Characteristics and Determinants
of Primary Dysmenorrhea in Young Adults

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Abstract: Problem statement: Dysmenorrhea is believed to be on rise affecting activities of women adversely. It was considered worthwhile to identify risk factors for dysmenorrhea, since such information is useful in designing management process. **Approach:** A Cross-sectional study was conducted on 500 healthy females aged 18-28 years. Standardized Self-reporting questionnaires were used to obtain relevant data. The categorical data was analyzed using Chi-sq, correlation and regression analyses by SPSS version 16. **Results:** Majority (72.9%) of the participants experienced menstrual pain. More than 50% dysmenorrheic subjects experienced pain every menstrual cycle. Among the factors studied menstrual flow, length of flow and family history exhibited positive association while family size had an inverse association to a significant extent (p = 0.01). BMI, SFT did not exhibit significant effect, where as time spent in standing was significantly correlated to pain. Dysmenorrheic women scored significantly higher for all the subscales on menstrual attitude questionnaire, wherein certain components describing menstruation as debilitating event or predictability had high score significant at 1% level. **Conclusion:** Dysmenorrhea is becoming a highly debilitating event among young adult females with an increasing prevalence rate. The notorious determining factor may be the family history baring significant association to dysmenorrhea. Attitude towards menstruation and the posture is important contributory factors.

Key words: Dysmenorrhea, menstruation, factors, characteristics

INTRODUCTION

Menstruation is a normal biological process in woman of reproductive age (Sante and Sante, 1995). Often it is referred to cause physical discomfort and psychological upset. In most social structures it is surrounded by myths, superstitions and rituals since time immemorial. The modern scientific era has contributed a better understanding to its physiological importance, it is viewed with a scientific perspective nevertheless, differences in attitudes still persists among different population and culture groups. Since menstrual flow is a normal phase of female life and positive sign of good health, women should be encouraged to be normally active during menstruation (Moronkola and Uzuegbu, 2006).

Certain women experience pain during menstruation and is referred as dysmenorrhea. Primary dysmenorrhea is a common gynecological disorder in young women (Kennedy, 1997). Generally, it occurs within 6-12 months after encompassing menarche and characterized by crampy pelvic pain beginning shortly before or at the onset of menses lasting for 1-3 days (Durain, 2004). Pain occurs due to prostaglandins secretion that causes uterine smooth muscle to contract and set in the menstruation and expulsion of the endometrium (Campbell and McGrath 1997).

A variety of physiological, environmental and behavior factors are reported to influence dysmenorrhea. The confounding factors that have been referred frequently include-early menarche, younger age, low Body Mass Index (BMI), prolonged or aberrant menstrual flow, premenstrual somatic complaints, somatization, psychological disturbances, pelvic infections and smoking. Genetic influence is also known to affect prevalence and severity of dysmenorrhea (Latthe *et al*., 2006; Tonnin, 2002). Exertion and activity patterns are also found to influence dysmenorrhea. Epidemiological studies suggests that women participating in moderate recreational activity experience longer and more

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variable cycles compared to sedentary women (Cooper *et al*., 1996; Harlow and Matanoski, 1991). The general consensus among women is that physical activities increase menstrual flows, therefore women tend to reduce their levels of physical activity during menstruation (Chiou *et al*., 2007; Lee *et al*., 2006; Im and Choe, 2001; Hill, 2003). Other than this, literature also indicate that menstruation is conceived as an overwhelmingly negative period, in fact a time when women must cope with considerable psychological and physical symptoms (Marianne and McPherson, 2004). The present study was planned with an objective to investigate the menstrual pattern among the young females from urban area and correlate the occurrence of dysmenorrhea with demographic variables, menstrual pattern, activity and attitude.

MATERIALS AND METHODS

The present study was of a Cross-sectional design conducted in urban areas from a major city in South India. The selected women were explained about the protocol and purpose of the study and were requested to complete the questionnaires to elicit information relating to demographic feature, menstrual characteristics, pain intensity and attitude towards menstruation.

Five hundred healthy young females aged 18-28 years formed the study population. They were selected from educational institutions offering higher secondary education, pre-university and under graduate courses. A purposeful sampling was adopted to select unmarried girls; also those who volunteered to give complete and correct information were included for the study.

Demographic assessment: The demographic information included family details relating to family size and type, chronological age and age at menarche. Parent's education, occupation, house type and possession of costly goods like vehicles, computer, TV, DVD, refrigerator, phones was also obtained and this information was used to compute Socio Economic Status (SES), it was designated as low, middle and high SES.

Assessment of menstrual characteristics: Menstrual regularity: Menstrual flow in equal intervals between 21 and 35 days was considered as regular (normal) menstruation (Bernis *et al*., 1999).

Menstrual blood flow: The quantity of menstrual flow usually experienced was recorded by each participant as per the method suggested by Higham and Shaw (1990). This was indicated based on the size of stain and number of pads used per day during the menstruation. The extent of blood loss was expressed as low, moderate, or heavy.

Identifying dysmenorrheic females: Those females, who experienced pain in the abdominal, groin and lumbar regions on the day before or on the first day of menstruation, were considered as dysmenorrheic (Liu *et al*., 2007).

Pain intensity: The Numerical Pain Scale developed by McCaffery and Beebe (1993) was used for assessing pain intensity.

Anthropometric assessment: All the participants were measured for linear height and body weight. Height measuring scale was used to measure height to the nearest of 0.1 cm. Body weight was measured using a battery operated digital balance(Glan Electronic Scale) the balance was checked for its accuracy each time before use, measurements were made to the nearest of 0.1 kg . This information was used to compute BMI.

Skin Fold Thickness (SFT) was also measured at triceps, using SLIMGUIDE caliper to the nearest of one millimeter. Standard protocols as described by Jelliffe (1966) were employed for all the measurements.

Physical activity: Time spent on usual activities for 24 h during the normal days was obtained through recall method as suggested by WHO FAO/WHO/UNU, 1985. The pattern and type of exercise performed in the past one week was also collected. The information was computed as the duration of work done in different postures such as sitting, standing, walking, lying down and sleeping.

Menstrual attitude: Menstrual attitude questionnaire of Brooks-Gunn and Ruble (1980) and modified was adopted. This schedule carried 22 items with six dimensions for menstruation, i.e., as a debilitating event, a bothersome event, a natural event, anticipation and prediction of the onset of menstruation, denial of any effect of menstruation and embarrassment about menstruation. Each item was scored from disagree strongly to agree strongly.

The research protocol was approved by the Ethical Committee, University of Mysore.

The data was analyzed using SPSS for Windows version 16. Descriptive statistics was used to determine mean and percentages. The categorical data was analyzed using Chi-sq, correlation and regression analyses.

RESULTS

Subjective information is presented in Table 1, the participants were in the age group of 18-28 years with a mean age of 21 ± 1.65 years. No significant difference in age was noted between dysmenorrheic and non dysmenorrheic women; however it is of concern that more than 50% dysmenorrheic subjects experienced pain every menstrual cycle.

Table 1: Socio-demographic characteristics of females by status of dysmenorrhea

Socio demographic variables		Dysmenorrheic N (%)	Non dysmenorrheic N (%)	Total N	Chi-square
Distribution		363 (72.9)	135 (27.1)	498	-
Age (Years)	18-21	185(51)	66(48.9)	251	0.170^{ns}
	>21	178(49)	69(51.1)	247	
SES	Low	99(27.3)	38(28.1)	137	1.428^{ns}
	Middle	221(60.9)	76(56.3)	297	
	High	43(11.8)	21(15.6)	64	
Family size	≤4	204(56.2)	66(48.9)	270	7.999^*
	5-8	152(41.9)	60(44.4)	212	
	>8	7(1.9)	9(6.7)	16	
Type of family	joint	45(12.5)	16(11.9)	61	0.607^{ns}
	Nuclear	304(84.5)	112(83.6)	416	
	Extended	11(3)	6(4.5)	17	

Table 2: Menstrual characteristics, family history and work pattern of subjects with/without dysmenorrhea

Menstrual characteristics	Dysmenorrheic N (%)	Non dysmenorrheic N (%)	Total	Chi-square
Cycle length				
<21 days	12(3.4)	7(5.4)	19	4.492^{ns}
21-27	144(40.7)	59(45.7)	203	
28-35	168(47.4)	58(45)	227	
>35	30(8.5)	5(3.9)	35	
Blood flow				7.761^*
Low	85(23.5)	48(35.8)	133	
Moderate	96(26.5)	32(23.9)	128	
Heavy	181(50)	54(40.3)	235	
Length of flow (days/ cycle)				
≤ 4	144(40)	73(54.5)	217	8.423^*
5-6	195(54.2)	56(41.8)	251	
≥7	21(5.8)	5(3.7)	26	
Regularity of periods				
Yes	310(85.6)	120(88.9)	430	0.891^{ns}
No	52(14.4)	15(11.1)	67	
Family history of menstrual pain				
Yes	243(68.4)	55(42)	298	28.2^{***}
No	112(31.6)	76(58)	188	

Table 3: Distribution of subjects into BMI category and SFT

	Menstrual pain					
Anthropometric parameters	Dysmenorrheic N (%)		Non dysmenorrheic N (%)			Chi-square
BMI						
<18.50	97	26.7	44	32.6		3.542 (3)
18.50 – 24.99	218	60.0	78	57.8		p = 0.315
25.00 – 29.99	43	11.8	10	7.4		
≥30.00	5	1.4	3	2.2		
SFT						
	Mean ± SD		Mean ± SD			Correlation
	14.48±4.85		14.56±5.52			r = 0.890

Table 4: Correlation Coefficient between different position and dysmenorrhea

	Mean ± SD total time for different position in two groups		
Different positions	Dysmenorrheic	Non dysmenorrheic	Pearson correlations
Sitting	418.07±144	414.23±133	0.012
Standing	205.52±104	184.42±89	-0.099*
Walking	102.02±67	93.91±50	-0.065
Sleeping/lying	522.88±105	537.26±96	0.064
Working	165.77±107	172.61±118	0.026

The percentage distribution of women into low, middle and high SES was also essentially similar in the two groups. Majority of the selected women belonged to low and middle SES. Family size of the participants varied between less than 4 to more than 8 members, large families were less prevalent. Chi-sq analysis exhibited a significant association between family size and dysmenorrhea (p = 0.01).

Table 2 presents the menstrual characteristics and family history of dysmenorrhea.

Table 5: Mean and group differences of attitudes toward menstruation

MAQ subscales	Group	Group Dysmenorreic	Non dysmenorrheic	t	p
Menstruation as a debilitating event Mean ± SD	3.37±1.1	3.45±0.06	3.02±0.1	-2.304	
Menstruation as a bothersome event Mean ± SD	3.42±0.85	3.46±0.85	3.24±0.94	0.022	
Menstruation as a natural event Mean ± SD	3.71±1.07	3.7±1.09	3.71±1.11	0.162	0.871
Anticipation and prediction of the onset of menstruation Mean± Sd	3.91±1.35	4.06±1.32	3.22±1.56	-5.873	0.000
Denial of any effect of menstruation Mean± SD	3.53±1.37	3.15±1.71	2.92±1.77	-1.234	0.218
Embarrassment about menstruation Mean± SD	3.15±1.28	3.17±1.29	2.84±1.49	-2.413	0.016

Table 6: Relationship between certain subjective factors on occurrence of dysmenorrhea

Variables	ß	Adj.r^2	P
Family size	-0.096	0.007	0.033
Menstrual blood flow	0.117	0.012	0.009
Length of flow	0.126	0.014	0.005
Family history of menstrual pain	0.241	0.056	0.000

It is evident that 48-90% of women had the cycle length of 21-27 and 28-35 days respectively. No significant differences in the cycle length were found between women with and without dysmenorrhea (χ^2= 4.492). Blood flow and length of flow appeared to be significantly associated with dysmenorrhea, 50% of dysmenorrheic women reported to experience heavy blood flow and 26.5% had moderate flow as against the non dysmenorrheic (40.3 and 23.9%) females. Majority of dysmenorrheic females experienced more menstrual days of flow (5-6 and ≥7 days), which exhibited significant association according to the chi. Sq. analysis (χ^2 8.423). All the participants regardless of dysmenorrhea had regular periods.

Table 3 provides the distribution pattern of selected subjects into the BMI categories. Majority (60 and 57.8%) of dysmenorrheic and non dysmenorrheic women respectively had BMI in the normal range (18.5-24.99). Nearly 27 and 33% of women had BMI less than 18.5 indicating Chronic Energy Deficiency (CED), while 13.2 and 9.6% of women were overweight and obese. It is worthwhile to highlight that a higher percent of dysmenorrehic women were in this category. However the distribution of women with and without dysmenorrhea into various BMI categories was not significant statistically at 5% level. There was not meaningful difference in mean of SFT between two groups.

Table 4 provides data regarding the usual daily activity pattern of the participants. Pearson`s correlation was performed to identify the association between time spent in activities such as standing, sitting, walking, lying down or sleeping and occurrence of dysmenorrhea. The mean time spent in standing and walking was higher among dysmenorrheic girls as compared to non-dysmenorrhic, standing time was found to be negatively correlated to dysmenorrhea

significantly. It appears that the non dysmenorrhic females' work in a more leisurely manner, since sleeping time was higher while walking and standing time was comparatively low, this probably make them fit for working longer time.

Table 5 presents mean scores for attitudes towards menstruation, as it is evident from the table, the mean values for all subscales for dysmenorrheic women were significantly higher than those scored by non dysmenorrheic women. Scores for subscales such as "debilitating event" and "prediction of the onset of menstruation" were extremely significant at 1% level. On the other hand scores for other subscales except for "Menstruation as a natural event" and "Denial of any effect of menstruation" were significant at 5% level, indicating that dysmenorrhea is influenced by an array of psychological factors.

Table 6 Certain selected subjective factors such as family size, menstrual flow, length of flow, family history for menstrual pain and occurrence of dysmenorrhea were subjected to correlation test. Although all the selected variables correlated significantly to the occurrence of dysmenorrhea in the selected women, family history exhibited extremely significant correlation.

DISCUSSION

Dysmenorrhea is being recognized as an important debilitating period for females. Studies from different regions indicate a rise in its prevalence rate (Agarwal and Agarwal, 2010). The cause of primary dysmenorrhea has not been clearly elucidated (Davis and Westhof, 2001). Less is known about the non-biological factors in the etiology of primary dysmenorrhoea. Demographic characteristics are often referred to influence dysmenorrhea, especially the chronological age, menarche age and SES. In the present study family size was seen to have a significant effect, nevertheless, age and SES did not exhibit significant association. Although the effect seen between family size and dysmenorrhea was mild, it was surprising that females from small families were more inflicted than those from large families; the reason for such an observation is difficult to explain. Studies from

different regions covering a large number of adolescent population reported socioeconomic status and literacy to have a positive correlation with dysmenorrheal (Klein and Litt, 1988; Patel *et al.*, 2006), contrary to this, Ohde *et al.* (2008) reported no association to income or education with dysmenorrheal.

Menstrual characteristics are known to be one of the risk factors for dysmenorrhea, wherein, the important ones being length of flow and menstrual blood loss (Balbi *et al.*, 2000). Our findings also revealed similar results, since both length of flow and menstrual blood loss were found to be significantly associated to the occurrence of dysmenorrhea. Results from other studies have supported our findings (DiCintio *et al.*, 1997). Genetic predisposition to dysmenorrhea was found to be a predominating factor in the present group; the results indicate that family history is a vital sign for predicting the occurrence of dysmenorrhea among the female child. According to genetic studies, genotypes were found to have a significant association with risk of recurrent dysmenorrhea (Di *et al.*, 2000; Liu *et al.*, 2007).

CONCLUSION

Our results also revealed that cycle length and regularity of menstruation did not exhibit significant association to dysmenorrhea. However, fact is that relatively higher proportions of the selected females in dysmenorrheic group had longer cycle length than the non dysmenorrheic females suggesting cycle length to exert an effect in menstrual pain. Both dysmenorrheic and non dysmenorrheic females were found to experience regular menstrual periods. A small proportion of the participants reported to have experienced irregularity. It is relevant to mention that, the primary dysmenorrhea may essentially be due to hormonal effects causing higher levels of circulating prostaglandins.

According to the Ozerdogan *et al.* (2009) dysmenorrhea was 1.5-times higher in underweight women compared to overweight/obese women (OR 1.52; 95% CI 0.99-2.33). Other studies reported that adopting weight management programs also caused an increase in menstrual pain (Montero *et al.*, 1996). However, in contrary our study did not find an association between BMI and SFT to the occurrence of dysmenorrhea, studies reported by Ohde *et al.* (2008) supported our findings (Ohde *et al.*, 2008).

Importance of attitude towards dymsmenorrhea has been a focus of study from various countries and realized that a significant cross-cultural difference exists. It is often reported that psychological status influences the occurrences of debilitating events (Wang *et al.*, 2004; Lori *et al.*, 2000). The readiness for menstrual event reflects the attitudes of women towards themselves and in turn their self esteem. Hoerster *et al.* (2003) in their comparison between American and Indian women in knowledge and attitude towards menstruation found American women to score significantly higher for preparedness and knowledge for menstruation than the Indian women. On the other hand Indian women scored significantly higher for their positive attitude towards menstruation (Hoerster *et al.*, 2003). Results from other studies coincided with our findings that majority (92.2%) of females regardless of age believed menstruation was a natural event also 71.1% believed that the onset of menstruation could be anticipated (Hoerster *et al.*, 2003; Lu, 2001).

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