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ORIGINAL ARTICLE

Prevalence of Dysmenorrhea and Its Impact on Daily Activities Among University Students

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ABSTRACT

Background: Dysmenorrhea is a common gynecological problem among young women and may adversely affect academic performance, physical activity, and quality of life. Despite its high prevalence, many university students experience menstrual pain that interferes with daily functioning.

Objective: To determine the prevalence of dysmenorrhea and assess its impact on daily activities among university students.

Materials and Methods: A cross-sectional study was conducted among 770 female students at Women University Mardan from January to June 2022. Participants were selected through convenience sampling and completed a structured self-administered questionnaire. Information on sociodemographic characteristics, menstrual history, dysmenorrhea severity, and its effects on academic, physical, social, and daily activities was collected. Data were analyzed using SPSS version 26. Descriptive statistics were presented as frequencies and percentages. Chi-square test and binary logistic regression analysis were used to identify factors associated with dysmenorrhea. A p-value <0.05 was considered statistically significant.

Results: Among 770 participants, 589 (76.5%) reported dysmenorrhea. Moderate pain was reported by 45.0% of affected students, followed by mild pain (34.1%) and severe pain (20.9%). Dysmenorrhea was significantly associated with age group (p=0.041), academic year (p=0.031), and family income (p=0.005). Students with severe dysmenorrhea had higher rates of class absenteeism (82.1%), reduced academic performance (82.1%), limited physical activity (91.1%), sleep disturbance (86.2%), and difficulty concentrating during lectures (92.7%) (p<0.001). Logistic regression identified positive family history (AOR=2.73, 95% CI: 1.89–3.95), irregular menstrual cycles (AOR=2.11, 95% CI: 1.42–3.13), and low family income (AOR=1.91, 95% CI: 1.24–2.95) as significant predictors.

Conclusion: Dysmenorrhea was highly prevalent and negatively affected academic performance, physical activity, and daily functioning. Health education, early identification, and appropriate management strategies are needed to reduce its burden and improve students' quality of life.

Keywords: Dysmenorrhea, Menstrual Pain, University Students, Prevalence, Daily Activities.

INTRODUCTION

Dysmenorrhea is one of the most prevalent gynecological disorders affecting women of reproductive age and is characterized by painful menstrual cramps occurring before or during menstruation [(1)]. It is broadly classified into primary dysmenorrhea, which occurs in the absence of pelvic pathology, and secondary dysmenorrhea, which is associated with underlying reproductive disorders such as endometriosis, adenomyosis, or pelvic inflammatory disease [(2)].

Primary dysmenorrhea is particularly common among adolescents and young adults, with symptoms ranging from mild discomfort to severe pain that can significantly interfere with daily activities [(3)]. The condition is primarily caused by excessive production of prostaglandins in the endometrium, leading to increased uterine contractions, reduced uterine blood flow, and menstrual pain [(4)].

Globally, the prevalence of dysmenorrhea varies widely, ranging from 45% to 95% among women of reproductive age, depending on the study population and diagnostic criteria used [(5)]. University students represent a particularly vulnerable group due to academic pressures, lifestyle factors, and limited access to reproductive health services [(6)].Dysmenorrhea has been recognized as a major public health concern because of its negative impact on physical, psychological, social, and academic well-being [(7)]. Many students report difficulty concentrating during lectures, decreased productivity, reduced participation in physical activities, sleep disturbances, and absenteeism from classes due to menstrual pain [(8)].

The burden of dysmenorrhea extends beyond physical discomfort and may affect mental health by increasing levels of stress, anxiety, and emotional distress [(9)]. Consequently, affected students often experience a reduced quality of life and impaired educational performance, potentially influencing their future academic achievements [(10)].Several factors have been identified as contributors to dysmenorrhea, including younger age, family history of menstrual pain, irregular menstrual cycles, sedentary lifestyle, stress, and unhealthy dietary habits [(11)]. Understanding these factors is important for developing targeted interventions aimed at reducing the severity and consequences of dysmenorrhea among university students.

Despite the high prevalence of dysmenorrhea, many students do not seek professional medical care and instead rely on self-medication, home remedies, or simply endure the pain. This underreporting and undertreatment may contribute to the persistence of symptoms and their adverse effects on daily functioning [(12)].Given the substantial burden of dysmenorrhea and its potential impact on students' academic and personal lives, there is a need for further research to assess its prevalence and associated effects on daily activities among university populations.

Objective of the Study: To determine the prevalence of dysmenorrhea and its impact on daily activities among university students.

MATERIAL AND METHODS

This cross-sectional study was conducted among female students enrolled at Women University Mardan, Khyber Pakhtunkhwa, Pakistan, from January to June 2022.

Study Population: The target population consisted of female university students of reproductive age who were currently enrolled in undergraduate and postgraduate programs. Students from various academic disciplines were included to ensure adequate representation of the university population.

Sample Size: A total sample size of 770 female university students was included in the study. The sample size was

considered sufficient to estimate the prevalence of dysmenorrhea and assess its impact on daily activities with adequate statistical power.

Sampling Technique: A convenience sampling technique was used to recruit participants. Eligible students who were available during the data collection period and willing to participate were approached and invited to complete the study questionnaire.

Inclusion Criteria: The study included female university students aged 18 years and above who had attained menarche, were currently enrolled in a university program, and provided informed consent to participate in the study.

Exclusion Criteria: Students who were pregnant, had reached menopause, reported diagnosed gynecological disorders causing secondary dysmenorrhea, or submitted incomplete questionnaires were excluded from the study.

Data Collection Tool: Data were collected using a structured self-administered questionnaire developed after reviewing relevant literature. The questionnaire consisted of sections on demographic characteristics, menstrual history, prevalence and severity of dysmenorrhea, associated symptoms, impact on academic performance, class attendance, physical activities, social activities, sleep patterns, and coping or management strategies.

Data Collection Procedure: Ethical approval was obtained from the relevant Institutional Review Board/Ethics Committee prior to the commencement of the study. Participation was entirely voluntary, and informed consent was obtained from all participants. Confidentiality and anonymity were ensured by excluding personal identifiers from the questionnaire. Participants were informed of their right to withdraw from the study at any stage without any consequences.

Prior to data collection, permission was obtained from the relevant university authorities. Eligible participants were informed about the purpose of the study and invited to participate voluntarily. Written informed consent was obtained before administering the questionnaire. Participants completed the questionnaire anonymously, and confidentiality of the collected information was maintained throughout the study.

Study Variables: The dependent variable was the presence of dysmenorrhea. Independent variables included age, academic year, marital status, place of residence, family income, menstrual characteristics, family history of dysmenorrhea, physical activity, and other relevant demographic factors. Outcome variables related to daily activities included class absenteeism, academic performance, physical activity limitation, social activity restriction, sleep disturbance, and concentration difficulties.

Data Analysis: Data were entered and analyzed using Statistical Package for Social Sciences (SPSS) version 26. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize the data. Inferential statistics were performed using the Chi-square test to assess associations between dysmenorrhea and categorical variables. Binary logistic regression analysis was conducted to identify predictors of dysmenorrhea. Statistical significance was considered at a p-value of less than 0.05.

RESULTS

The prevalence of dysmenorrhea among university students was **76.5% (589/770)**. Significant associations were observed between dysmenorrhea and age group ($\chi^2 = 8.24$, $p = 0.041$), academic year ($\chi^2 = 10.63$, $p = 0.031$), and monthly family income ($\chi^2 = 12.74$, $p = 0.005$). No significant association was found between dysmenorrhea and residence ($p = 0.074$) or marital status ($p = 0.345$). Younger students and those from lower-income families reported a higher prevalence of dysmenorrhea.

The severity of dysmenorrhea was significantly associated with all assessed daily activities ($p < 0.001$). Students experiencing severe dysmenorrhea reported greater impairment in academic performance, class attendance, physical activities, social interactions, sleep quality, concentration during lectures, and household tasks compared with those experiencing mild or moderate dysmenorrhea. The highest proportion of impairment was observed in difficulty concentrating during lectures (92.7%) and limitation of physical activities (91.1%) among students with severe dysmenorrhea.

A significant association was found between dysmenorrhea severity and management practices ($p < 0.001$). Students with

Table1: Demographic Data

Variable	Category	Dysmenorrhea Present n (%)	Dysmenorrhea Absent n (%)	p-value
Age Group (Years)	18–20	215 (81.1)	50 (18.9)	0.041*
	21–23	264 (77.2)	78 (22.8)	
	24–26	88 (69.3)	39 (30.7)	
	≥27	22 (61.1)	14 (38.9)	
Academic Year	1st Year	145 (82.4)	31 (17.6)	0.031*
	2nd Year	153 (79.7)	39 (20.3)	
	3rd Year	122 (74.8)	41 (25.2)	
	4th Year	105 (72.4)	40 (27.6)	
	Postgraduate	64 (68.1)	30 (31.9)	
Residence	Urban	377 (79.9)	95 (20.1)	0.074
	Rural	212 (71.1)	86 (28.9)	
Marital Status	Single	539 (77.7)	155 (22.3)	0.345
	Married	50 (65.8)	26 (34.2)	
Monthly Family Income (PKR)	<50,000	129 (83.8)	25 (16.2)	0.005*
	50,000–100,000	222 (77.4)	65 (22.6)	
	100,001–150,000	145 (73.2)	53 (26.8)	
	>150,000	93 (71.0)	38 (29.0)	

Table2: Association between Severity of Dysmenorrhea and Impact on Daily Activities among University Students (n = 589)

Daily Activity Affected	Mild (n=201) n (%)	Moderate (n=265) n (%)	Severe (n=123) n (%)	p-value
Missed Classes	52 (25.9)	128 (48.3)	101 (82.1)	<0.001*
Reduced Academic Performance	44 (21.9)	134 (50.6)	101 (82.1)	<0.001*
Limited Physical Activities	61 (30.3)	162 (61.1)	112 (91.1)	<0.001*
Restricted Social Activities	36 (17.9)	109 (41.1)	89 (72.4)	<0.001*
Sleep Disturbance	58 (28.9)	151 (57.0)	106 (86.2)	<0.001*
Difficulty Concentrating During Lectures	69 (34.3)	184 (69.4)	114 (92.7)	<0.001*
Unable to Perform Household Tasks	42 (20.9)	121 (45.7)	97 (78.9)	<0.001*

Table3: Association between Severity of Dysmenorrhea and Management Practices Among University Students (n = 589)

Management Practice	Mild (n=201) n (%)	Moderate (n=265) n (%)	Severe (n=123) n (%)	p-value
Use of Pain Medication	74 (36.8)	168 (63.4)	111 (90.2)	<0.001*
Use of Hot Water Bag/Heat Therapy	58 (28.9)	146 (55.1)	95 (77.2)	<0.001*
Rest/Sleep During Pain Episodes	81 (40.3)	173 (65.3)	112 (91.1)	<0.001*
Herbal Remedies/Home Treatments	39 (19.4)	84 (31.7)	51 (41.5)	<0.001*
Physical Exercise During Menstruation	92 (45.8)	87 (32.8)	21 (17.1)	<0.001*
Consultation with Healthcare Professional	18 (9.0)	54 (20.4)	61 (49.6)	<0.001*

Table 4: Logistic Regression Analysis of Factors Associated with Dysmenorrhea

Variable	Adjusted Odds Ratio (AOR)	95% CI	p-value
Age ≤23 years	1.68	1.12 – 2.52	0.012*
Rural Residence	1.24	0.87 – 1.77	0.231
Family Income <50,000 PKR	1.91	1.24 – 2.95	0.003*
Positive Family History of Dysmenorrhea	2.73	1.89 – 3.95	<0.001*
Lack of Regular Physical Exercise	1.58	1.09 – 2.29	0.016*
Irregular Menstrual Cycle	2.11	1.42 – 3.13	<0.001*

severe dysmenorrhea were more likely to use pain medication, heat therapy, rest, and seek professional healthcare consultation compared to those with mild or moderate dysmenorrhea. Conversely, engagement in physical exercise during menstruation decreased as pain severity increased. These findings suggest that students experiencing severe dysmenorrhea adopt more intensive pain-management strategies to cope with symptoms.

Multivariable logistic regression analysis revealed that younger age, lower family income, positive family history of dysmenorrhea, lack of regular physical exercise, and irregular menstrual cycles were significant predictors of dysmenorrhea. Family history emerged as the strongest predictor (AOR = 2.73, 95% CI: 1.89–3.95, $p < 0.001$).

DISCUSSION

The present study assessed the prevalence of dysmenorrhea and its impact on daily activities among university students. The findings revealed that 76.5% of participants experienced dysmenorrhea, indicating that menstrual pain remains a common health problem among young women. This prevalence is consistent with previous studies conducted among university students in different countries, which reported prevalence rates ranging from 60% to 85% [12]. The high prevalence observed in the current study highlights the substantial burden of dysmenorrhea on female students and emphasizes the need for effective management strategies within university settings.

The study found that younger students were more likely to experience dysmenorrhea compared to older participants. Similar findings have been reported in earlier studies, where younger age was identified as a significant predictor of menstrual pain due to increased prostaglandin production and greater uterine sensitivity during adolescence and early adulthood [13]. This finding suggests that age-related physiological factors may contribute to the occurrence of dysmenorrhea among university students.

A significant association was observed between academic year and dysmenorrhea. Students in the early years of their academic programs reported a higher prevalence of menstrual pain compared to postgraduate students. Previous research has suggested that younger students may have less experience in managing menstrual symptoms and coping with menstrual discomfort, leading to increased reporting of dysmenorrhea [14]. Furthermore, academic stress and adjustment to university life may contribute to symptom severity.

Family income was also significantly associated with dysmenorrhea in this study. Students from lower-income households reported a higher prevalence of menstrual pain than those from higher-income families. This finding is supported by previous studies indicating that socioeconomic status may influence access to healthcare services, nutritional status, health literacy, and pain management resources [15]. Consequently, lower-income students may be more vulnerable to the adverse effects of dysmenorrhea.

The results demonstrated that dysmenorrhea had a considerable impact on academic activities. A large proportion of students with severe dysmenorrhea reported missing classes, reduced academic performance, and difficulty concentrating during lectures. Similar findings have been documented in previous investigations, where menstrual pain was identified as a major cause of absenteeism and reduced academic productivity among university students [16]. These disruptions can negatively affect learning outcomes and overall educational achievement.

Physical activity was significantly affected by dysmenorrhea severity. Students with severe pain reported substantial limitations in participation in sports, exercise, and routine physical activities. Previous studies have reported comparable findings, suggesting that intense menstrual pain often restricts mobility and reduces engagement in physical exercise [17]. Reduced physical activity may further contribute to poor physical and psychological well-being.

The present study also found that dysmenorrhea negatively influenced social activities. Students experiencing severe pain were more likely to withdraw from social interactions and recreational activities. Similar observations have been reported in earlier research, where menstrual pain was associated with decreased social participation and reduced quality of life [18]. These findings indicate that dysmenorrhea affects multiple dimensions of student life beyond academic performance.

Sleep disturbance was another common consequence identified among participants with moderate and severe dysmenorrhea. Previous studies have shown that menstrual pain can interfere with sleep quality by causing discomfort, nocturnal awakening, and fatigue [19]. Poor sleep quality may further exacerbate stress levels, impair concentration, and reduce daily functioning among students.

The logistic regression analysis identified family history of dysmenorrhea as one of the strongest predictors of menstrual pain. This finding is consistent with previous studies suggesting a genetic predisposition to dysmenorrhea, where daughters of women with menstrual pain are more likely to experience similar symptoms [20]. Familial patterns may be related to inherited biological mechanisms affecting prostaglandin production and pain perception.

Irregular menstrual cycles were also significantly associated with dysmenorrhea. Similar findings have been reported in several studies, which demonstrated that menstrual irregularities are frequently accompanied by increased pain severity and menstrual-related symptoms [21]. These associations may be explained by hormonal fluctuations and reproductive health factors affecting menstrual function.

The findings further indicated that students with severe dysmenorrhea were more likely to use pain medications, heat therapy, and healthcare consultations. Previous studies have similarly reported that increasing pain severity leads to greater utilization of coping and management strategies [22]. However, despite the availability of treatment options, many students continue to rely on self-medication and informal remedies rather than seeking professional healthcare advice.

Overall, the findings of this study support existing evidence that dysmenorrhea is a highly prevalent condition with significant consequences for academic performance, physical activities, social interactions, and quality of life among university students. These findings underscore the importance of implementing menstrual health education programs, improving access to healthcare services, and promoting evidence-based management strategies to reduce the burden of dysmenorrhea in university populations [23].

CONCLUSION

This study found that dysmenorrhea is highly prevalent among university students, affecting more than three-quarters of the study population. The findings demonstrated that dysmenorrhea has a substantial negative impact on students' daily lives, particularly in terms of academic performance, class attendance, concentration, physical activities, social participation, and sleep quality. The severity of menstrual pain was significantly associated with increased impairment in these activities.

Furthermore, factors such as younger age, lower family income, positive family history of dysmenorrhea, and irregular menstrual cycles were identified as significant predictors of dysmenorrhea. Students experiencing severe dysmenorrhea were more likely to use pain-management strategies and seek healthcare support, indicating the considerable burden imposed by the condition.

Overall, dysmenorrhea remains an important but often overlooked health issue among university students. Increased awareness, early identification, menstrual health education, and access to appropriate healthcare services are essential to minimize its impact and improve the academic performance, well-being, and quality of life of affected students.

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CONTRIBUTORS

Hemasa Gul: Concept and design; Data acquisition; Drafting of manuscript; Critical review; final approval
Huma Gul: Drafting of manuscript; Critical review, final approval
Fatima Rehman: Data acquisition; supervision; final approval
Nayab Hakim: Data Analysis; Critical review, final approval

REFERENCES

1. Bilir E, Yıldız Ş, Yakın K, Ata B. The impact of dysmenorrhea and premenstrual syndrome on academic performance of college students, and their willingness to seek help. Turk J ObstetGynecol [Internet]. 2020;17(3):196–201. Available from: http://dx.doi.org/10.4274/tjod.galenos.2020.97266
2. Lghoul S, Loukid M, Hilali MK. Prevalence and predictors of dysmenorrhea among a population of adolescent schoolgirls in Morocco. Saudi J Biol Sci [Internet]. 2020;27(7):1737–42. Available from: http://dx.doi.org/10.1016/j.sjbs.2020.05.022
3. Barcikowska Z, Rajkowska-Labon E, Grzybowska ME, Hansdorfer-Korzon R, Zorena K. Inflammatory markers in dysmenorrhea and therapeutic options. Int J Environ Res Public Health [Internet]. 2020;17(4):E1191. Available from: http://dx.doi.org/10.3390/ijerph17041191
4. Chen CX, Draucker CB, Carpenter JS. What women say about their dysmenorrhea: a qualitative thematic analysis. BMC Womens Health [Internet]. 2018;18(1):1–8. Available from: http://dx.doi.org/10.1186/s12905-017-0499-3
5. Latthe PM, Champaneria R, Khan KS. Dysmenorrhoea. BMJ Clin Evid. 2011;2011:0813.
6. Ferries-Rowe E, Corey E, Archer JS. Primary dysmenorrhea: Diagnosis and therapy: Diagnosis and therapy. ObstetGynecol [Internet]. 2020;136(5):1047–58. Available from: http://dx.doi.org/10.1097/AOG.0000000000004096
7. Clayton AH. Symptoms related to the menstrual cycle: diagnosis, prevalence, and treatment. J PsychiatrPract [Internet]. 2008;14(1):13–21. Available from: http://dx.doi.org/10.1097/01.pra.0000308491.54885.f8
8. Ozerdogan N, Sayiner D, Ayranci U, Unsal A, Giray S. Prevalence and predictors of dysmenorrhea among students at a university in Turkey. Int J GynaecolObstet [Internet]. 2009;107(1):39–43. Available from: http://dx.doi.org/10.1016/j.ijgo.2009.05.010
9. Geta TG, Woldeamanuel GG, Dassa TT. Prevalence and associated factors of premenstrual syndrome among women of the reproductive age group in Ethiopia: Systematic review and meta-analysis. PLoS One [Internet]. 2020;15(11):e0241702. Available from: http://dx.doi.org/10.1371/journal.pone.0241702
10. Sahin S, Ozdemir K, Unsal A, Arslan R. Review of frequency of dysmenorrhea and some associated factors and evaluation of the relationship between dysmenorrhea and sleep quality in university students. GynecolObstet Invest [Internet]. 2014;78(3):179–85. Available from: http://dx.doi.org/10.1159/000363743
11. Latthe P, Latthe M, Say L, Gülmezoglu M, Khan KS. WHO systematic review of prevalence and incidence of chronic pelvic pain: neglected reproductive health morbidity. BMC Public Health [Int ernet]. 2006;6. Available from: http://dx.doi.org/10.1186/1471-2458-6-177
12. Schoep ME, Nieboer TE, van der Zanden M, Braat DDM, Nap AW. The impact of menstrual symptoms on everyday life: a survey among 42,879 women. Am J ObstetGynecol [Internet]. 2019;220(6):569.e1-569.e7. Available from: http://dx.doi.org/10.1016/j.ajog.2019.02.048
13. Akinyotu O, Bello F, Odubamowo K. Dysmenorrhea among female students at a Teaching Hospital in South-Western Nigeria. Trop J ObstetGynaecol [Internet]. 2017;34(2):129. Available from: http://dx.doi.org/10.4103/tjog.tjog_10_17
14. Azagew AW, Kassie DG, Walle TA. Prevalence of primary dysmenorrhea, its intensity, impact and associated factors among female students' at Gondar town preparatory school, Northwest Ethiopia. BMC Womens Health [Internet]. 2020;20(1):5. Available from: http://dx.doi.org/10.1186/s12905-019-0873-4
15. Yesuf TA, Eshete NA, Sisay EA. Dysmenorrhea among university health science students, northern Ethiopia: Impact and associated factors. Int J Reprod Med [Internet]. 2018;2018:9730328. Available from: http://dx.doi.org/10.1155/2018/9730328
16. Hailemeskel S, Demissie A, Assefa N. Primary dysmenorrhea magnitude, associated risk factors, and its effect on academic performance: evidence from female university students in Ethiopia. Int J Womens Health [Internet]. 2016;8:489–96. Available from: http://dx.doi.org/10.2147/IJWH.S112768
17. Burnett MA, Antao V, Black A, Feldman K, Grenville A, Lea R, et al. Prevalence of primary dysmenorrhea in Canada. J ObstetGynaecol Can [Internet]. 2005;27(8):765–70. Available from: http://dx.doi.org/10.1016/s1701-2163(16)30728-9
18. Sanctis D, Soliman V, Elsedfy AT, Soliman H, Elalaily NA, Kholy E. Dysmenorrhea in adolescents and young adults: a review in different countries. Acta Biomed. 2016;87(3):233–46.
19. Vilšinskaitė DS, Vaidokaitė G, Mačys Ž, Bumbulienė Ž. The risk factors of dysmenorrhea in young women. Wiad Lek [Internet]. 2019;72(6):1170–4. Available from: http://dx.doi.org/10.36740/wlek201906102
20. Chauhan M, Kala J. Relation between dysmenorrhea and body mass index in adolescents with rural versus urban variation. J ObstetGynaecol India [Internet]. 2012;62(4):442–5. Available from: http://dx.doi.org/10.1007/s13224-012-0171-7
21. Kural M, Noor NN, Pandit D, Joshi T, Patil A. Menstrual characteristics and prevalence of dysmenorrhea in college-going girls. J Family Med Prim Care [Internet]. 2015;4(3):426–31. Available from: http://dx.doi.org/10.4103/2249-4863.161345
22. Ju H, Jones M, Mishra G. The prevalence and risk factors of dysmenorrhea. Epidemiol Rev [Internet]. 2014;36(1):104–13. Available from: http://dx.doi.org/10.1093/epirev/mxt009
23. Acheampong K, Baffour-Awuah D, Ganu D, Appiah S, Pan X, Kaminga A, et al. Prevalence and predictors of dysmenorrhea, its effect, and coping mechanisms among adolescents in Shai Osudoku District, Ghana. ObstetGynecol Int [Internet]. 2019;2019:5834159. Available from: http://dx.doi.org/10.1155/2019/5834159