherji & Sengupta (1962)	691	12.9	9-17	0.8
Hindu	Rama Rao (1963)	305	13.8		
Kerala-urban/rural	Madhavan (1965)	1795	13.24/14.42		
Madras-urban/rural	" "		12.76/14.16		
Punjab	Wyon & Gordon (1971)	2232	15.5		
Rajput-Rajasthan	Flint (1974)	243	14.65	11-17	1.20
Rajput-Himachal Pradesh	"	240	15.23	12-18	1.45

menarche in the current year only are taken for correct record ng. To determine the association of socio-economic status with menarche, two different schools are taken, one Hindi medium Govt. school where majority of girls are from lower socio-economic status and another English medium private school for girl where majority of girls are from better socio economic status.

Two equal groups of 2000 girls are taken and data is collected by questionnaire method. The nutritional status is assessed by finding out height weight and by detecting nutritional deficiency clinically. The girls are contacted to give information regarding present age, onset of menses in the current year (date and month), religion, income, education and occupation of parent, age of mother at menarche.

The collected data are analysed according to various factors mentioned and tested for statistical significance.

Finding and Discussion

1. *Age at menarche*: For analysis and comparison the total number of girls (4000) are divided into two groups. Group A consists of 2000 girls from Hindi medium Govt. school and group B consists of 2000 girls from English medium private school. The range of age of girls contacted is 10 to 16 years in both groups as seen Table II.

TABLE II

Showing Distribution of Girls According to Age at Menarche

Age in Years	Group-A	%	Group-B	%	Total
10	—	—	—	—	—
11	—	—	—	—	—
12	78	3.90	88	4.40	166
13	602	30.10	513	25.65	1115
14	1046	52.30	1025	51.25	2071
15	220	11.00	302	15.10	522
16	54	2.70	72	3.60	126
	2000	100	2000	100	4000
Mean	13.785		13.8785		
S. D.	0.79		0.84		
S. E.	0.018		0.019		

From the above table it is seen that range of age at menarche in the 2 groups is from 12-16 years. Mean age is 13.785 in group A and 13.878 years in group B. The standard deviation and standard error are 0.78, 0.018 and 0.84, 0.019 for group A and B respectively. The difference is statistically significant (P-3.6) at significant level 5%.

Although the statistically calculated difference of mean age at menarche in 2 groups is significant but the difference of mean age in group A 13.785 and in group B 13.875 is just 0.90 which is very small and the observations are almost similar in both groups for age at menarche. Therefore the overall mean age at menarche for both the groups will be 13.83 years taking the mean of both the groups into consideration.

This observed mean of 13.83 years is similar to the findings of majority of studies where the mean is between 12.9—14.06 (Flint, 1974).

2. *Religion*: Table 2 shows the distribution of girls according to religion and age at menarche.

The distribution of girls according to religion in the 2 groups shows the majority is of Hindus in both the groups. In groups B Christian girls are much more than in group-A. This difference may be due to preference of English language in christian community as group-B girls

TABLE III

Showing the Distribution of Girls According to Religion and Age at Menarche

Age	12	13	14	15	16	Total	%	12	13	14	15	16	Tot.	%
Hindu	54	597	1018	208	51	1928	96.4	59	477	991	259	57	1843	9215
Muslim	23	3	19	7	2	54	2.7	19	13	12	18	6	68	3.70
Christian	1	2	9	5	1	18	0.09	10	23	22	25	9	89	4.45
	78	602	1046	220	54	2000	100	88	513	1025	302	72	2000	100

are from English medium school. No correlation between religion and age at menarche can be derived at as the observation are almost similar in both the groups.

3. *Nutrition*: The nutritional status of girls is assessed by finding height, weight and any nutritional deficiency clinically. The height and weights of girls in the 2 groups are given in Table 4. For comparison normal height and weights observed by All India Survey by the National Institute of Nutrition Hyderabad are given. The difference found in the 2 groups is not significant for height and weight. Thus it is concluded that the growth of girls in both groups is similar and is not affected by social status. The common nutritional deficiency is anaemia in both the groups and girls in both the groups are under developed as compared to the findings of National Survery. It is also concluded that age at menarche is not affected by height, weight and nutritional status.

4. *Socio-Economic Status (S.E.S.)*: The S.E.S. of girls is assessed by applying Kuppuswamy's scale (urban) taking into consideration income, education and occupation of parent in each group (see Annexe I). It is seen that in group A maximum girls belong to S.E.S. scale class III and IV (72%) and in group-B maximum belong to class II and III (67%) Table V.

TABLE IV

Showing the Mean Height Weight of Girls at Different Ages

Age in Yrs.	Height Group-A	Height in CM	Height Group-B	Weight Group-A	Weight Kg. in	Weight in Group-B
10	137.98	138.5	137.69	32.65	33.5	32.97
11	142.9	144.1	142.89	36.01	36.5	35.98
12	149.68	150.3	149.52	41.09	42.2	41.98
13	152.98	155.0	154.01	42.32	44.4	42.69
14	153.08	155.1	153.03	45.47	44.7	43.89
15	153.61	155.3	153.69	45.92	48.2	45.65
16	153.97	155.4	155.98	48.06	49.8	48.1

B. Kuppuswamy

Socio-economic Status Scale (Urban)

Score Card

Seis Class

Code No. Name:

Age Address:

Check below by putting a cross in the appropriate item box on the basis of information Blank. But the weights (Scores) in last column.

ITEMS	Weight	Score
4. *Education:*		
1. Professional degrees or Hons. & above	7 0	
2. B.A. or B.Sc. Degree	6 0	
3. Intermediate or Post-High School Diploma	5 0	
4. High School Certificate	4 0	
5. Middle school completion	3 0	
6. Primary school or literate	2 0	
7. Illiterate	1 0	
		A .....
B. *Occupation:*		
1. Profession	10 0	
2. Semi-Profession	6 0	
3. Clerical, shop-owners, Farm owners etc.	5 0	
4. Skilled worker	4 0	
5. Semi-skilled worker	3 0	
6. Unskilled worker	2 0	
7. Unemployed	1 0	
		B .....
C. *Income:*		
1. Above Rs. 1000 per month	12 0	
2. Between Rs. 750 and Rs. 999	10 0	
3. Between Rs. 500 and Rs. 749	6 0	
4. Between Rs. 300 and Rs. 499	4 0	
5. Between Rs. 101 and Rs. 299	3 0	
6. Between Rs. 51 and Rs. 100	2 0	
7. Below Rs. 50	1 0	
		C .....
Total Score (add A, B, C)		

	Total Score	Sess Class
S	26 — 29	I
C	16 — 25	II
A	11 — 15	III
L	5 — 10	IV
E	Below 5	V

TABLE V

Showing Distribution of Girls According to the Socio Economic Status Class

Sess Class	Group-A	%	Group-B	%	Total
I	100	5%	180	9%	280
II	300	15%	600	30%	900
III	700	35%	740	37%	1440
IV	740	37%	440	22%	1180
V	160	8%	40	2%	200
	2000	1000	2000	100	4000

$X^2 = 136.11$ df. 4.

Applying the significance test to the above findings of S.E.S. Chi square is calculated—$X^2 = 136.11$ df.-4 it is significant at 5% L.S. Thus it is seen that group-A girls belong to lower socio economic status than group-B girls. This difference is statistically significant.

From these sifinificance test it is derived that group A girls are from lower socio-economic states than group-B. When we consider the age pattern again no correlation can be shown as one of the variable (age at menarche) does not show much difference in the two groups.

As only 402 girls could bring information about their mothers' age at menarche no association is found for shift of age at menarche from previous generation.

Summary

Four thousand girls are taken from 2 different schools to study age at menarche and its association with various factors, like religion, nutrition and socio-economic states.

The range of age at menarche is 12-16 years with mean age 13.785 and 13.875 (Mean of two groups 13.83). Although statistically the difference is significant practically it is too small 0.090.

Majority of girls belong to Hindu religion in both groups. Christians are more in group B due to preference for English language. No correlation of age at menarche and religion can be derived. As for nutritional status the girls in both the groups were under developed as height and weight are less than the findings of National Institute of Nutrition Hyderabad. Anemia was common deficiency in both groups. Socio-economic status class of parents (Kuppusamy urban scale) shows significant difference in the girls of the two groups. Group A girls are from lower socio-economic states than group B. The difference cannot be correlated to age at menarche it being almost similar in two groups. The difference in religion, nutrition socio-economic status does not affect age at menarche in the present observation as the age is almost same for the two groups.

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