Original Research Article

Age at menarche and the menstrual pattern of secondary school adolescents in central India

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ABSTRACT

Background: Population studies on characteristics of menstrual cycles are scarce. Knowledge on this variability is necessary for patient education and to guide clinical evaluation.

Methods: A cross sectional study was conducted and 622 school girls were selected randomly. A pretested questionnaire was used to gather data.

Results: Mean age of participants was 16.9 ± 1 years. About 92.2% had attained menarche. Probit analysis of the status-quo data yielded median age at menarche of 14.8 (13.9-15.3) years and by recall method to be 15.8 ± 1 years. The mean age at menarche was, significantly, 0.3 years younger for urban females compared with rural ones. Cycle length between 21-35 days was observed in 70.3% of the girls. Mean duration of flow was 4 ± 1.3 days. Menstrual cycles were irregular in 42.8% of the subjects. Overall prevalence of dysmenorrhoea was 72%. and of PMS was 75.4%.

Conclusions: Age of menarche was found to be significantly delayed. Considerable number of students complained of dysmenorrhoea and premenstrual symptoms.

Keywords: Dysmenorrhoea, Menarche

INTRODUCTION

Menarche is one of the most significant milestones in woman's life. The mean age at menarche varies widely and is known to be a sensitive indicator of various characteristics of population including nutritional status, environmental conditions and magnitude of socioeconomic inequalities in society.[1-3]

Studies suggested that menarche tends to appear earlier in life as the sanitary, nutritional and economic conditions of a society improve.[4] For most females, it occurs between the ages of 10-16 years; however, it shows a remarkable range of variation.[3] The normal range for ovulatory cycles is 21-35 days. While most periods last 3-5 days, duration of menstrual flow normally ranges from two to seven days. For initial years after menarche, irregular and cycles are common.[3,5]

Knowledge of the length and variation of the menstrual cycle is necessary for patient education and for identifying deviations from normal to guide clinical evaluation.[5] Among the gynaecological problems, menstrual problems are said to be the major ones especially among adolescent females.[5] The common menstrual disorders for female adolescents are amenorrhea, abnormal/excessive uterine bleeding, dysmenorrhea, and premenstrual syndrome.[5]

Population studies on normal and dysfunctional characteristics of menstrual cycles are relatively scarce. The purpose of this study is therefore, to determine the

age at menarche and patterns of menstruation among secondary school girls, and to identify the magnitude of common menstrual disorders.

METHODS

Study design- Cross sectional study

Study period- November-December 2016.

Study setting- Four schools (two in urban and two in rural area), Nagpur region, Central India

Sample Size- Sample size was calculated assuming 95% C.I., 50% elevated risk prevalence (for the sake of having larger sample size it was considered at 50%) and acceptable difference of 4%. Assuming a non-response rate of 10% the total sample size stood at 622. Equal number of students from urban and rural areas were enrolled.

Sampling- Systematic sampling was used, after male students left the classrooms.

Data collection

Self-administered, pre-tested questionnaire was used for collecting the data. The questionnaire included socio-demographic information about the respondent's age, marital status, education level, ethnic group and residence. Questions related to menstruation comprised menarcheal age, menstrual pattern, premenstrual symptoms, dysmenorrhea and severity of dysmenorrhea and associated symptoms, impact of menstrual disorder on school attendance, the source of information about menarche and whether they required medical help for menstrual disorder or not.

The age of menarche was grouped in three classes of menarche (early, medium and late). Early menarche is considered 12 years or less, medium menarche between 13 and 14 years and delayed menarche more than 14 years.[6] Only 612 were included in the final analysis, partly because many girls didn't report their exact dates of birth or age at menarche.

The data were analyzed using SPSS v13 (SPSS Inc, Chicago). For information obtained by status quo procedure the age at menarche was calculated by probit analysis. Permission to conduct the study was also obtained from the principals of participating schools. The purpose of study was explained to the students and verbal consent was obtained from them.

RESULTS

From 622 distributed questionnaires 612 were filled correctly (98.4%), with age ranging between 14.5 and 19.5 years and mean and standard deviation of 17.4 ± 1 years. Forty-seven (7.7%) of the subjects didn't have their first menstruation yet at the time of interview. These groups of students were not included in the analysis of recall age at menarche, menstrual pattern and disorder.

By using probit analysis, the median age at menarche was found to 14.8 (13.9-15.3) years and the distribution didn't differ significantly from normal. Age at menarche by recall method was 15.8 ± 1.0 years (range- 11.5 to18.5 years). Nine female adolescents (1.6%) had early menarche (≤ 12.5 years), 87 girls (15.4%) had medium menarche (13 and 14 years) and 469 (83%) experienced delayed menarche (≥ 15 years). Subjects living in rural areas revealed mean and median age at menarche of 15.9 and 15.1 years respectively. The mean age at menarche was, significantly, 0.3 years younger for urban girls compared to rural girls.

Table 1: Menstrual pattern of secondary school adolescents.

Menstrual characteristics	Total	Residence		Gynaecological age		
		Rural	Urban	< 2 years	3-4 Years	> 5 years
Cycle length						
<14 days	49 (8.6)	23	26	34	15	0
14-20 days	68 (12)	42	26	51	14	3
21-28 days	322 (57)	191	130	248	66	7
29-35 days	76 (13.4)	48	28	53	21	2
>35 days	51 (9)	39	12	46	5	0
Menses duration						
2-3 days	262 (46.7)	163	99	207	49	6
4-5 days	229 (40.8)	140	89	165	60	4
6-7 days	70 (12.5)	38	32	56	12	2
Regularity						
Regular	323 (57.2)	188	135	252	66	5
Irregular	242 (42.8)	155	87	180	55	7

The menstrual pattern of study subjects is shown in table 1 w.r.t. place of residence and age of menarche. The menstrual cycles were irregular in 42.8% of the study subjects.

There was no statistically significant difference of menstrual cycle regularity by residence (urban versus rural) or age of menarche. The mean duration of menstrual flow was 4 ± 1.3 days with a range of 2-7 days. The difference between these mean values was not statistically significant by residence or age of menarche (Table 1).

Out of the total study population, 117 (20.6%) adolescents had a menstrual cycle length shorter than 21 days, 51 (9%) longer than 35 days and 70.4% had a cycle length between 21 and 35 days. The difference between the length of the cycle by place of residence (urban, rural) is also significant.

The overall prevalence of dysmenorrhoea was 72%. Dysmenorrhoea was significantly more frequent among students from a rural residence, those who said they had an irregular cycle, those with longer duration of bleeding (>6 days) and those with long cycles (> 28 days).

However, dysmenorrhoea was not significantly associated with age at menarche. Premenstrual symptoms were present in 426 girls (75.4%). There was statistically significant association between presence of premenstrual symptoms and regularity of cycle. PMS was not significantly associated with age at menarche, duration of menses, cycle length. Significantly higher proportion of female adolescents who had premenstrual symptoms also suffered from dysmenorrhea (82.4%) compared to adolescents who had no premenstrual symptoms (40.3%) (Table2).

Table 2: Dysmenorrhoea and premenstrual syndrome among school adolescents.

Variable	Dysmenorrhoea		PMS	
	Yes (%)	P-Value	Yes (%)	P-value
Residence				
Rural	261 (76)	<0.05	263 (76.7)	0.19
Urban	146 (65.8)		163 (73.4)	
Onset of menarche				
Early	18 (78.3)		20 (87)	
Medium	219 (71.3)	0.76	236 (76.9)	0.2
Late	170 (72.2)		170 (72.2)	
Cycle length				
<21 days	71 (60.6)		81 (69.2)	
21-28 days	238 (74.1)	<0.05	245 (76.3)	0.26
29-35 days	59 (77.6)		59 (77.6)	
<35 days	39 (76.5)		41 (80.4)	
Menses duration				
2-3 days	163 (62.2)		186 (71.4)	
4-5 days	181 (79)	<0.05	177 (77.2)	0.09
6-7 days	61 (85.7)		59 (82)	
Regularity				
Regular	211 (65.3)	<0.05	221 (68.4)	<0.05
Irregular	196 (81)		205 (84.7)	

Dysmenorrhoea was rated mild in 295 (73%), moderate in 58 (14.4%) and sever type in 54 (12.6%). There was a significant association between severity of dysmenorrhea and duration of menstrual flow. Elevated level of severe dysmenorrhea was observed among adolescents with irregular cycle (60.8%) as compared to those with regular cycle (39.2%).

More female adolescents with moderate to severe dysmenorrhea (68%), as compared to mild (43.4%) were absent from school because of the pain. Severity of dysmenorrhoea was unaffected by the length of menstrual cycle, gynecologic age, age of menarche, chronological age or visit of health professional for the pain. Dysmenorrhoea resulted in absence from school of 196 (48%) girls with dysmenorrhoea. Among girls who had dysmenorrhoea, only 46 (11.4%) had consulted a health worker about the problem (Table 3).

From the total study subjects, 564 (92.1%) reported they had got information about menarche from someone. The leading sources of menarcheal information were mothers

(39.7%), followed by friends (26.6%) and teachers (21.8%).

Table 3: Factors affecting severity of dysmenorrhoea among school adolescents.

Variable	Dysmenorrhoea			P-value
	Mild (%), (n=299)	Moderate (%), (n=62)	Severe (%), (n=54)	
Cycle length				
<21 days	48 (16.2)	12 (20.7)	10 (18.6)	
21-28 days	177 (60)	30 (51.7)	30 (58.8)	0.57
29-35 days	41 (13.9)	12 (20.7)	5 (9.8)	
<35 days	29 (9.8)	4 (6.9)	6 (11.8)	
Menses duration				
2-3 days	133 (44.9)	15 (26.3)	16 (32)	
4-5 days	121 (41.1)	35 (61.4)	23 (46)	< 0.05
6-7 days	41 (13.9)	7 (12.3)	11 (22)	
Regularity				
Regular	130 (44.1)	33 (56.9)	31 (60.8)	<0.05
Irregular	165 (55.9)	25 (43.1)	20 (39.2)	
Absent from school				
Yes	117 (39.9)	43 (74.1)	36 (70.6)	<0.05
No	176 (60.1)	15 (25.9)	15 (29.4)	
Visited health professional				
Yes	30 (10.2)	10 (17.2)	5 (9.8)	0.28
No	263 (89.8)	48 (82.1)	46 (90.2)	

DISCUSSION

In the present study, age of menarche was found to be delayed by both probit analysis (14.8 years) and recall method (15.8 years). Probit analysis also showed that the menarcheal age in our study was found higher than in similar previous studies.[7-10] It was significantly higher in rural than urban ones, which agrees with the results found by Ikaraoha et al and Montero et al.[7,9] This can be explained by the better socioeconomic status for urban girls than rural ones and the lack of fat for rural girls due to malnutrition. Besides, rural girls travel long distances to school every day which may partially put them to stress and delay their menarche.

About 30% of the study subjects had experienced abnormal menstrual cycle length (<21 days or >35 days) which is a common phenomenon in the first two years after menarche.[5] This is because anovulation is common now.[5]

In this study dysmenorrhea was reported by 72% of the study subjects of which about 28.5% were having moderate to severe dysmenorrhea. A study done among Malaysian school girls showed a similar result (67.7%) with ours.[11] In current study, dysmenorrhea was more common among those who had irregular cycles, longer duration of flow, rural residents and those who had premenstrual syndrome. In the study done in the US by Banikarim et al, dysmenorrhea was the leading cause (48.8%) of short-term school absenteeism, like present study.[12] This sits well with many similar studies as well, which reported a 34-50% of school absenteeism due to dysmenorrhea.[13-15]

About 75.4% percent of adolescent female students had at least one symptom of PMS in the last 6 months. It is like Malaysian study (75%); but lower than the figure reported in a study done in Ethiopia, where 99.6% of students had at least one premenstrual symptom in the last 12 months.[11,16]

Mothers were found as potential sources of information in urban girls where as teachers for rural girls. This agrees with studies done in India and Malaysia.[11,17].

CONCLUSION

In conclusion, menarcheal age was found to be delayed and to vary by residence i.e. later among rural subjects than urban ones. Dysmenorrhea was a widespread problem in school adolescents with significant short-term school absenteeism. Mothers and teachers were potential sources of information on menarche.

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