ORIGINAL ARTICLE

Prevalence of Dysmenorrhea and Predictors of Its Pain Intensity Among Female Medical Students: A Cross Sectional Study

Barira Afzal[1], Saliha Hussain[2], Sanabil Gul[3], Sidra Hamid[4]

ABSTRACT

Objective: The objective of this study is to determine the prevalence of dysmenorrhea and to assess the predictors of pain intensity during dysmenorrhea among female medical students at Rawalpindi Medical University.

Study Design: Descriptive Cross-sectional study

Place and Duration of Study: The study was conducted from May 2023 to October 2023 at Rawalpindi Medical University.

Materials and Methods: A validated, self-structured and self-administered 24 items questionnaire regarding dysmenorrhea was used to assess the prevalence and pain intensity of dysmenorrhea focused on 277 undergraduate medical students, excluding those with any pre-existing pelvic pathology. Participants were selected through convenience sampling and data was analyzed using SPSS version 26.

Results: The study involved 277 female medical students, showing an 83.2% dysmenorrhea prevalence. Based on visual analog scale, most of the research participants experienced moderate to severe pain (49.6%), along with symptoms like depressed mood (50.7%) and mood swings (51.4%). Common outcomes were limited daily activities (57.5%) and emotional instability (55%). Heavy bleeding (p=0.041, OR=3.56) and stress (p=0.041, OR=2.108) were significant predictors. BMI and caffeine consumption showed no significant improvement, but the pain's duration during periods significantly affected pain scale scores, with the "more than 3 days" group reporting the most severe pain.

Conclusion: Dysmenorrhea is widespread among female medical students, causing substantial disruptions in their daily routines. This condition is closely linked to heavy bleeding and stress, highlighting the importance of addressing these factors. Understanding the timing and duration of pain during the menstrual cycle is crucial for developing effective treatment strategies.

Key Words: *Dysmenorrhea, Education, Medical Students, Prevalence, Predictors.*

Introduction

Primary dysmenorrhea, a condition characterized by painful menstruation in the absence of pelvic disease, is one of the most common gynecological concerns globally.[1] In a comprehensive systematic review and meta-analysis encompassing 38 studies with the participation of 21,537 women, the prevalence of dysmenorrhea was identified to be notably prevalent, affecting 71.1% of young females.[2] This discomfort can be categorized into two distinct forms: primary dysmenorrhea, characterized by lower abdominal pain during menstruation without any concurrent pelvic pathology, and secondary dysmenorrhea, which associates with various pelvic and extra-uterine pathologies.[3]

Among young females, primary dysmenorrhea's major risk factors include the presence of heavy menstrual flow, a family history of dysmenorrhea, and endeavors at weight loss.[4] Furthermore, a meta-analysis identified additional risk factors such as poor sleep quality, skipping breakfast, elevated stress levels, and a lack of physical exercise.[5] The repercussions of dysmenorrhea extend beyond mere physical discomfort; it exerts a detrimental influence on the overall quality of life for affected individuals, impacting their physical, mental, emotional well-being, and social relationships.[6] Women with dysmenorrhea have increased

[1,2,3]*Medical Student*
Rawalpindi Medical University, Rawalpindi
[4]*Department of Physiology*
Rawalpindi Medical University, Rawalpindi
Correspondence:
Barira Afzal
Medical Student
Rawalpindi Medical University, Rawalpindi
E-mail: barirach20@gmail.com

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sensitivity to pain, even outside of menstruation, which may lead to a higher risk of chronic pain conditions like fibromyalgia. Dysmenorrhea significantly impacts quality of life, mood, and sleep, but can be effectively managed with non-steroidal anti- inflammatory drugs (NSAIDs) as first-line therapy.[7]

Particularly noteworthy is the high prevalence of dysmenorrhea among university students[8, 9], significantly impairing their daily activities and occasionally leading to school absenteeism. Notably, medical students report the highest incidence of dysmenorrhea-related distress[10], making it one of the primary causes of psychological distress among female medical students.[11]

However, the existing body of research on this subject within the context of medical students in Pakistan is notably limited, with no specific studies conducted in the Rawalpindi region. Therefore, there is a pressing need to examine the prevalence of dysmenorrhea and its associated predictors concerning pain intensity among the student population at Rawalpindi Medical University, Rawalpindi, Pakistan. This research endeavor aimed to fill this critical gap in our understanding of the condition's impact and characteristics among this specific demographic.

The rationale of this study was to increase awareness that dysmenorrhea is a medical condition necessitating appropriate medical care, despite common misconceptions and cultural norms. This would enable medical students to address it effectively, leading to enhancements in individuals' psychological, social, mental, and physical well-being, as well as their overall quality of life. Objectives of this study was to determine the prevalence of dysmenorrhea and to assess the predictors of pain intensity and exploration of other factors contributing to dysmenorrhea among female medical students of RMU from first year to final year MBBS.

Materials and Methods

This research was a descriptive cross-sectional study that utilized a questionnaire-based approach and spanned a period of six months, from May 2023 and to October 2023. The study focused on a cohort comprising 277 undergraduate female medical students studying in Rawalpindi Medical University. Individuals with any pre-existing pelvic pathology were excluded from the study in accordance with our exclusion criteria as they might experience secondary dysmenorrhea. Prior to embarking on this study, we sought and successfully obtained ethical approval Ref no.424/IREF/RMU/2023 from the esteemed Ethical Review Board at Rawalpindi Medical University, situated in Rawalpindi, Pakistan[12]. Additionally, our research adhered to ethical standards by obtaining informed consent from each of the participating students.

To gauge the prevalence of dysmenorrhea among the female medical students of Rawalpindi Medical University, we employed a self-administered questionnaire containing a comprehensive set of 24 items specifically designed for this purpose. The questionnaire underwent a thorough validity check process including a comprehensive review by an expert in the field, as well as a preliminary assessment involving a sample of 20 students. Hence the pilot study was successfully conducted, and appropriate modifications were incorporated into the questionnaire to enhance its accuracy and relevance, based on the feedback received during this validation phase.

For the purpose of participant selection, we employed a convenience sampling technique, which allowed us to conveniently approach and engage with the target population, given the practical constraints and available resources. The sample size was calculated to be 277, using the EPI info software with 95% confidence interval, margin of error 5%, expected frequency 50% and population size considered to be the total female medical students of RMU. Those students with any diagnosed pelvic pathology were excluded from the study. The questionnaires were administered by our team of investigators directly to the study participants. Written informed consent was taken from all participants. To streamline the process and ensure data accuracy, questionnaires were collected on the same day they were distributed.

Upon collection, the data from the completed questionnaires were entered into a Microsoft Excel spreadsheet. Subsequently, data analysis was performed using the Statistical Package for the Social Sciences (SPSS) version 26. The data obtained was described through frequencies and percentages and

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further analyzed by applying statistical tests like chi square test, one-way ANOVA and logistic regression. Confidence interval was kept at 95% and p-value was set at 0.05.

Results

The study included 277 female medical students and prevalence of dysmenorrhea was found to be 83.2% (N=230). All of the participants of the study were aged between 18-26 years with 54.5 percent of the participants aged 21-23 years. The mean age of participants was 20.8+- 1.5 years. The participants were from all years of study from first to final year (fifth year) of medical school as per convenience sampling. Among these, the majority of participants, 49.6% (137), reported experiencing "moderate to severe (4- 6)" pain. Following this, 27.5% (76) of respondents reported "mild pain (1-3)," while 12.0% (33) experienced "very severe (7-9)" pain. A smaller proportion, 7.6% (21), reported "No Pain (0)," and only 3.3% (9) described their pain as the "Worst Pain Ever (10)." These findings suggest that, within this population, the prevalence of moderate to severe pain is notably higher than mild or very severe pain. This categorization of pain intensity was done by employing the visual analogue scale in the questionnaire.

The majority of participants reported experiencing "depressed mood" (50.7%, N=140) and "mood swings" (51.4%, N=142) as common symptoms associated with primary dysmenorrhea. Besides these, sleep disturbance was also found in 23.2% (64) of participants. A summary of symptoms is presented in the figure below.

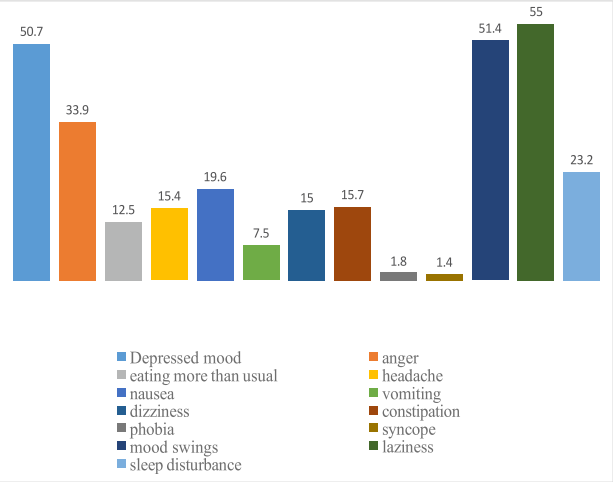

Fig 1: Frequencies of Symptoms (N=277)

"limited daily activities" (57.5%, N=159) and "emotional instability" (55%, N=152) were the most frequently reported outcomes related to primary dysmenorrhea among the participants.

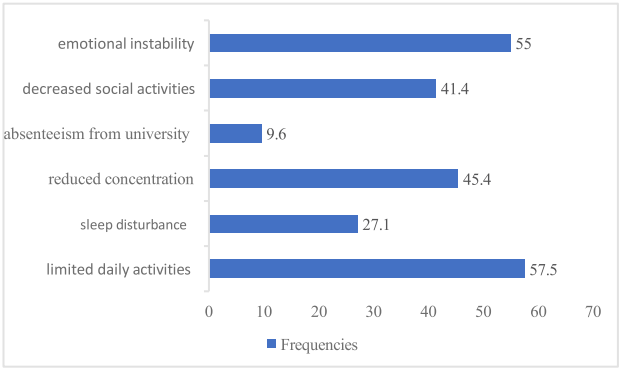

Fig 2: Frequencies of Outcomes (N=277)

The prevalence of dysmenorrhea was found to be higher (94.1%, N=260) among students who experienced heavy bleeding (more than 3 towels per day). A statistically significant relation was found (p=0.041) and females who suffered from heavy bleeding had more than 3 times (OR=3.5) risk of having dysmenorrhea as compared to others. Similarly, a significant relation was found between stress and dysmenorrhea (p=0.041) and students who had stress were found to have greater prevalence (51.1%, N=141) of dysmenorrhea as compared to others (34.1%, N=94). Other factors such as duration of cycle, days of menstruation, age of menarche, family history, and physical exercise were found to be statistically insignificant (p=≥0.05). However, a higher prevalence (85.7%, N=237) was found among participants who don't do physical exercise regularly. Following table shows a summary of predictors:

According to the results of logistic regression model, heavy periods (p value=0.041, OR=3.5646) and stress (*p* value=0.041, OR= 2.108) were significant predictors of dysmenorrhea.

The relationship between pain scale and BMI based on ANOVA test showed that the mean pain scale scores for "underweight" and "overweight and obese" groups were similar (2.82), while the "normal" group had a slightly lower mean (2.72). The *p* value was found to be 0.677 so there were no significant differences in pain intensity scores among the three BMI groups.

The mean pain scale score for each group showing

Table I: Association Between Dysmenorrhea and Various Pain Related Factors in Female Medical Students of RMU

Dysmenorrhea	Yes	%	No	%	P	OR	95% C.I.
Variables							
Amount of bleeding					0.041	3.546	1.0353-11.945
Less than 3 towels	185	81.9	41	18.1			
More than 3 towels	48	94.1	3	5.9			
Stress					0.041	2.018	1.028-3.96
Yes	119	51.10%	114	48.90 %			
No	15	34.10%	29	65.90 %			
Regularity of Cycle					0.075	0.495	0.228-1.075
Yes	200	85.8	33	14.2			
No	33	75	11	25			
Physical Exercise					0.093	1.99	0.894-4.4
Yes	30	75	10	25			
No	203	85.7	34	14.3			
					0.851	0.929	0.430-2.009
Day Scholar	183	84.3	34	15.7			
Hostelite	50	83.3	10	16.7			
Days of Menstruation					0.184	0.626	0.314-1.25
Less than 5 days	57	79.2	15	20.8			
More than 5 days	166	80.9	29	15.3			
Duration of cycle							
Less than 21 days	20	90.9	2	9.1	0.671		
More than 21 days	213	83.5	42	16.5	0.452	2	0.328-12.184
Age of Menarche					0.635	1.173	0.608-2.27
Before 12 or at 12	99	85.3	17	14.7			
After 12	134	83.2	27	16.8			
Family History					0.772	0.901	0.446-1.82
Yes	159	83.7	31	16.3			
No	74	85.1	13	14.9			

Table II: Logistic Regression Analysis of Dysmenorrhea with Stress and Heavy Bleeding

Predictor	B	Sig.	AOR (adjusted odds ratio)	95% C.I (confidence interval)	Constant
Heavy Period	1.266	0.041	3.546	1.053-11.94	2.071
Stress	0.702	0.041	2.018	1.028-3.96	1.507

the interval between menstrual cycles was 3.09 for "less than 21 days", 2.73 for "21-35 days" and 2.71 for "more than 35 days". In this case, the *p* value for the ANOVA test was not statistically significant (0.178) so the gap between consecutive menstrual cycles does not appear to have a significant impact on the intensity of pain in dysmenorrhea.

The mean pain scale score for each group with

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regards to consumption of cups of caffeine was 2.84 for 1 cup, 2.55 for 2 cups, and 2.75 for more than 2 cups. The ANOVA results provide evidence that there are no significant differences in pain intensity among these three groups.

The mean pain scale score for each group with regards to duration of pain during periods was 1.94 for "A few hours before periods", 2.69 for "Few hours before and few hours after start of periods", 2.79 for "1st day of periods only", 3.15 for "from 1st to 3rd day" and 3.33 for "more than 3 days". It suggested that the severity of pain varies depending on when the pain occurs in relation to the menstrual phase, with the "more than 3 days" group experiencing the most severe pain on average. In this case, the *p* value was significant and showed that the timing of pain during menstrual cycle has a significant impact on pain intensity.

The data revealed that dysmenorrhea led 27.9% of the students to resort to over the counter (OTC) medication for pain relief. 14.7% used hot water bags for pain relief, while 6.3% opted for herbal medication and 51.1% chose to rest only to get through dysmenorrhea.

Discussion

The prevalence of dysmenorrhea in our sample female medical students was notably high, with 83.2% of participants reporting the experience of menstrual pain. This percentage is in line with the global trends of prevalence of dysmenorrhea in young females with 85.1% in Palestine [13], 80% among 15-17-year-old females in Australia [14], 94% in Oman [15], 72.4% in India [16] and 94% among Egyptian nursing students [17]. This high prevalence suggests that dysmenorrhea is a common issue among this population and emphasizes the need for effective management strategies. This difference in prevalence among different populations may be due to differences in culture, genetics, social and personal factors and different criteria to define dysmenorrhea.[18]

The results of our study indicate that 12% of the participants have very severe pain while 3.3% categorized their dysmenorrhea as the worst pain ever. However, the majority of participants reported to have moderate to severe pain (49.6%). Previous studies investigating severe dysmenorrhea pain show very varied results with percentages ranging from 0.9% in Korea 15 to 21.7% in Iran [19] and 59.8% in Bangladesh.[15] This highlights that a substantial portion of individuals in our sample and in other populations worldwide experiences pain that may significantly impact their well-being. Our study excluded the cases of pre-existing pelvic pathologies, however, those suffering from undiagnosed pelvic pathologies may make up a portion of the participants suffering from moderate to severe pain or worst pain ever.

The presence of dysmenorrhea led to the outcomes of disruptions in daily activities and emotional instability, reported by 57.5% and 55% of the participants, respectively. This is also reflected in a study in Australia which revealed that 53% Western Australian young girls said that dysmenorrhea limited their activities [14]. Furthermore, 45.4% of the participants of our study also said that they suffered from reduced concentration as a result of dysmenorrhea. This may have serious implications on academic productivity of students while suffering from dysmenorrhea. However, only 9.6% of the participants in our study reported absenteeism from university as a result of dysmenorrhea in contrast to 28.3% in female medical students at a university in Jeddah Saudi Arabia [20]. This rate is also much lower than that reported in nursing students in Spain. [21] This unique finding of our study suggests that female medical students in Pakistan may feel compelled and pressurized to attend classes and daily tasks despite being in disruptive pain.

Our study identified common symptoms associated with dysmenorrhea, such as depressed mood (50.7%), laziness (55%) and mood swings (51.4%). These symptoms underscore the emotional and psychological toll that dysmenorrhea can exact on individuals. Physical fatigue and emotional instability were the most common symptoms shown by a study in North Palestine Additionally, 23.2% of our participants reported sleep disturbance and 33.9% of the participants said that they experienced increased anger during dysmenorrhea. In a study conducted in Saudi Arabia among medical female students, the most common symptoms that accompanied dysmenorrhea were also depressed mood and anger. [22] We suspect that these effects of dysmenorrhea on mood and daily activities are both due to the dysmenorrhea and also the hormonal

changes in the body accompanied by the menstrual phase. These also emphasize the broad and undeniable impact of menstrual pain on various aspects of life.

The relationship between dysmenorrhea and different predictors of dysmenorrhea was explored. Notably, a statistically significant association was found between heavy bleeding and dysmenorrhea, with 94.1% of students who experienced heavy bleeding reporting dysmenorrhea, and students who suffer from heavy bleeding having more than three times the risk of experiencing dysmenorrhea. These results are similar to a previous study in Saudi Arabia[20] in which heavy period was the first predictor of dysmenorrhea and a study in Athens, Greece [23] which found a good correlation between heavy and painful periods. This finding suggests that heavy bleeding may be a significant risk factor for dysmenorrhea and it is essential for healthcare providers to consider the presence of heavy menstrual bleeding when evaluating and managing dysmenorrhea in their patients. Heavier bleeding accompanied by a higher amount of prostaglandins release may explain the association between heavy menstrual bleeding (HMB) and dysmenorrhea. HMB may also be linked to other common symptoms associated with dysmenorrhea like fatigue and laziness due to being a cause of anemia in women.

Furthermore, our results identified stress as another significant predictor of dysmenorrhea. Among students, those who reported experiencing stress had a higher prevalence of dysmenorrhea (51.1%) to those without stress (34.1%). This is also in line with the results of similar investigations in Saudi Arabia [20], Iran [19] and Taiwan [24]. The underlying pathophysiology of this association is given by several studies by relating stress and a cascade of neuroendocrine responses [19]. Stress management and emotional well- being should, therefore, be integral components of dysmenorrhea treatment and prevention strategies.

The logistic regression analysis confirmed that heavy periods and stress were robust predictors of dysmenorrhea, further emphasizing the importance of addressing these factors in the assessment and management of menstrual pain. Other factors, including the regularity of the menstrual cycle, physical exercise, days of menstruation, age of menarche, and family history, were found to be statistically not significant in their association with dysmenorrhea. These results suggest that these factors may not play a significant role in determining the likelihood of experiencing dysmenorrhea among female medical students. However, our findings were in disagreement to results from Dammam and Iran[19] which revealed a statistical association between family history of dysmenorrhea and presence of dysmenorrhea (This inconsistency may be due to variations in study populations and sample sizes).

BMI, cycle interval, and caffeine had no notable impact on pain scores or dysmenorrhea. A Saudi study confirmed no BMI-dysmenorrhea link.[20] Notably, pain duration relative to periods mattered; pain over three days indicated severe discomfort. Understanding pain timing and duration is crucial for dysmenorrhea management.

Although this is among the few such studies conducted in North Pakistan, it has the limitation of having non-probability sampling and being a cross-sectional study which hinders the interpretation of causality. This study only investigates students from Rawalpindi Medical University hence it may not very accurately represent the general female population from all parts of Pakistan. Furthermore, while this study does inquire about the employment of different techniques young women use for the relief of dysmenorrhea such as OTC medication, hot water bags and rest etc., it doesn't delve into the efficacy of such techniques, therefore demanding future research into this aspect. Despite these limitations, this study provides a comprehensive statistical picture of factors surrounding dysmenorrhea and can be used to enhance awareness regarding dysmenorrhea and its predictors and to devise effective strategies to prevent and control dysmenorrhea. These strategies include both non-pharmacologic means like exercise and heat therapy and pharmacologic means such as non-steroidal anti-inflammatory inhibitors and hormonal contraceptives.[26]

Conclusion

In conclusion, dysmenorrhea is a highly prevalent issue among female medical students leading to a significant proportion of the students to experience moderate to severe pain and associated symptoms

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that impact daily life. Heavy bleeding and stress emerged as robust predictors of dysmenorrhea, emphasizing the need for targeted interventions in these areas. Addressing dysmenorrhea is not only important for the well-being of individuals but also for promoting overall health and productivity in the context of medical education and beyond.

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CONFLICT OF INTEREST

Authors declared no conflicts of Interest.

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DATA SHARING STATMENT

The data that support the findings of this study are available from the corresponding author upon request.