Prevalence of Primary Dysmenorrhea, Associated Factors and its Pain Intensity among Female Students

Fazila [1], Dua Rehmatullah[1], Samreen Yasmeen[1], Farhan Ishaque[1*], Saba Mughal[1], Abid Kamal[2]

[1]*Institute of Physical Medicine and Rehabilitation, Dow University of Health Sciences, Karachi, Pakistan*
[2]*College of Physiotherapy Jinnah Post Graduate Medical Centre, JPMC Karachi*
[*]*Corresponding Author*

Abstract:

***Background*: Dysmenorrhea is broadly defined as pain during menstruation nearly frequent symptoms is lower abdominal cramps, back pain, nausea, headache and depression. Dysmenorrhea is categorized into two subtypes that are Primary Dysmenorrhea and Secondary Dysmenorrhea. Primary dysmenorrhea is most commonly found in adolescent and young adult group with no underlying pelvic pathology. Symptoms usually subside within three days of menstrual cycle. Affected Females extremely restrict their physical activities in these days. Dysmenorrhea induces negative impact on quality of life of affected females. This may have now the major reason behind absentees of female students in academics and working women in their work places.**

***Objective* The aim of this study was to determine the frequency of primary dysmenorrhea in sample of under graduated female students of Dow University of Health Sciences and evaluate pain intensity with its associated factors that provoke dysmenorrhea.**

***Materials and Methods*: The Frequency of primary dysmenorrhea was 92% (n=381) out of total respondents (n=414) participated in this study. The pain score of dysmenorrhea categorized in varying intensities, 5.6% of the participants were experiencing no pain, 14.0 % of the total participants were experiencing mild pain, and 61% moderate pain and 18.6% were having severe pain. According to Dysmenorrhea Severity Scale (VMSS) scores 8 % of the participant reported no pain, 33.6 % individuals complained of having mild pain, while, 41.8 % and 16.7 % of the recruits reported moderate and severe pain. Dysmenorrhea was significantly associated with daily life style habits consumption of Coke (p = 0.040) and Coffee (P = 0.022), further significant association were between dysmenorrhea and moderate to severe pattern of menstrual flow (p = <0.001). Those with Regular menstrual cycle having dysmenorrhea 90% (n=271) whereas, 113 female participants of irregular menstrual cycle were mentioned out of these 97.3% (n=110) reported dysmenorrhea.**

***Results*: The Frequency of primary dysmenorrhea was 92% (n=381) out of total respondents (n=414) participated in this study. The pain score of dysmenorrhea categorized in varying intensities, 5.6% of the participants were experiencing no pain, 14.0 % of the total participants were experiencing mild pain, and 61% moderate pain and 18.6% were having severe pain. According to Dysmenorrhea Severity Scale (VMSS) scores 8 % of the participant reported no pain, 33.6 % individuals complained of having mild pain, while, 41.8 % and 16.7 % of the recruits reported moderate and severe pain. Dysmenorrhea was significantly associated with daily life style habits consumption of Coke (p = 0.040) and Coffee (P = 0.022), further significant association were between dysmenorrhea and moderate to severe pattern of menstrual flow (p = <0.001). Those with Regular menstrual cycle having dysmenorrhea 90% (n=271) whereas, 113 female participants of irregular menstrual cycle were mentioned out of these 97.3% (n=110) reported dysmenorrhea.**

***Conclusion*: There is high a proportion of primary dysmenorrhea among female medical students of Dow University of Health and Sciences. Excessive consumption of coke and coffee in daily routine intake were the associated factors that provoked dysmenorrhea. , where as moderate to severe menstrual flow and irregular menstrual cycle were seen as dominant predictors that significantly contributed to the intensity of primary dysmenorrhea. Promote awareness regarding factors that might influence the occurrence of primary dysmenorrhea in early adult age-group females.**

***Keywords:* Dysmenorrhea, Primary Dysmenorrhea Secondary Dysmenorrhea, Cramps, Pre-menstrual Syndrome, VAS, Menarche, student.**

I. INTRODUCTION

Dysmenorrhea is a medical term means painful menstruation, typically involving cramps like pain in the lower abdomen segment due to excessive abdominal muscle contraction. Pain may be dull ache or throbbing in nature. [1] Dysmenorrhea can be designated into two well-designed categories, primary dysmenorrhea and secondary dysmenorrhea.

Primary dysmenorrhea is defined as painful menstruation occurring without any underlying pelvic pathology frequently starting 6 to 12 months after menarche and perhaps continues till menopause [2]. Although secondary dysmenorrhea can occur at any age group of women between puberty and menopause usual onset is generally seen after the age of 25 mostly due to recognized pelvic pathological conditions such as endometriosis, pelvic inflammatory disease, poly cystic ovary adenomyosis, uterine myomas/polyps, uterine fibroids, intrauterine adhesion, cervical stenosis, intrauterine devices, irregular periods and infertility problems.[3]

Often observed symptoms of primary dysmenorrhea are lower abdominal cramps, nausea, vomiting, constipation, diarrhea, low back pain, headache, nervousness, lightheadedness, breast tenderness, depression, mood swings with loss of appetite.

These symptoms usually begin at the menstrual cycle start of and subside within 3 days of cycle. [4], [5]

Physiology of menstruation shows that various hormones of the stimulated hypothalamus pituitary axis controls the menstrual cycle. The menstrual period last from 5 to 7 days with decline level of estrogen and progesterone hormones causes uterine arteries to constrict, as a result their blood supply become ischemic and start to die entire stratum functionalis sheds off while stratum basalis layer of uterus remains. [6]

Many women suffered premenstrual syndrome (PMS) which comprises of physical and psychological symptoms that some women experienced in between 7 to 14 days prior to menstruation or monthly menses cycle. Whereas numbers of etiologies of premenstrual syndrome have been identified such as elevated prolactin level, hypoglycemia or due to vitamins deficiency. [7], [8]

According to a research worldwide prevalence of dysmenorrhea among many countries ranges between 50-90% [9-10] with reference to another research about 40% incidence of women complains of dysmenorrhea among 10% of the, are unable or restricted to do daily living activities in between 1 to 3 days of monthly period cycle.[11]

Risk factors that have been associated to dysmenorrhea include hormonal disturbance, exposure to chronic stress vitamin deficiency, smoking habit, sedentary life style and dietary habits. [12-14].

Despite of its high prevalence of primary dysmenorrhea are many women do not seek medical aids for this condition.[15] there is negative impact on quality of life of affected females as it affects academics, professional performances, relationships, social and recreational activities and most important or major reason behinds absenteeism in university students.[16-19] the purpose of this study was to determine the frequency of primary dysmenorrhea and its associated factors that enhanced dysmenorrhea among under graduated female students of Dow University. This study will create awareness among female students, to let them identify the signs and symptoms of dysmenorrhea, and to provide the association between their lifestyle habits and the primary dysmenorrhea.

II. METHODOLOGY

This cross- sectional survey study was conducted on female students of DUHS University. The data was collected by international standardized Questionnaire which includes question regarding demographical information, menstrual characteristics under the column of personal information, Visual Analogue Scale (VAS) recognized scale was used to measure pain intensity associated with menstrual cycle. Verbal multidimensional scoring system (VMSS) for assessment of dysmenorrhea severity Scale comprises of 0-3 severity grades were used for evaluating the intensity of pain related to daily physical activities. We were also analyzing the effects of associated factors of dysmenorrhea through daily intake and life style habits among targeted population. The selective questionnaires were distributed and collected on the same day of survey to ensure privacy. At the starting of questionnaire presence of any diagnosed or identified pelvic pathological condition mention in earlier section of source and student with such conditions was not to be asked to attempt the questionnaire or return it back to investigator. Consequently, the questionnaire for those who have no previous pelvic pathological problems.

Our sample size was subset of population of female students in Dow University of health sciences. For this study there were sample of 414 subjects. A stratified random simple/convenient sample method was used to collect the data considered the inclusion criteria of female students' population with age group between 20 to 25 years with no any diagnosed of pelvic or gynecological disease.

III. STATISTICAL ANALYSIS

The statistical analysis was carried out using Statistical Package for Social Sciences (SPSS) version 21.0. Descriptive measures; like percentage and frequency were reported to describe categorical variables such as dysmenorrhea severity, age group, overweight/ obese, chronic disease, type of menstrual cycle, nature of menstrual flow and various life style habits. Normality of continuous variable was checked using Shapiro-wilk test and median and inter-quartile range (IQR) were reported to describe continuous variable such as age of student, age at menarche and number of spotting days. Pie chart was constructed to see the distribution of dysmenorrhea among female students. Chi-square test/ Fisher's exact test where needed, was used to assess the association between all independent categorical covariates and dysmenorrhea status. Mann-Whitney test was applied to check median differences between quantitative characteristics and outcome variable. Binary logistic regression model was run, unadjusted and adjusted odds ratios (OR) with 95% confidence intervals (CI) were reported for dysmenorrhea by other independent factors and this analysis was carried out for all those covariates whose p-values were found to be less than 0.25 in univariate logistic model. All test results having p-values less than or equal to 0.05 level of significance were considered statistically significant.

IV. RESULTS

A total of 414 female students were included in this study. Average age of female students was 22.21 years with SD ±1.19 years (range between 20 and 25 years). Among all the participants, 27.3% (n=113) were less than 22 years old and 57.5% (n=238) were aged between 22 and 23 years. According to (Verbal Multidimensional Scoring System) VMSS which was used to assess severity of dysmenorrhea, it was found that 8.0% (n=33) of the female students reported no pain and 33.6% (n=139) students reported mild pain. Whereas 41.8% (n=173) and 16.7% (n=69) of the students complained for moderate and severe pain, respectively (See

Table **1**). The overall proportion of primary dysmenorrhea (from grade 1 to grade 3) perceived among the female students of DUHS was 92.0% (n=381) according to VMSS. The distribution of female participants with or without dysmenorrhea is shown in Figure **1**.

Table **2** reports the results of Chi-square/ Fisher's exact tests which were run to find the association between the dysmenorrhea status (No/ Yes) and various life style habits. It was observed that tendency of having dysmenorrhea was slightly higher in those students who consumed tea (93.2%, n=274) and those who were overweight/ obese (94.9%, n=94). Those female students who consumed coffee (94.9%, n=206) and coke (94.7%, n=198) were more prone to have dysmenorrhea and these life style habits of being a consumer of coffee (p-value=0.022) and coke (p-value=0.040) were found to be statistically significantly associated with dysmenorrhea status.

Female menstrual cycle pattern and reproductive characteristics were also investigated to observe their association with primary dysmenorrhea. It was assessed that female participants having irregular menstrual cycle were more prone to have dysmenorrhea (97.3%, n=110) and those who experienced moderate to severe menstrual flow had higher tendency to have primary dysmenorrhea (94.1%, n=352). Type of menstrual cycle (p-value=0.014) and menstrual flow (p-value=<0.001) were significantly positively associated with dysmenorrhea. Although quantitative characteristics like age of student, age at menarche and number of spotting days did not show any significant median differences between the groups of dysmenorrhea (See Table **3**).

Univariate analysis revealed that female participants who consumed coffee (OR=2.35, p-value=0.025), coke (OR=2.16, p-value=0.044), had irregular menstrual cycle (OR=4.06, p-value=0.023) and moderate to severe menstrual flow (OR=6.06, p-value= <0.001) were more likely to have dysmenorrhea as compared to those students who were not coffee and coke consumers, had regular menstrual cycle and light menstrual flow, respectively. After adjusting the multivariate logistic model, it was again observed that female students who had irregular menstrual cycle and had moderate to severe menstrual flow were three and five times more likely to have dysmenorrhea as compared to those who had regular menstrual cycle and light flow, respectively and these two factors remained consistent and showed significant association with dysmenorrhea (See Table **4**).

Table 1.Distribution of age and menstrual pain severity level of female participants (n=414).

Variables		n	%
Age group (years)			
	20-21	**113**	**27.3**
	22-23	**238**	**57.5**
	24-25	**63**	**15.2**
Dysmenorrhea severity by VMSS			
	Grade 0 (No Pain)	**33**	**8.0**
	Grade 1 (Mild)	**139**	**33.6**
	Grade 2 (Moderate)	**173**	**41.8**
	Grade 3 (Severe)	**69**	**16.7**

Table 2. Daily life style habit of female participants associated with dysmenorrhea

Variables	Total	Dysmenorrhea		p-value
		No (n=33)	Yes (n=381)	
		n (%)	n (%)	
Age group (years)				
20-21	113	11 (9.7)	102 (90.3)	0.551^
22-23	238	16 (6.7)	222 (93.3)	
24-25	63	6 (9.5)	57 (90.5)	
Life style habits				
Sugar intake				
Yes	354	31 (8.8)	323 (91.2)	0.200~
No	60	2 (3.3)	58 (96.7)	
Salt intake				
Yes	368	31 (8.4)	337 (91.6)	0.561~
No	46	2 (4.3)	44 (95.7)	
Tea consumption				
Yes	294	20 (6.8)	274 (93.2)	0.170^
No	120	13 (10.8)	107 (89.2)	
Coffee consumption				
Yes	217	11 (5.1)	206 (94.9)	0.022^
No	197	22 (11.2)	175 (88.8)	
Coke consumption				
Yes	209	11 (5.3)	198 (94.7)	0.040^
No	205	22 (10.7)	183 (89.3)	
Chocolate consumption				
Yes	286	22 (7.7)	264 (92.3)	0.754^
No	128	11 (8.6)	117 (91.4)	
Overweight/Obese				
Yes	99	5 (5.1)	94 (94.9)	0.219^
No	315	28 (8.9)	287 (91.1)	
Anychronic disease				
Yes	36	4 (11.1)	32 (88.9)	0.513~
No	378	29 (7.7)	349 (92.3)	
^ p-value has been calculated using Chi-square test				
~ p-value has been calculated using Fisher's exact Test				

Table 3. Menstrual and reproductive characteristics of female participants with primary dysmenorrhea status.

Characteristic	Total	Dysmenorrhea		p-value
		No (n=33)	Yes (n= 381)	
		n (%)	n (%)	
Type of Menstrual Cycle				
Regular	**301**	**30 (10.0)**	**271 (90.0)**	**0.014^**
Irregular	**113**	**3 (2.7)**	**110 (97.3)**	
Nature of Menstrual Flow				
Light	**40**	**11 (27.5)**	**29 (72.5)**	**< 0.001~**
Moderate to Severe	**374**	**22 (5.9)**	**352 (94.1)**	
		Median (IQR)	**Median (IQR)**	
Age (years)		**22 (2)**	**22 (2)**	**0.950ł**
Age at Menarche (years)		**13 (2)**	**13 (2)**	**0.612ł**
No. of Spotting Days		**5 (2)**	**5 (2)**	**0.266ł**
^ p-value has been calculated using Chi-square test.				
~ P-value has been calculated using Fisher's exact Test.				
ł p-value has been calculated using Mann-Whitney test.				

Table 4. Odds ratio for dysmenorrhea by important risk factors

Characteristic		Dysmenorrhea			
		OR[a] (95% CI)	p-value	OR[b] (95% CI)	p-value
	No	**Ref**		**Ref**	
	Yes	**0.36 (0.08 - 1.54)**	**0.169**	**0.34 (0.08 - 1.54)**	**0.162**
	No	**Ref**		**Ref**	
	Yes	**1.66 (0.80 - 3.46)**	**0.173**	**1.57 (0.72 - 3.45)**	**0.259**
Coffee consumption					
	No	**Ref**		**Ref**	
	Yes	**2.35 (1.11 - 4.99)**	**0.025**	**1.56 (0.69 -3.51)**	**0.287**
Coke consumption					
	No	**Ref**		**Ref**	
	Yes	**2.16 (1.02 - 4.58)**	**0.044**	**1.67 (0.74 - 3.74)**	**0.212**
Overweight/Obese					
	No	**Ref**		**Ref**	
	Yes	**1.83 (0.68 - 4.88)**	**0.225**	**1.47 (0.53 - 4.10)**	**0.456**
Type of Menstrual Cycle					
	Regular	**Ref**		**Ref**	
	Irregular	**4.06 (1.21 - 13.57)**	**0.023**	**3.56 (1.03 - 12.25)**	**0.044**
Nature of Menstrual Flow					
	Light	**Ref**		**Ref**	
	Moderate to Severe	**6.06 (2.68 - 13.73)**	**< 0.001**	**5.24 (2.21 - 12.40)**	**< 0.001**
OR[a] = unadjusted odds ratio, OR[b] = odds ratio adjusted for all above covariates, CI = confidence interval.					

V. DISCUSSION

In this study participants were assessed for the experience of dysmenorrhea and its intensity using international standardize questionnaire Visual Analog Scale (VAS) of pain and Dysmenorrhea Severity Scale (VMSS). The study revealed that in all three groups classified on the basis of age, there was a major proportion of the participant experiencing dysmenorrhea i.e. 381 out of total 414 individuals. In terms of percentile it is found to be 92% which indicates that a larger number of young females are experiencing dysmenorrhea. However, the according to the scores of both VAS and VMSS the majority of the population experience moderate intensity of dysmenorrheal pains.

Conversely, an epidemiological cross-sectional study conducted in Upper Egypt demonstrated higher values of prevalence for dysmenorrhea among the young adolescent girls i.e. 94.4 %[1]. However, the value appeared as the result of our study lies approximately next to this. Similar national studies conducted in Lebanon, China, Canada, USA and Ethiopia revealed the percentages of the females experiencing dysmenorrhea lesser than that of Upper Egypt and ours own, which are 38.1 % in Lebanon, 44.4 % in China, 60 % in Canada, 76% in USA and 85.1 % in Ethiopia [5 ,20].The reason for the these type of difference in the prevalence of the condition among various nationalities could be some underlying genetic makeup and dietary habits or the sample would have been more significantly suitable for such results.

Another study conducted among Serbian university students suggested that younger age at menarche and longer durations of menstrual flow are the contributing factors for the occurrence of dysmenorrhea. However, no significant results have been obtained in this regard and the results are almost similar for the women having dysmenorrhea or those who do not have [6].

On contrary, the association between the consumption of coffee and coke was analyzed by VAS pain scale and severity grade scale (VMSS) found significant in relation with dysmenorrhea while non-significant for tea and chocolate. However, there is a need of further advance study incorporating biochemical investigation so that it could reveal the role and mechanism of action of this tea, coffee, coke and other edibles on the human physiology and playing its role in primary dysmenorrhea. A research conducted at a university in northern Ghana concluded that paracetamol is more potent than bed rest which is the most commonly suggested treatment [21].

VI. LIMITATIONS

As with all studies, this study has also some limitations. It was not possible to compare casual inference between the association of different independent variables and severity grades of primary dysmenorrhea due to the cross-sectional study design. Only few variables addressed several factors that might provoke primary dysmenorrhea and trigger its symptoms were not contemplated. Including stress, sexual history, family history, BMI, PMS, skipping breakfast and physical activity habits. Moreover, this research study was limited to university students, so unable to discriminate the prevalence of dysmenorrhea in females of general community living population.

VII. CONCLUSION

The frequency of Primary Dysmenorrhea among female students of Dow University of Health And Sciences was very high. Primary Dysmenorrhea was more frequent in early adult group females with corresponding to their daily life style habits. Those Participants with their history of excessive Coke and coffee intake in routine consumption, having heavy menstrual period and positive history of Dysmenorrhea, whereas moderate to severe menstrual flow and irregular menstrual cycle were seen as dominant predictors that significantly contributed to the intensity of primary dysmenorrhea. Dysmenorrhea and the menstrual associated symptoms adversely effect on daily lives of females, which includes restricted physical activities or increase absentees in their respective institutes.

VIII. FUTURE RESEARCH RECOMMENDATION

Primary dysmenorrhea has been made one of the main causes of absenteeism of most of the female students. Provide awareness and education to all females regarding dysmenorrhea is most important and worth-full task nowadays. They should be able to recognize regular menstrual pattern, making difference of excessive pain during menstruation. Also lookout regarding associated particular predictors that chiefly exaggerates their symptoms. Health educative sessions should be tailored to enhanced female knowledge about menstrual disorder. Future studies should include prevalence under the community living females to lookout overall proportion of dysmenorrhea to rule out the extensive cause of primary dysmenorrhea despite documenting effective medical recommendation, approach for good wellbeing of females, encourage better quality of life

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