

Original Article

Prevalence of Primary Dysmenorrhea and Factors Associated with Its Intensity Among Undergraduate Students: A Cross-Sectional Study

■ ■ ■ *Nabal Habibi, MSc,* Mary Soo Lee Huang, PhD,*
Wan Ying Gan, PhD,* Rejali Zulida, MD,†
and Sayyed Morteza Safavi, PhD‡*

■ ABSTRACT:

Primary dysmenorrhea is a womanhood problem around the world and negatively affects quality of life. This study was designed to investigate the prevalence of primary dysmenorrhea and to determine the factors associated with its intensity. A cross-sectional study was carried out among 311 undergraduate female students aged 18 to 27 years in Isfahan University of Medical Sciences, Iran. Socio-demographic characteristics and menstrual factors were obtained through interviews with the help of a pretested questionnaire. The prevalence of primary dysmenorrhea was 89.1%. Residing at home, younger age, lower number of years of formal education for the mother, positive family history of dysmenorrhea, higher severity of bleeding, and shorter menstrual period intervals were significantly associated with the higher intensity of primary dysmenorrhea. Primary dysmenorrhea is a common health concern among young women. Being aware of the factors that are associated with its intensity makes it possible for health professionals to organize better focused programs to reduce the adverse effects of dysmenorrhea.

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BACKGROUND

One of the most common complaints for women that can affect quality of life is dysmenorrhea. Dysmenorrhea is a subgroup of pelvic pain that manifests as painful menstrual flow (Lefebvre et al., 2005; Nasir & Bope, 2004). It occurs in two forms: primary and secondary dysmenorrhea. Primary dysmenorrhea is painful menstruation occurring without any gynecological disease, often starting at 6 to 12 months after menarche and possibly continuing to menopause. Although the

From the *Department of Nutrition and Dietetics, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Serdang, Malaysia; †Department of Obstetrics and Gynaecology, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, Serdang, Malaysia; ‡School of Nutrition and Food Science, Isfahan University of Medical Sciences, Isfahan, Iran.

Address correspondence to Wan Ying Gan, PhD, Department of Nutrition and Dietetics, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, 43400 Serdang, Selangor, Malaysia. E-mail: wanying@upm.edu.my

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secondary form can occur at any time in a woman's life between menarche and menopause, it most often happens after 25 years of age subsequent to a gynecological pathology such as endometriosis and ovarian cysts (Proctor & Farquhar, 2007). Primary dysmenorrhea usually starts around the onset of menstruation and may continue for 8 hours to 3 days (Proctor & Farquhar, 2007). Although there is not enough information to attribute the etiology of primary dysmenorrhea to one factor yet, a combination of factors, including increase of synthesis and secretion of prostaglandin $F_{2\alpha}$, increased vasopressin and oxytocin that subsequently enhance the secretion of prostaglandin, and stimulation of the type C pain fibers, are postulated to be the contributing agents (Montoya, Cabezza, Rojas, Navarrete, & Keever, 2012; Sheila Rani, 2012). Dysmenorrhea has different detrimental effects on individuals and the community. For instance, school and work absenteeism, interference with daily living activities, limitation in socialization, and higher intake of sedative medications are positively associated with the higher prevalence and intensity of dysmenorrhea (Al-Kindi & Al-Bulushi, 2011; Locklear, 2009; Pitanguí et al., 2013). In 2007, the International Association for the Study of Pain estimated that at each menstrual period, approximately 10% to 15% of dysmenorrheic women were not able to work for 1 to 3 days (IASP, 2007). In the United States, dysmenorrhea causes annual loss of nearly 140 million working hours (Ostrzenski, 2002). In Japan, it was estimated that economic losses due to dysmenorrhea totaled \$4.2 billion dollars annually (Taketani, 2000). Sugumar et al. (2013) in their study on 654 respondents in India found that 42% self-medicated and that 35% took inappropriate medicine and mefenamic acid as a non-steroidal anti-inflammatory drug (NSAID) to reduce the discomfort of dysmenorrhea. According to the medication guidelines of the U.S. Food and Drug Administration (FDA), NSAIDs can increase the risk of heart attack or stroke, stomach ulcers, and bleeding, especially when used over a long time. Furthermore, kidney, liver, and heart failure; anemia; asthma attacks in people suffering from asthma; and allergic reactions are serious side effects of NSAIDs. In addition, stomach pain, diarrhea, constipation, heartburn, dizziness, nausea, and vomiting are reported as the mild to moderate side effects of the consumption of NSAIDs (FDA, 2007). There are only two studies about the prevalence of primary dysmenorrhea among undergraduate students in Iran (Akhavanakbari & Ahangar-Davoudi, 2010; Nazarpour, 2010). Additionally, there is limited literature on the association among socio-demographic characteristics and menstrual factors with the intensity of primary dysmenorrhea. This study aimed to determine the prevalence of primary dysmenorrhea and identify

factors associated with its intensity to provide better understanding of this issue in an effort to safely reduce its intensity and negative impacts.

METHODS

Design

This cross-sectional study was conducted in Isfahan University of Medical Sciences in Iran among 311 undergraduate female students. Prior to the study, it was approved by the University Research Ethics Committee of Universiti Putra Malaysia (JKEUPM).

Participants were given the information about the purpose and protocol of the study. Informed consent of participants was sought prior to data collection. Inclusion criteria included studying at Isfahan University of Medical Sciences; being single; not taking any medications (namely vitamin-mineral supplements, NSAIDs, oral contraceptive pills [OCPs], and any other special medications); not having a previous history of pelvic inflammatory disease; not currently suffering from ailment including pelvic inflammatory disease; and not having any symptoms including stinging, itching, and discharge from the vagina.

Data Collection

All participants were interviewed with the help of a pre-tested questionnaire consisting of socio-demographic characteristics and menstrual factors, including the numeric pain rating scale and pictorial blood loss assessment chart. Socio-demographic characteristics included age, family size, place of origin (rural or urban), residential status (at home with their families, alone and away from home, or at the dormitory), participant's average monthly income, number of years of parents' formal education, parents' occupation (managers & professionals, support service, skilled workers, elementary occupations, armed force occupations, housewife, unemployed), and parents' average monthly income.

To assess the intensity of primary dysmenorrhea, the Numeric Pain Rating Scale (NPRS) questionnaire was used (McCaffery & Beebe, 1993). According to the guideline of the NPRS, participants were classified as dysmenorrheic if they circled 1 to 10. Mild, moderate, and severe intensity were assigned as 1 to 3, 4 to 6, and 7 to 10, respectively (McCaffery & Beebe, 1993).

Menstrual characteristics, including age of menarche, history of dysmenorrhea in the family (none, mother, sister, mother and sister), length of menstrual flow (days), and interval between menstrual periods (days), were obtained with a questionnaire by interview. To measure the intensity of bleeding, participants were asked to fill a Pictorial Blood Loss Assessment Chart (PBAC) questionnaire for one menstruation (Higham,

O'Brien, & Shaw, 1990); if that menstruation was not representative of the usual menstrual period, another PBAC questionnaire was given for next menstruation. Bleeding was classified as normal with a score of less than 100 and heavy bleeding with a score of more than 100 from the total score (calculated by the PBAC guideline; Higham et al., 1990).

Data Analysis

Data were analyzed using the IBM SPSS Statistics 21 (IBM Corp., Armonk, NY). Normal distribution of data was tested using skewness. Skewness values between -1 and $+1$ were considered excellent and between -2 and $+2$ were considered acceptable. Pearson's Product-Moment Correlation was used to test the correlations between continuous variables. Chi-square test was applied to determine the differences of association between categorical variables. Multiple linear regression analysis was used to

determine the factors contributing to the intensity of primary dysmenorrhea. A p value of less than .05 was considered as statistically significant.

RESULTS

In this study, prevalence of primary dysmenorrhea was 89.1%, with 30.3%, 36.5%, and 33.2% of the respondents reporting mild, moderate, and severe intensity pain, respectively. Age of participants ranged from 18 to 27 years (mean 20.69 ± 1.56). There was significant association between age ($r = -0.233$, $p < .01$) and mothers' years of formal education ($r = -0.143$, $p < .05$) with the intensity of primary dysmenorrhea (Table 1). Participants who lived at home with their families reported higher intensity of primary dysmenorrhea compared to residents of dormitories (chi-squared = 16.8, $p < .01$; Table 2).

More than half of the participants (58.8%) reported that they had a history of dysmenorrhea in their

TABLE 1.
Socio-Demographic Characteristics of Participants and their Association with the Intensity of Primary Dysmenorrhea (n = 277)

Characteristics (Continuous)	Mean (SD)	Pearson Correlation
Age (year)	20.69 (1.56)	-0.233*
Mothers' years of education	9.03 (5.41)	-0.143†
Fathers' years of education	11.34 (4.551)	NS
Family income (US dollars)	402.12 (254.41)	NS
Characteristics (Categorical)	No (%)	Chi-square
Family size		
<4	17 (6.1)	
4-6	228 (82.3)	NS
≥7	32 (11.6)	
Place of origin		
Urban	261 (94.2)	NS
Rural	16 (5.8)	
Place of residence		
Home	130 (46.9)	chi-squared = 16.8* df = 2, Cramer's V = 0.246
Dormitory	147 (53.1)	
Job classification of mothers		
Managers & professionals	38 (13.7)	
Support service	5 (1.8)	—‡
Elementary occupations	2 (0.7)	
Housewife	232 (83.8)	
Job classification of fathers		
Managers & professionals	84 (30.3)	
Support service	105 (37.9)	
Skilled workers	31 (11.2)	NS
Elementary occupations	36 (13.0)	
Armed Force occupations	10 (3.6)	
Unemployed	11 (4.0)	

* $p < .001$.

† $p < .01$.

‡In this analysis, 6 cells (66%) have expected count less than 5.

TABLE 2.
Association Between Residential Status and Intensity of Primary Dysmenorrhea (n = 277)

Residential Status	Intensity of Primary Dysmenorrhea			Total
	Mild	Moderate	Severe	
Home				
n	30	41	59	130
%	23.1	31.5	45.4	100.0
Dormitory				
n	54	60	33	147
%	36.8	40.8	22.4	100.0
Total				
n	84	101	92	277
%	30.3	36.5	33.2	100.0

Chi-squared = 16.8.

df = 2.

$p < .001$.

Cramer's V = 0.246.

family, with 27.8% saying that their mothers suffered from dysmenorrhea, 18.4% indicating that their sisters suffered from it, and 12.6% whose mothers and sisters both had a history of dysmenorrhea. While bleeding intensity ($r = 0.225$, $p < .01$), intervals between menstrual periods ($r = -0.202$, $p < .01$), and family history of dysmenorrhea (chi-squared = 28.09, $p < .01$) were significantly associated with the

intensity of primary dysmenorrhea, association between length of period and age of menarche with the intensity of primary dysmenorrhea were not significant ($p > .05$) (Tables 3 and 4).

Multiple linear regression analysis showed that family history of dysmenorrhea, age, residential status, bleeding intensity, mothers' years of formal education, and length of interval between periods significantly contributed to the intensity of primary dysmenorrhea ($F(6,270) = 18.821$, $p < .05$; Table 5); 27.9% of the variance in the intensity of primary dysmenorrhea could be explained by these factors. Meanwhile, family history of dysmenorrhea ($\beta = 0.294$, $p < .05$) was the strongest factor that contributed to the intensity of primary dysmenorrhea; the weakest factor was the interval between periods ($\beta = -0.168$, $p < .05$; Table 5).

DISCUSSION

The high prevalence of primary dysmenorrhea in this study showed that it was a common health complaint among young women. It was consistent with previous studies that also reported that primary dysmenorrhea was a common problem (Akhavanakbari & Ahangar-Davoudi, 2010; Nazarpour, 2010; Omidvar & Begum, 2012; Ortiz, 2010; Polat et al., 2009). Results of the current study showed that higher intensity of dysmenorrhea was associated with younger ages, and

TABLE 3.
Menstrual Characteristics of Participants and their Association with the Intensity of Primary Dysmenorrhea (n = 277)

Characteristics (Continuous)	Mean (SD)	Pearson Correlation
Menarche age (year)	13.26 (1.46)	NS
Menstrual period length (day)	6.21 (1.26)	NS
Bleeding intensity	129.7 (78.46)	0.225*
Intervals between periods (day)	27.8 (6.16)	-0.202†
Characteristics (Categorical)	No (%)	Chi-square
Family history of dysmenorrhea		
No	139 (44.7)	28.09* df = 6, Cramer's V = 0.225
Mother	85 (27.3)	
Sister	52 (16.7)	
Mother and Sister(s)	35 (11.3)	
Primary dysmenorrhea		
No	34 (10.9)	—
Yes	277 (89.1)	
Intensity of primary dysmenorrhea		
Mild	84 (30.3)	—
Moderate	101 (36.5)	
Severe	92 (33.2)	

* $p < .001$.

† $p < .01$.

TABLE 4.
Association Between Family History of Dysmenorrhea and Intensity of Primary Dysmenorrhea (n = 277)

Family History of Dysmenorrhea	Intensity of Primary Dysmenorrhea			Total
	Mild	Moderate	Severe	
No				
n	51	41	22	114
%	44.7	36.0	19.3	100.0
Mother				
n	16	25	36	77
%	20.8	32.4	46.8	100.0
Sister(s)				
n	13	20	18	51
%	25.5	39.2	35.3	100.0
Mother & sister(s)				
n	4	15	16	35
%	11.4	42.9	45.7	100.0
Total				
n	84	101	92	277
%	30.3	36.5	33.2	100.0

Chi-squared = 28.09.

df = 6.

$p < .001$.

Cramer's V = 0.225.

some previous studies confirmed that the intensity of primary dysmenorrhea decreased as age increased (Juang et al., 2006; Lindh, Ellström, & Milsom, 2012; Okoro, Malgwi, & Okoro, 2013; Tavallaee et al., 2011). In this study, as years of education of mothers increased, severity of primary dysmenorrhea was significantly lower. There was no association between monthly family income and the intensity of primary dysmenorrhea ($p > .05$) and was consistent with the findings of a cohort study among Japanese women by Ohde et al. (2008) that reported no significant association between dysmenorrhea and household income. In contrast, although Akhavanakbari and Ahangar-

Davoudi (2010) reported that there was significant association between dysmenorrhea and economic situation, they did not define "economic situation" and they also gave no report of the direction of association.

There was positive association between history of dysmenorrhea in the immediate family and severity of primary dysmenorrhea in the current study. Results of previous studies also support this association (Akhavanakbari & Ahangar-Davoudi, 2010; Nazarpour, 2010; Shabani-Nashtai & Mohamadalizadeh, 2010; Tavallaee et al., 2011; Wu et al., 2000). There are two possible reasons regarding this association; the first points to the girls' behavioral modelling after their mothers or sisters (Ozerdogan, Sayiner, Ayranci, Unsal, & Giray, 2009), and the second reason can be explained by genetic factors. In this instance, results of a study by Silberg et al. (1987) among 1200 pairs of monozygotic and dizygotic twin sisters confirmed that genetic factors as well as environmental factors were responsible for primary dysmenorrhea.

In the current study, heavier intensity of bleeding was associated with the higher severity of primary dysmenorrhea. Similarly, a prospective study conducted on 2,640 Chinese female students showed that severity of dysmenorrhea was associated with greater amount of menstrual bleeding (Zhou & Yang, 2010). Meanwhile, results of a cross-sectional study on 16- to 56-year-old Iranian women showed significant positive association between heaviness of menstrual bleeding and level of menstrual pain (Tavallaee et al., 2011). Intervals between periods were negatively associated with the intensity of primary dysmenorrhea in the current study, which is similar to Tavallaee et al. (2011), who reported significant association between severity of pain and period intervals. In contrast, in a study conducted among 276 Japanese women aged 19 to 24 years, no association between the length of menstrual cycle and intensity was reported (Nagata, Hirokawa, Shimizu, & Shimizu, 2005). The reason of this inconsistency can

TABLE 5.
Factors Contributing to the Intensity of Primary Dysmenorrhea

Variable	Unstandardized Coefficient (β)	Standardized Coefficient (β)	t Value*
Family history of dysmenorrhea	1.586	.294	5.620
Age	-.369	-.216	-4.090
Bleeding intensity	.007	.203	3.918
Mothers' years of formal education	-.092	-.183	-3.436
Residential status	-.905	-.170	-3.153
Interval between periods	-.072	-.168	-3.259

*For all values, $p < .05$.

be explained by the use of different scales for classification of the intensity of dysmenorrhea (in this instance, Nagata et al. used a verbal multidimensional scoring system compared to the numeric pain rating scale in the current study).

According to the results of this study, family history of dysmenorrhea, age, residential status, bleeding intensity, mothers' years of formal education, and intervals between menstrual periods explained 27.9% of variation in the intensity of primary dysmenorrhea. To our knowledge it is the first time that a model is used to explain the intensity of primary dysmenorrhea and there are no studies with which to compare results; however, Omidvar and Begum (2012) used a regression model to find the factors that can explain prevalence of dysmenorrhea among young women. In their study, family size, bleeding intensity, length of menstrual flow, and family history of dysmenorrhea were included in the regression model of the occurrence of dysmenorrhea, and these factors explained 5.6% of the variance in the prevalence of dysmenorrhea among young Indian adults.

As with all studies, this study has some limitations. For instance, due to the cross-sectional design, it is not possible to make the casual inferences about the association between different independent variables and intensity of primary dysmenorrhea. Additionally, the study of pain is difficult because firstly, pain is a subjective matter and when people want to assess its intensity, their perception of pain is

affected by several factors such as culture, social conditions, and their lifestyles, and secondly, studies about dysmenorrhea used different scales to score its intensity, and so comparison of the results with other studies can be affected.

CONCLUSION

In summary, the prevalence of primary dysmenorrhea was high and family history of dysmenorrhea, age, residential status, bleeding intensity, mothers' years of formal education, and intervals between periods were factors that significantly contributed to the intensity of primary dysmenorrhea among undergraduate female students of Isfahan University of Medical Sciences. Researchers and healthcare providers should consider primary dysmenorrhea as a highly prevalent gynecological complaint and intervention studies should give due attention to the above factors to reduce the intensity, as well as the prevalence, of primary dysmenorrhea in young female students. It would also seem that if mothers' years of formal education and family history significantly affect the intensity of primary dysmenorrhea, a certain amount of reassurance on the part of the mothers can go a long way in helping their daughters cope with the discomforts that accompany primary dysmenorrhea. Further studies about associated factors with the intensity of primary dysmenorrhea in different populations are also necessary.

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