

Menstrual characteristics of Bengali Hindu adolescent girls of three age groups

D. Mondal¹ and D. Dasgupta²

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¹Dipti Mondal, Master's student, Department of Anthropology, University of Calcutta, 35 Ballygunj Circular Road, Kolkata 700019, West Bengal, INDIA. Email id: Dipti Mondal dips3659@gmail.com

²Dr. Doyel Dasgupta, Department of Anthropology, University of Calcutta, 35 Ballygunj Circular Road, Kolkata 700019, West Bengal, INDIA. Email: dasgupta.anthro@gmail.com

Corresponding author: Dr. Doyel Dasgupta, Department of Anthropology, University of Calcutta, 35 Ballygunj Circular Road, Kolkata 700019, West Bengal, INDIA. Email: dasgupta.anthro@gmail.com

ABSTRACT

The study investigates the variation in the menstrual characteristics among adolescents of three different age groups, and the significant factors associated with menstrual characteristics. We selected 257 Bengali Hindu adolescent girls who attained menarche at least one year before the date of interview and aged between 12 and 22 years from the state of West Bengal. The participants were divided into three groups on the basis of their present age, namely Group 1 (12 to 14 years), Group 2 (15 to 17 years) and Group 3 (18 to 22 years). We used well-tested questionnaire to collect information on socio-demographic variables, menstrual characters, gynaecological problems and management of menstrual and gynecological problems. Results show that significant differences exist between these three age groups in menstrual characteristics, such as age at menarche, menstrual bleeding length and cycle length, skipped and irregular menstrual cycles, presence of PMS and the presence of gynaecological problems. Binary logistic (enter method) regression analyses reveal that age group of the participants along with some other socio-demographic variables were significantly associated with menstrual characteristics.

Key words: Menstrual characteristics, adolescent girls, Bengali Hindu, West Bengal

INTRODUCTION

Onset of menarche is a universal phenomenon among adolescent girls that marks the transition from childhood to early womanhood (Koo and Rohan, 1997) and it signifies reproductive maturity. It may have an impact on risk factors of the chronic disease (Harlow, 2000). Most of

the adolescent girls experience some problems and discomforts like variable degree of abdominal pain, amenorrhea, dysmenorrhea and menorrhagia before and during the menstrual period, which sometimes affects their daily life activities (Fox, 2004).

A number of population-based cross sectional studies on menstrual function have investigated a wide variation of menstrual characteristics and the concomitants of it (Harlow and Matanowski, 1991; Harlow and Campbell, 1994; Harlow *et al.*, 1997; Waller *et al.*, 1998; Narayan *et al.*, 2001; Basu *et al.*, 2008). Sanyal and Ray (2008) stated that menstrual characteristics show deviations during the onset of menstruation and later phase of the life. Moreover, factors such as socio-demographic variables of women affect their menstrual characters like menstrual cycle length, regularity in periods, prevalence of premenstrual problems and pain at the time of menstruation (Rowland *et al.*, 2002; Rahman *et al.*, 2004; Avasarala and Panchangam 2008; Sanyal and Ray, 2008).

National level data shows that 22% of total Indian populations are adolescent (IIPS and Macro, 2007). Reproductive development in adolescent population introduces a wide range of reproductive health risk especially in girls. Adolescent girls suffered from menstrual health problems as their lack of knowledge on reproductive health, low literacy rate, improper health education, gender disparity, 'culture of silence' and lack of governmental initiative to address this group (Jejeebhoy and Sebastian, 2003).

In the light of the above discussion, the present study investigates the variation in the menstrual characteristics among adolescents of three different age groups, and the significant factors associated with menstrual characteristics.

MATERIAL AND METHODS

We conducted this study in the state of West Bengal which is located in the eastern part of India. Majority of the population of this state comprises Bengali speaking Hindu community. The city of Kolkata (which is also a district of the state) was selected as one of the urban areas. Apart from Kolkata, the district headquarter of North 24th Parganas, Barasat (adjacent to Kolkata) was considered as urban center. A total number of 257 Bengali Hindu adolescent girls aged between 12 and 22 years were recruited from two higher secondary schools located in these two districts. Participants were selected following certain criteria like, have attained menarche at least one year before the date of interview and also consented to participate. The participants were divided into

three groups on the basis of their present age- Group 1 (12 to 14 years, mean age =13.38±0.6 years), Group 2 (15 to 17 years, mean age =15.61±0.7 years) and Group 3 (18 to 22 years, mean age =19.65±1.6 years). The participants falling in each of the age groups were as follows: Group 1: 101 participants; Group 2: 96 participants and Group 3: 60 participants. The mean of the years of education of Group 1, Group 2 and Group 3 was 7.22±0.7 years, 10.41±0.6 years and 13.58±1.2 years respectively. Prior to collection of data, the nature of study was explained to the participants and their parents.

A pre-tested questionnaire was used to collect the data on socio-economic variables (present age of participants, educational level, the parents' level of education and their type of occupation, per capita monthly household expenditure), and menstrual characteristics [age at menarche, skipping cycle, irregular menstruation, symptoms related to premenstrual syndrome (PMS), menstrual bleeding length and cycle length, menstrual problems like painful periods (pain at the time of menstrual discharge), type (heavy and/or scanty) and nature (fluid/fluid and clot) of menstrual discharge, gynecological problems and management of menstrual and gynecological problems. Age at menarche was ascertained by asking the participants to recall the actual date of the incident, if not, then the nearest month. A few of the participants could recall their age at menarche by referring to some landmark event or other memorable personal moment (e.g. her own birthday), which occurred around the time of menarche. The participants were asked to report any experience of skipped cycle during the one year period prior to the date of survey. However, data on episode of premenstrual symptoms, problems related to menstrual discharge and gynaecological problems were collected for the last 3 months prior to the date of interview in order to avoid recall lapse. The following are the definitions of some of the menstrual variables included in the present study: irregular menstruation – when consecutive menstrual cycles do not take place at a similar interval of time; skipping of cycle – when menstrual cycle skips during a particular month or for some months; PMS – women may encounter certain problems (e.g. pain in abdomen, flatulence and nausea) just prior to the days of menstrual discharge; painful periods – experience of abdominal pain during the days of discharge; heavy discharge (self-assessed) – heavy amount of flow of menstrual blood; nature of menstrual discharge – whether the menstrual blood is fluid only or a mixture of fluid and clot; gynaecological problems – white discharge, itching around genitalia, burning sensation during urination, increased frequency of urination, leakage of urine and inability to hold urine.

The present study was conducted during the period from June 2013 to July 2013.

We applied descriptive statistics (frequency and mean calculation) to compare the trend in menstrual and gynecological variables between the three age groups of adolescent participants. We also used Anova and Chi square test in bivariate comparisons.

Binary logistic regression (using enter method) analyses were done to find out the factors of menstrual and gynecological variables like irregular menstrual discharge, PMS, menstrual problems and gynaecological problems. In these analyses, the categorical variables which were used as references for comparison were as follows: age group of the participants (Group 3), per capita monthly household expenditure (\geq Rs 2000), occupational type of fathers (agriculture) and mother (home maker), irregular menstrual discharge (no), painful periods (no), heavy discharge (no) and PMS (no). The rest of the variables such as years of education of participants, their mothers and fathers, age at menarche, menstrual bleeding and cycle length of participants were treated as continuous variables. The co-linearity of the independent variables was checked and the values were found to be within the acceptable limit.

RESULTS

Table 1 shows the socio-demographic variables of the participants. Majority of parents of the participants got their education up to secondary level. ~~whereas~~ Mean years of education of father's (9.98 ± 3.9 years) was higher than mean years of education of mother's (8.76 ± 3.7 years). Majority of mothers were home maker (80.5%) whereas considerable section of fathers engaged in business (39.29%). More than half of the participants (58.8%) were belong from the per capita monthly household expenditure of ~~<Rs. 2000~~ rupees less than 2000.

Table 1: socio-demographic variables of participants

Socio-demographic variables	N=257
Years of education of the mothers of the participants (years)	8.76 ± 3.7
Educational level of mothers	
Non literate	11(4.28)
Up to primary level	19(7.39)
Up to secondary level	166(64.59)
Up to higher secondary	34(13.22)
Graduate and above	27(10.50)
Years of education of the fathers of the participants	9.98 ± 3.9

(years)	
Educational level of fathers	
Non literate	7(2.72)
Up to primary level	15(5.83)
Up to secondary level	126(49.03)
Up to higher secondary	56(21.78)
Graduate and above	53(20.62)
Mother's occupation	
Homemaker	207(80.5)
Business	9(3.5)
Labour	23(8.9)
Service	18(7.0)
Father's occupation	
Agriculture	13(5.05)
Business	101(39.29)
Labour	75(29.18)
Service	68(26.45)
Per capita monthly household expenditure in Indian rupees	
Rs <2000	151(58.8)
Rs ≥ 2000	106(41.2)

Figures in the parenthesis indicate percentages

Table 2: Distribution of the participants for reported menstrual and gynecological variables

menstrual and gynecological variables	Group1	Group2	Group3	F/χ^2, df, p
Mean age at menarche (in years)	11.70±0.8	12.50±1.4	12.21±1.3	F=10.76, df=2, p=0.00
Mean duration of menstrual cycle length (in days)	5.70±1.4	5.58±1.2	4.48±1.0	F=18.90, df=2, p=0.00
Mean duration of menstrual bleeding length (in days)	30.82±4.6	30.78±3.4	29.41±2.5	F=3.00, df=2, p=0.05
Skipped menstruation				
No	55 (55.5)	58 (60.4)	50 (83.3)	$\chi^2=14.12$, df=2, p=0.01
Yes	46 (45.5)	38 (39.6)	10 (16.7)	
Irregularity of menstrual cycle				
No	15 (14.9)	18 (18.8)	24 (40.0)	$\chi^2=14.38$, df=2, p=0.01
Yes	86 (85.1)	78 (81.2)	36 (60.0)	
Premenstrual syndrome (PMS)				
No	26 (25.7)	26 (27.1)	19 (31.7)	$\chi^2=0.86$, df=2, p=0.71
Yes	75 (74.3)	70 (72.9)	41 (68.3)	
Types of PMS *				
Vomiting	10 (13.4)	12 (17.1)	1 (2.4)	
Acne	7 (9.3)	7 (10.0)	3 (4.9)	
Back pain	37 (49.3)	33 (49.3)	31 (47.1)	
Flatulence	11 (14.7)	6 (8.6)	0 (0.0)	
Higher degree of abdominal pain	26 (34.7)	17 (34.3)	3 (7.3)	

Diarrhea	3 (4.0)	0 (0.0)	0 (0.0)	
Feels heavy body	8 (10.7)	10 (14.3)	5 (12.2)	
Headache	16 (21.3)	8 (11.2)	9 (21.9)	
Weakness	26 (34.7)	27 (38.6)	9 (21.9)	
Menstrual problems				
No	29 (28.7)	26 (27.1)	16 (26.7)	$\chi^2=0.10$, df=2, p=0.95
Yes	72 (71.3)	70 (72.9)	44 (73.3)	
Types of menstrual problems ¥				
Painful period	67 (93.1)	53 (75.8)	42 (95.5)	$\chi^2=4.24$, df=2, p=0.12
Heavy discharge	33 (45.9)	38 (54.3)	16 (36.4)	$\chi^2=2.85$, df=2, p=0.24
Scanty discharge	10 (13.9)	13 (18.6)	7 (15.9)	$\chi^2=0.63$, df=2, p=0.72
Nature of menstrual discharge				
Fluid	27 (16.7)	27 (28.1)	18 (30.0)	$\chi^2=0.10$, df=2, p=0.95
Fluid and clot	74 (73.3)	69 (71.9)	42 (70.0)	
Gynaecological problems				
No	23 (22.8)	27 (28.1)	29 (48.3)	$\chi^2=15.37$, df=2, p=0.00
Yes	78 (77.2)	69 (71.9)	31 (51.7)	
Types of gynaecological problems €				
White discharge	76 (97.4)	64 (92.8)	28 (90.2)	
Itching around genital area	15 (20.9)	22 (31.9)	3 (9.8)	
burning sensation during urination	11 (14.1)	12 (17.4)	3 (9.8)	
Increased frequency of urination	23 (29.5)	25 (36.2)	4 (12.9)	
leakage of urine	6 (7.7)	1 (1.4)	0 (0.0)	
Inability to hold urine	5 (6.4)	6 (8.7)	2 (6.5)	
Management of menstrual and gynecological problems				
Administer any medicine	11 (15.3)	18 (25.7)	8 (18.9)	$\chi^2=2.53$, df=2, p=0.28
Consulted doctors	8 (10.3)	10 (14.5)	3 (9.8)	$\chi^2=1.45$, df=2, p=0.48
Doing exercise	24 (23.8)	25 (26.0)	10 (16.7)	$\chi^2=1.89$, df=2, p=0.38

Figures in the parenthesis indicate percentages

* ¥ € Calculation based on the total number of participants reported to have PMS, menstrual and gynecological problems.

Table 2 shows that mean age at menarche, mean duration of menstrual cycle length, skipping of cycles and gynecological problems significantly differed in three age groups. Problems like abdominal and/or back pain and weakness are the major PMS types in Group 1 and Group 2, whereas back pain is only reported as a major type of PMS in Group 3. Considerable section of participants reported menstrual problem like painful period. Apart from this more than half of the participants from Group 2 reported heavy menstrual discharge. The nature of menstrual discharge

of majority of the study participants was a mixture of fluid and clot. White discharge was the most common gynaecological problem of the participants. In general, a higher proportion of participants from Group 2 administer medicine for their menstrual and gynaecological problems and higher proportion of participants from Groups 2 and 3 had taken up physical exercises to remain free from menstrual problems as compared to Group 1.

Table 3: Age at menarche of Bengali population

Age at menarche (years)	Sample size	Reference
12.12±1.2 (mean)	257	Present study
12.00 (median)	234	Bhadra et al., 2013
12.60 ±1.4 (mean)	798	Bhattacharjee et al., 2013
11.56 ±0.7 (mean)	424	Ghosh et al., 2012
11.90 ± 1.1 (mean)	715	Ray et al., 2010
12.80 ± 1.1 (mean)	280	Sanyal and Ray, 2008
12.00 (median)	-	Sen, 1994

The mean age at menarche of the present study population is 12.12±1.2 years. Studies on age at menarche of Bengali population reveal that it varies from 11.90 ± 1.1 years to 12.80 ± 1.1 years.

Table 4: Factors associated with menstrual characteristics and gynaecological problems

Sl no	Dependent variable	Independent variables	Exp(B)	P value	C.I. 95%
1.	Irregular menstrual cycle	Per capita monthly household expenditure	2.47	0.02	1.09-5.56
		Present age of participants (Group1)	2.003	0.02	1.07-3.73
		Age at menarche (years)	0.74	0.03	0.57-0.97
2.	PMS	Painful period	5.93	0.00	3.63-9.68
		Menstrual cycle length	1.16	0.00	1.05-1.27

3.	Painful period	Present age of participants (Group1)	1.93	0.00	1.23-3.02
		Heavy menstrual discharge	1.67	0.02	1.08-2.60
		PMS	3.04	0.00	1.62-5.70
4.	Heavy menstrual discharge	Present age of participants (Group1)	2.24	0.01	1.21-4.15
		Present age of participants (Group2)	2.16	0.00	1.25-3.75
		Per capita monthly household expenditure	2.35	0.02	1.10-5.02
		Menstrual bleeding length (days)	0.58	0.00	0.45-0.75
		Menstrual cycle length (days)	0.89	0.00	0.82-0.97
		Painful period	4.88	0.00	2.34-10.19
5.	Gynaecological problems	Years of education of participants (years)	1.18	0.01	1.03-1.36
		PMS	2.39	0.00	1.24-4.59
		Painful period	2.37	0.00	1.24-4.52

Only significant factors are presented.

The reference categories for the categorical variables are as follows: age group of the participants (Group 3), per capita monthly household expenditure (\geq Rs 2000), occupational type of fathers (agriculture) and mother (home maker), irregular menstrual discharge (no), painful period (no), heavy discharge (no) and PMS (no).

The results (table 4) show that the chance of having irregular menstruation was higher among girls from age Group 1 and those who belong from per capita monthly household expenditure of below rupees 2000 and has attained menarche at an early age. The likelihood of having PMS increased with an increase in menstrual cycle length and presence of painful period. The chance of having painful period was higher among those girls who belong from the age Group 1, suffered from PMS and heavy discharge than those who did not. The likelihood of having heavy menstrual discharge was found to increase with decrease in participants' per capita monthly household expenditure, decrease in menstrual cycle length, bleeding length and having painful period. The participants who belong from the age Groups 1 and 2 were more likely to be reported the heavy

menstrual discharge. The likelihood of having gynecological problems was found to increase with an increase in participants' years of education. Presence of PMS and painful period were also found to be significant factors of gynaecological problems.

DISCUSSION

It is revealed that the adolescents of three age groups differ significantly with respect to most of the menstrual characteristics, like age at menarche, menstrual bleeding length and cycle length, skipped and irregular menstrual cycles, presence of PMS and the presence of gynaecological problems. Binary logistic (enter method) regression analyses reveal that age group of the participants along with some other socio-demographic variables were significantly associated with menstrual characteristics.

Researchers have cited a number of explanations behind the premenstrual problems and menstrual problems. Amenorrhea and irregular menstrual cycle may be caused by the immaturity of the hypothalamus–gonadal–pituitary axis, as a result the menstrual cycle remains irregular for the first few years after menarche (Jabbour *et al.*, 2006). Amenorrhea and irregular menstrual cycle may be associated with infertility (Goodenough *et al.*, 1998; Fox, 2004). Dysmenorrhea is characterized by menstrual cramps, which occur due to the contraction of uterus muscle (Goodenough *et al.*, 1998; Fox, 2004) and may be disruptive to productivity. (Walraven *et al.*, 2002). Menorrhagia or heavy bleeding most commonly occurs just after a women starts menstruation. It may lead to anemia or may be a signal for the presence of infection, fibroids or cancer (Goodenough *et al.*; 1998).

In developing countries reporting of amenorrhea ranges between 5 and 9 per cent, menorrhagia between 5 and 15 per cent, irregular menstrual cycle between 5 and 17 per cent and dysmenorrhea has been found between 35 to 78 per cent (Harlow and Campbell, 2000). On the other hand studies on Indian women showed wide variation of menstrual characteristics like heavy bleeding (15 to 57%), excessive bleeding (30%), menstrual pain and/or discomfort (87%) (Patel and Khan, 1996; Koenig *et al.*, 1998; Narayan *et al.*, 2001). Present study population corroborates with the other Indian population.

A study on Indian women has observed prevalence of dysmennorrhoea, i.e. painful period in rural women (Avasarala and Panchangam 2008; Ray *et al.*, 2010). In the present study painful period was higher among those girls who belong from 12 to 14 years of age. Several studies

established the inverse relation of the incidence of painful periods with both educational level and age at menarche (Andersch and Milsom 1982; Balbi *et al.* 2000; Patel *et al.* 2006; Ray *et al.*, 2010). Present study observed the association of two menstrual variables like PMS and heavy menstrual discharge with painful period.

We conclude from this study that age group of adolescent, years of education and per capita monthly household expenditure were likely to play an important role in the manifestation of menstrual characteristics among the adolescents of Bengali Hindu population. The findings of the present study were based on a small sample size. A larger sample size covering a large area, and additional information on the participants' lifestyle variables would have yielded a precise estimate of the menstrual condition of these adolescent girls.

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