

A study of prevalence and severity of primary dysmenorrhea in relation to reproductive characteristics of IX to X grade school girls

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Abstract

Primary dysmenorrhea is pain and discomfort during menstrual period in reproductive years of women without any pelvic pathology. The objective of this study was to evaluate the prevalence of primary dysmenorrhea and its reproductive risk factors among 9th to 10th grade school girls. This is a cross sectional questionnaire based study conducted among 931 school girls having age limit 14-16 years. Only unmarried adolescent females were included in the study however, females with gynecological, psychological or other medical problems were excluded from the study. It used validated and reliable questionnaire such as VAS for pain rating scale. The descriptive data analysis were used to explore the relationship between reproductive factors and dysmenorrhea. $P < 0.05$ was considered as significant. 36.6% females coming from a family having previous history of dysmenorrhea. 85.28% study population were dysmenorrheic. Risk of dysmenorrhea was more among adolescent with early menarche (below 11 years), frequent menstrual cycle (below 28 days), menstrual bleeding duration above 5 days, irregular menstrual pattern and release of clot blood in menstrual flow. *Participants whose family members had a history of dysmenorrhea had 1.67 times greater chance of having same problem in compared to participants without family history of dysmenorrhea.* Thus, earlier age at menarche, family history of dysmenorrhea, irregular menstrual cycle, and presence of clot blood in menstrual flow, longer bleeding duration and frequent menstrual cycle were risk factors for primary dysmenorrhea among secondary female students.

Keywords: Primary dysmenorrhea; Age of menarche; Menstrual characteristics; Family history

1. Introduction

Dysmenorrhea is a painful menstrual cramp of uterine origin (1). It is characterized by cramping sensation in the lower abdomen which may also radiate to the back and thighs. There are two categories of dysmenorrhea viz. primary and secondary dysmenorrhea. Primary dysmenorrhea defines as menstrual pain without any pelvic pathology and usually happens within a year of menarche (2). Secondary dysmenorrhea refers to a menstrual pain caused by organic pelvic pathology such as endometriosis and arises later in life (3).

Dysmenorrhea, menstrual disorder is accompanied by various symptoms including headache, nausea, vomiting, fatigue chills and muscle cramps and disrupt the quality of life and social activities of young women [4]. 3-33% women suffer in severe pain lasting for 1-3 days in each monthly menstrual cycle [5]. Severe dysmenorrhea causes inability to function and absence from occupation [6]. Because of painful menstrual cramp approximately 1% of women of reproductive age are unable to do their job due to severe dysmenorrhea for 1-3 days each month and approximately 14% of girls are absent from school/college for 1-2 days each month [7]. Dysmenorrhea has negative impact on daily life, lower education performance at puberty, poor sleep quality and mood resulting in anxiety and depression [8]. Dysmenorrhea has socioeconomic impacts because of the increased need of medical care and associated medical costs as well as decreased women's effectiveness in day-to-day tasks [9].

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The epidemiology of primary dysmenorrhea is difficult to establish because the symptoms perceived differentially by different women and also diversity in diagnostic criteria. The prevalence varies across different countries from 16 to 91% [9, 10] out of which 2-40% report as moderate to severe. The true prevalence of primary dysmenorrhea is not yet established clearly in India. Kamble et al.2021 [11] reported the prevalence of 72.5% among Indian school going adolescent. Several research finding showed that the proportions of primary dysmenorrhea in young females are higher. A recent large Australian study of senior high school girls found that a higher proportion, 93% of teenagers reported of menstrual pain [10].

In literature survey wide ranges of risk factors for dysmenorrhea have been identified with controversial findings. Various parameters of reproductive life including age of menarche (12), menstrual flow(13) and family history of dysmenorrhea (1) are associated with dysmenorrhea

Primary dysmenorrhea is a most common gynecological problem among adolescents (14) yet remains poorly understood and rarely taken into consideration while assessing health and performance of adolescent girls. Thus it is necessary to evaluate the relationship between primary dysmenorrhea and reproductive life history. The aim of this study was to explore the prevalence of dysmenorrhea and its associated reproductive risk factors.

2. Material and methods

2.1. Subject

A cross-sectional study was done in Hooghly district and adjoining areas. The population was unmarried Bengali female adolescent students who were randomly selected from Higher Secondary schools in the age group between 14 to 16 years. Willingness of the subject was considered. A total of 931 female students were involved in the study. Students having age less than 14 years or more than 16 years, married, who have not started menstruating, those who were taking regular drugs or hormonal therapy and suffering from chronic disorders including diabetes mellitus, clinically established hypertension, liver cirrhosis and kidney disease, suffering with secondary dysmenorrhea were excluded from the study.

2.2. Questionnaire

A self-administered questionnaire having questions related to their age, age when menarche appear, duration of menstruation, regularity of menstrual cycle, presence of blood clot in menstrual flow, duration of menstrual cycle, family history of dysmenorrhea and menstrual pain were applied. The questionnaires were translated to the local language (Bengali) as well. Dysmenorrheic assessment was done and classified on the basis of pain scale.

2.3. Anthropometric measurement

Body weight was measured in light clothing and bare feet using bathroom scale accurate to 0.5kg. The scale was kept on a flat surface and adjusted with '0' mark. Now the subject was requested to step on it in bare feet. Weight was recorded to the nearest 0.5kg. Height was measured using anthropometric rod without footwear on to the nearest 0.1 cm [18]. BMI was calculated from the height and weight using following equation: $BMI (kg/m^2) = \text{weight (kg)} / \text{height}^2 (m)$.

2.4. VAS (Visual Analogue Scale)

The intensity of menstrual pain was assessed by using visual analogue scale [19]. The visual analogue scale is a 10 cm / 100 mm long scale. VAS had been recommended: no pain (0-4mm), mild pain (5-44mm), moderate pain (45-74mm), and severe pain (75-100mm). All students are divided into four classes on the basis of scores obtained from VAS.

2.5. Statistical analysis

Quantitative data were presented as percentage and/or mean \pm standard deviation. T-test was done to determine significance of difference between females with dysmenorrhea and without dysmenorrhea. Bivariate and multivariate logistic regression analysis was done to evaluate reproductive risk factors of primary dysmenorrhea. The significant level of the tests was considered at a significance level of 0.05.

3. Results

3.1. Demographic Characteristics

Initially 962 students participated in the study. 11 respondents withdraws their names due to shortage of time. 20 students excluded from the analysis due to incomplete answer in questionnaires. Thus actual participants were 931.

Demographic characteristics of study population were given in table-1. Ages of participants were ranging from 14 to 16 years. There was wide variation of age of menarche from 9 years to 14 years. 76% of study population had normal BMI, 5.6% was in underweight category, 10% was in overweight category and remaining 5% was in obese category. 36.6% females were coming from a family having previous history of dysmenorrhea.

Table 1 Socio-demographic characteristics of study population

Parameter	Category	Frequency (n=931)	Percentage
Age (year)	14	523	56.18
	15	276	29.64
	16	132	14.18
Age of menarche (year)	<10	25	2.69
	10	146	15.68
	11	275	29.54
	12	275	29.54
	13	174	18.69
	14	35	3.76
BMI	1 st to 5 th percentile (underweight)	52	5.59
	6 th to 84.99 th percentile (Normal weight)	735	78.95
	85 th to 94.99 th percentile (Over weight)	96	10.31
	≥ 95 th percentile (obese)	48	5.15
Family History of dysmenorrhea.	No	590	63.37
	Yes	341	36.63

3.2. Comparative characteristics of dysmenorrhea and non-dysmenorrhea group

Table 2 Comparative characteristics of dysmenorrhea and non-dysmenorrhea group

Parameters	Overall (n=931)	Non-dysmenorrhea (n=137)	Dysmenorrhea (n=794)	P
Age (year)	14.60 ± 0.79	14.43 ± 0.79	14.63 ± 0.79	>0.05
Height (cm)	152.67 ± 6.01	152.32 ± 5.71	152.73 ± 6.06	>0.05
Weight (kg)	47.98 ± 10.50	47.88 ± 10.45	47.99 ± 10.51	>0.05
BMI (kg/m ²)	20.56 ± 1.23	20.65 ± 4.13	20.55 ± 3.98	>0.05
Age of menarche (year)	11.57 ± 1.23	12.03 ± 1.47	11.49 ± 1.17	<0.001

A baseline characteristic of non-dysmenorrheal and dysmenorrheal group of adolescent was given in table-2. There was no significant difference of age, height, weight and BMI. Age of menarche differed significantly between non-dysmenorrhea and dysmenorrhea group of adolescent girls.

3.3. Prevalence of dysmenorrhea

Age wise prevalence of primary dysmenorrhea was represented in table-3. As a whole 14.72% adolescent were non-dysmenorrheic and rest (85.28%) are dysmenorrheic. Around 49.4% had mild pain, 22.7% reported the pain score as moderate and around 13.2% had severe pain score.

Table 3 Distribution of study population on the basis of dysmenorrhea

Age (year)	n	Non-dysmenorrhea	Dysmenorrhea			
			Mild	Moderate	Severe	Total
14	523	97 (18.55)	260 (49.71)	109 (20.84)	57 (10.90)	426 (81.45)
15	276	26 (9.42)	132 (47.82)	72 (26.09)	46 (16.67)	250 (90.58)
16	132	14 (10.61)	68 (51.51)	30 (22.73)	20 (15.15)	118 (89.39)
14-16	931	137 (14.72)	460 (49.41)	211 (22.66)	123 (13.21)	794 (85.28)

3.4. Age of menarche

The average age of menarche was 11.57±1.23 years (ranging from 9 to 14 years). Majority of girls (77.77%) fall under the reference category of 11-13 years. 18.37% subjects having menarcheal age below 11 and only 3.76% having menarcheal age above 13 years. There was a significant difference (<0.001) of age of menarche between non-dysmenorrhea and dysmenorrhea (table-2) group. Adolescent with early menarche (below 11 years) of age approximately 1.7 times more experience to dysmenorrhea (table- 4).

Table 4 Multivariate analysis association between age of menarche and incident of dysmenorrhea

Age of menarche	Dysmenorrhea		Odd Ratio	Relative Risk	95% CI	p
	No	Yes				
11-13	108 (14.92)	616 (85.08)	1	1	-----	Ref
< 11	16 (9.30)	156 (90.70)	1.709	1.603	0.982 to 2.974	0.0008
>13	13 (37.14)	22 (62.86)	0.296	0.402	0.145 to 0.607	0.0117

Data in parenthesis indicates percentage

3.5. Length of menstrual cycle

Majority of study population (55%) had cycle length 28 to 35 days. Only 11.7% had cycle length above 35 days and remaining had cycle length below 28 days. In respect to control group more percentage of study population had cycle duration below 28 days. Adolescent girls with menstrual cycle duration below 28 days 2.6 times more experience to dysmenorrhea (table-5).

Table 5 Multivariate analysis of association between length of menstrual cycle and incidence of dysmenorrhea

Length of cycle	Dysmenorrhea		Odd Ratio	Relative Risk	95% CI	p
	No	Yes				
28-35 days	86 (15.99)	452 (84.01)	1	1	-----	Ref
< 28 days	21(6.82)	287 (93.18)	2.600	2.344	1.578 to 4.285	0.0001
> 35 days	30 (35.29)	55 (64.71)	0.349	0.453	0.211 to 0.575	0.0002

Data in parenthesis indicates percentage

3.6. Bleeding duration

Bleeding duration was divided into three categories: below 4 days, 4-5 days and above 5 days. Majority of participants (48.6%) reported bleeding duration as 4-5 days, about 5.9% reported less than 4 days and in 45.4% reported more than 5 days. Bleeding duration above 5 days had significantly higher pain scores compare to other categories having bleeding duration 4-5 days and below 4 days. Adolescent girls with menstrual bleeding duration above 5 days approximately two times more experience to dysmenorrhea (table-6) than other having bleeding duration 4-5 days.

Table 6 Multivariate analysis of association between length of menstrual flow and incidence of dysmenorrhea

Bleeding duration	Dysmenorrhea		Odd Ratio	Relative Risk	95% CI	p
	No	Yes				
4-5 days	83 (18.32)	370 (81.68)	1	1	-----	Ref
<4 days	11(20.00)	44 (80.00)	0.897	0.916	0.444 to 1.811	0.0100
> 5 days	43 (10.17)	380 (89.83)	1.982	1.802	1.335 to 2.943	0.0000

Data in parenthesis indicates percentage

3.7. Menstrual pattern

45% of control group (non-dysmenorrhea) and 33.7% of experimental group (dysmenorrhea) had regular menstrual cycle and remaining with irregular pattern of cycle.. Adolescent girls with irregular menstrual pattern approximately 1.6 times more experience to dysmenorrhea (table-7) than girls with regular menstrual pattern.

Table 7 Bivariate analysis of association between menstrual status and incidences of dysmenorrhea

Menstrual status	Dysmenorrhea		Odd Ratio	Relative Risk	95% CI	p
	No	Yes				
Regular	64 (18.82)	276 (81.18)	1	1	-----	Ref
Irregular	73 (12.35)	518 (87.65)	1.645	1.524	1.141 to 2.372	0.0000

Data in parenthesis indicates percentage

3.8. Release of clot blood

Majority of study population (70.65%) have reported the presence of clots during menstruation. On the basis of release of blood clot menstrual flow is divided into three categories: bleeding without clot blood, presence of a few small clots and presence of huge clots. Prevalence of dysmenorrhea was more among participants having menstruation with huge blood clot in menstrual flow in respect to participants having no clot and fewer clots. Adolescent girls with having blood clot in menstrual flow were approximately 2.4 times more experience to dysmenorrhea (table-8) than girls with menstrual flow without clot blood.

Table 8 Multivariate analysis of association between release of blood clot in menstrual flow and incidence of dysmenorrhea

Clot blood in menstrual flow	Dysmenorrhea		Odd Ratio	Relative Risk	95% CI	p
	No	Yes				
No clot	62 (23.49)	202 (76.51)	1	1	-----	Ref
Less clot	72 (12.44)	507 (87.56)	2.161	1.888	1.483 to 3.150	0.0000
Huge clot	3 (3.41)	85 (96.59)	8.696	6.888	2.656 to 28.473	0.1878
Presence of clot	75 (11.24)	592 (88.76)	2.423	2.088	1.669 to 3.515	0.0000

Data in parenthesis indicates percentage

3.9. Family History of dysmenorrhea

36.63% of the participants had complaints of dysmenorrhea among immediate family members (mother and/or sister). Prevalence of dysmenorrhea was more among participants coming from family having immediate history of dysmenorrhea. The bivariate analysis proved statistically significant association between family history and incidence of dysmenorrhea. Participants whose family members had a history of dysmenorrhea had 1.67 times greater chance of having same problem in compared to participants without family history of dysmenorrhea.

Table 9 Bivariate analysis of association between family history and incidence of dysmenorrhea

Family history	Dysmenorrhea		Odd Ratio	Relative Risk	95% CI	p
	No	Yes				
No	100 (16.95)	490 (83.05)	1	1	-----	Ref
Yes	37 (10.85)	304 (89.15)	1.676	1.562	1.120 to 2.510	0.0000

Data in parenthesis indicates percentage

4. Discussion

Prevalence of dysmenorrhea in our study was very high (85.28%). Our results lie within early reported range of 20% to 95% (15). A recent meta-analysis of dysmenorrhea among students reported that prevalence varies from 24 to 94% and 8% with severe pain (16). Other studies also reported high levels among school girls for example 89% in Iraq (17) and 96% in Palestine (18) Wide variation may be due to ethnic and sociocultural differences of the study groups. Besides this, measuring of dysmenorrhea is problematic due to lack of universal measurement tools causing a wide range of variation in prevalence of dysmenorrhea (19). Adolescent girls among dysmenorrhea group, 15.5% reported as severe pain, 26.6% as moderate and 57.9% as mild pain.

There was significant difference in the mean age of menarche between adolescents with dysmenorrhea and without dysmenorrhea. Risk of dysmenorrhea was more among adolescent girls who attained menarche early in life (below 11 years). It is believed that girls who attend menarche earlier in life have longer exposure to uterine prostaglandin leading to higher prevalence of dysmenorrhea(20).

Majority of participants (48.6%) reported menstrual bleeding duration 4to 5 days. Girls who had bleeding duration more than 5 days had 2 times more chance of getting dysmenorrhea. This finding is compatible with previous observation suggesting that risk of dysmenorrhea is higher in woman with long menstrual flow (21, 22).

Results of our study indicate that menstrual irregularity tends to enhance menstrual pain. This finding was in accord with previous studies (23, 24). Irregular menstrual cycle can be caused by psychological factors like stress (25). Stress is an important risk factor of dysmenorrhea (26). Women who experience stress will cause an increase prostaglandin production, mediator of primary dysmenorrhea (27)

Girls with presence of clot had 2 times more chance of getting dysmenorrhea in respect to girls who did not report clot. This finding was in accord with previous studies (28).

Our study showed that a maternal history of dysmenorrhea was a risk factor for development of primary dysmenorrhea. Most of the previous studies indicated that women with family history of dysmenorrhea had an increase risk dysmenorrhea (29, 30). This may be due behavior that girls learn from their mothers (29) and/or related to genetic factors (31).

5. Conclusion

A proportion of female secondary school students were suffering from primary dysmenorrhea. Earlier age at menarche, family history of dysmenorrhea, irregular menstrual cycle, and presence of clot blood in menstrual flow, longer bleeding duration and frequent menstrual cycle were risk factors for primary dysmenorrhea among secondary female students.

Compliance with ethical standards

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Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of ethical approval

The study conducted was a noninvasive one and approved by the Human Ethical Committee of the institute.

Statement of informed consent

Written consent for participation was obtained from the parents and school authorities

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