

Determining the Burden of Dysmenorrhea on Women's Quality of Life: The Dysmenorrhea Symptom Interference Scale

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ABSTRACT:

OBJECTIVE: Dysmenorrhea negatively impacts a woman's quality of life. The lack of proper awareness results in poor coping mechanisms in females. This study aims to determine the association of dysmenorrhea with quality of life using the Dysmenorrhea Symptom Interference (DSI) Scale and the management choices of females.

STUDY DESIGN: This cross-sectional study was conducted among females studying at various universities in Karachi from March 2023 to May 2023. The calculated sample size was 270. A non-probability, convenience sampling technique was applied. A web-based, structured, self-administered questionnaire was used to collect data.

RESULTS: 278 females completed the survey. The Numeric Rating Scale (NRS) score (1–10) indicated the degree of dysmenorrhea. The majority of the females, 40.6% (n=113), had moderate dysmenorrhea. Quality of life was measured according to the DSI Score (maximum score=5). The mean DSI score recorded was 2.75. Most participants (27%; n=75) were found in the mood component of DSI. Most of the females used lifestyle modifications, followed by home remedies and medications. A significant positive correlation between the NRS score and the DSI score ($p < 0.001$) suggests that an increased degree of dysmenorrhea led to a significant decline in the quality of life.

CONCLUSION: We conclude that dysmenorrhea is associated with a decreased quality of life and the DSI Scale is a valid tool for assessing its impact on quality of life. There is a general lack of knowledge about adequate pain management.

Keywords: Dysmenorrhea; Menstrual disorder; Pain management; Reproductive health; Quality of life

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Introduction

Women in the reproductive period are liable to several menstrual problems, including painful menstruation, heavy menstrual bleeding, irregular or absent bleeding, etc. (1).

Dysmenorrhea is a painful sensation in the lower abdomen or pelvis that occurs before or during menstruation. Other symptoms such as nausea, vomiting, diarrhea, and mood disturbances may accompany (2). Some women also experience lower back discomfort, etc. (3).

The prevalence of dysmenorrhea varies between 16% and 91% (4). According to various international articles, the prevalence rate of dysmenorrhea is approximated to be 85%, 84.1%, and 40.7% in the USA, Italy, and India, respectively (5). In Pakistan, dysmenorrhea has a reported prevalence of approximately 78.4% (6).

Dysmenorrhea can disrupt a woman's quality of life. It affects everyday tasks, causing decreased working ability, absenteeism, and poor academic or professional performance. Furthermore, the stress, anxiety, and negative influence on mental health that it causes in women typically lead to the avoidance of social gatherings and decreased engagement in recreational activities (7).

Despite being such a common issue that causes significant discomfort in a woman's life, not much attention is directed towards dysmenorrhea. One of the reasons is that it is widely

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considered a natural aspect of menstruation. Although slight pain during menstruation can be physiological, moderate to severe dysmenorrhea, which is refractory to medication, is a pathological condition and may indicate an underlying disease like endometriosis, which requires a timely diagnosis (7).

Many international studies report that up to 86% of women do not seek proper medical treatment for their menstrual problems. The reasons are that most women either do not consider it a serious issue or have limited resources, while many others are unaware that it is a manageable condition with various treatment options. Those taking medications do so on a self-prescribed basis because they are embarrassed to discuss their menstrual problems with the clinician (8).

The systemic symptoms of dysmenorrhea can be debilitating. Similarly, heavy bleeding can cause individuals to bleed through their clothing and require double protection more often than once a year. Such experiences can lead to feelings of embarrassment or discomfort (9).

Our objective is to assess the impact of dysmenorrhea on a woman's life and identify preferred treatment options. In our society, where menstrual issues are stigmatized, proper awareness is crucial.

In Pakistan, there is limited data on dysmenorrhea's association with female quality of life and relief measures. The plausible management choices explored in this study will benefit further research and use by the affected females.

Material and method

This cross-sectional study was conducted among young females studying in various universities in Karachi from March 2023 to May 2023 after the approval of the Institutional Review Board of Dow University of Health Sciences on 6th March 2023 (Ref: IRB-2808/DUHS/Approval/2023/121). The sample size was 270, estimated based on previous literature (10).

The data was collected from 278 women via a web-based questionnaire using a non-probability, convenience sampling technique. The questionnaire had 29 questions in seven sections. The first few sections contained informed consent, socio-demographic data, lifestyle habits, and menstrual history. We included women under the age of 40 who consented and were studying at various universities in Karachi. Pregnant women and those with primary amenorrhea were excluded.

Section five was concerned with the characteristics of dysmenorrhea, including average pain intensity, assessed by a validated pain rating scale, i.e., the Numerical Rating Scale (NRS). It is a scale of 11 points, containing scores from 0 to 10, with 0 being no pain and 10 being the worst pain possible (11).

The impact of dysmenorrhea on quality of life was as-

sessed using the Dysmenorrhea Symptom Interference Scale (DSI), Chen X. Chen, 2020 (3), which is a validated nine-item scale developed by Chen X et al. that helps measure dysmenorrhea in clinical settings and research. The license to use the scale was obtained from ePROVIDE™, Mapi Research Trust, Lyon, France. The DSI comprises nine items, with 1 (not at all) to 5 (very much) as response options. A total scale score (range 1-5) was derived from the average individual item scores, with higher values showing greater interference and a more negative outcome.

The last section asked participants about their preferred pain management choices, including lifestyle modifications (rest, yoga, etc.), home remedies (heat application, warm beverages, etc.), and medications (oral/topical/intravenous analgesics, etc.). We used a 5-point Likert scale to assess the perceived effectiveness of these measures.

Statistical analysis

The sample size for the association between quality of life and dysmenorrhea was estimated based on previous literature [10] using the formula for cross-sectional studies on OpenEpi: 74% unexposed with the outcome and 88% exposed with the outcome, with a 95% confidence interval. Statistical Package for the Social Sciences (SPSS) version 24.0 was used to perform the statistical analysis.

Descriptive analyses were performed using the mean and standard deviation for quantitative variables, while qualitative variables were described using frequencies and percentages. To determine the normal distribution of quantitative variables, the Shapiro-Wilk test was performed, and then the best test for each set was chosen.

The correlation between perceived quality of life, as measured by the DSI score, and the degree of dysmenorrhea severity, as measured by the NRS score, was determined by Spearman's rank correlation. The Kruskal-Wallis test was used to compare DSI scores among women with mild, moderate, and severe dysmenorrhea.

Participants were compared based on Body Mass Index (BMI) and the degree of dysmenorrhea using Spearman's rank-order correlation test.

Results

A total of 278 females completed the survey. The participants in this study had a mean age of 21.88 years and a mean BMI of 21.05. Most of the participants were in the healthy weight range of BMI. Table I shows details of the participants' socio-demographic characteristics.

Only 5% (n=14) of females had any chronic systemic disorders like hypertension or diabetes, while 10.8% (n=30) reported any chronic gynecological conditions (e.g., Polycystic Ovarian Syndrome (PCOS)).

In our study, the mean age of menarche was 12.74 years (maximum age=18 years; minimum age=8 years).

The main characteristics of the menstrual cycle are reported in Table II.

Table I: Socio-demographic characteristics and lifestyle of participants

	Frequency (n)	Percentage %
Professional Status		
Undergraduate	237	85.3
Postgraduate	41	14.7
Institutes		
Medical	163	58.6
Non- medical	115	41.4
Marital Status		
Married	17	6.1
Unmarried	261	93.9
Body Mass Index (BMI)		
Underweight	86	30.9
Healthy weight	150	54.0
Overweight	27	9.7
Obese	15	5.4
Frequency of Exercise		
Daily	15	5.4
Weekly	24	8.6
Occasionally	155	55.8
Never	84	30.2

Note: Total number of participants n=278

Table II: Menstruation characteristics of participants

	Frequency (n)	Percentage %
Regularity Of Periods		
Regular	221	79.5
Irregular	57	20.5
Flow of Periods		
Minimal	9	3.2
Mild	178	64.0
Moderate	87	31.3
Severe	4	1.4
Degree of Dysmenorrhea		
No dysmenorrhea	6	2.2
Mild dysmenorrhea	64	23.0
Moderate dysmenorrhea	113	40.6
Severe dysmenorrhea	95	34.2
Family History of Dysmenorrhea		
Yes	145	52.2
No	133	47.8

Note: Total number of participants n=278

The majority of females, 79.9% (n=222), reported periods lasting for 3-7 days; 10.8% (n=30) reported longer than 7 days; and only 9.4% (n=26) reported periods lasting less than

3 days. In our sample, 67.6% (n=188) of participants experienced gastrointestinal (GI) symptoms associated with menstruation, while hormonal symptoms and psychological symptoms affected 60.8% (n=169) and 55% (n=153) participants, respectively.

The severity of pain was measured according to the Numeric Rating Scale (NRS) score (0-10); the mean score was 5.29 (±2.41). The degree of dysmenorrhea was categorized by the NRS score according to previous literature. The majority had moderate dysmenorrhea. (Table II)

The majority, 59.4% (n=165) reported pain beginning on the first day of menstruation, whereas 40.6% (n=113) reported pain before the start of menstruation. The majority, i.e., 77.3% (n=215) reported that their pain lasted up to days 1-2, 19.8% (n=55) had pain lasting up to days 3-4, and 2.9% (n=8) reported pain lasting more than 4 days.

Quality of life was measured according to the DSI; the maximum score is 5, and the higher score indicates higher interference. The mean DSI score recorded was 2.75 (±0.89).

The maximum number of participants, 27% (n=75) were found in the mood component of DSI, while the work component had 28.8% (n=80) participants with a score of 4 (Figure 1).

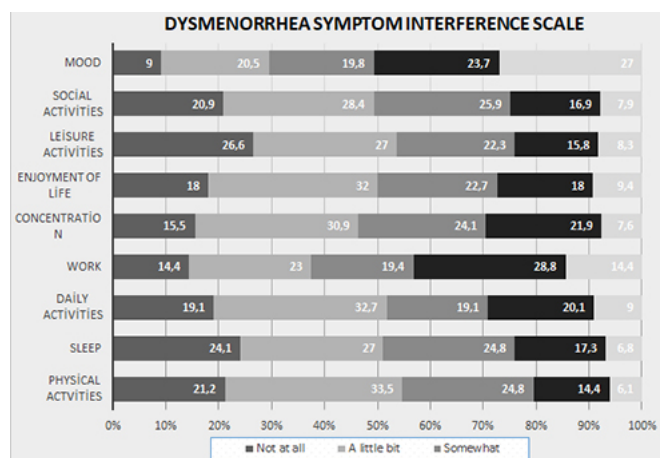


Figure 1: Components of dysmenorrhea symptom Interference Scale

Various management options, either alone or in combination, were used by the females to relieve their pain. (Table III)

The majority of those who used medications, 83.1% (n=98) were self-medicated, and only 16.9% (n=20) had a medical assessment and prescription. The medications used were primarily oral analgesics. When asked the reasons for not taking medicines for the pain, the majority, i.e., 58.1% (n=93), felt the pain was not severe enough to warrant medication; 37.5% (n=60) claimed pills would disrupt their cycles; 16.9% (n=27) were concerned about side effects; 1.9% (n=3)

Table III: Management preferences of participants

	Frequency (n)	Percentage %
Use Of Lifestyle Modifications (e.g. rest/sleep, exercise, warm baths, etc.)		
Yes	183	65.8
No	95	34.2
Use Of Home Remedies (e.g. warm compressions, warm milk, increased liquid intake, etc.)		
Yes	165	59.4
No	113	40.6
Use Of Medications (e.g. oral, topical, and intravenous analgesics, etc.)		
Yes	118	42.4
No	160	57.6

Note: Total number of participants n=278

were concerned about forming a habit of taking medication; and 1.3% (n=2) had a negative attitude towards medicines.

Out of the 220 participants using lifestyle modifications, 22.3% (n=49) found them very effective, while 57% (n=125) found them somewhat effective. For home remedies, 17.7% (n=38) out of the 214 found them very effective, and 57% (n=122) found them somewhat effective. Lastly, out of the 190 participants using medications, 42% (n=80) found them very effective, while 47% (n=89) found them somewhat effective.

Associations: NRS Score and DSI Score: An inspection of histograms and the Shapiro-Wilk tests suggested against the normal distribution with the NRS score, $W(278)=0.97$, $p<0.001$, and the DSI score, $W(278)=0.98$, $p=0.004$. There were positive and significant correlations between the NRS score and DSI score when Spearman's correlation was applied ($r_s=0.369$, $n=278$, $p<0.001$), suggesting that an increased degree of dysmenorrhea led to a significant decline in the quality of life.

NRS Groups and DSI Score: A visual inspection of the histograms and the Shapiro-Wilk's test ($p<0.05$) indicated that DSI scores were not distributed normally for the first 3 groups of dysmenorrhea severity. A Kruskal-Wallis H test revealed a significant difference among the four groups of dysmenorrhea severity in terms of the DSI score indicating the quality of life, $H(2)=32.19$, $p<0.001$.

Menarche, BMI, and NRS: No relation between BMI groups was found with a degree of dysmenorrhea severity when Spearman's correlations were applied ($r_s=0.002$, $n=278$, $p=0.978$). Moreover, the Pearson correlation test revealed no significant association between the NRS score and the age of menarche, ($r=0.104$, $n=278$, $p=0.084$).

Medical vs. Non-Medical Students: A chi-square test of independence was applied to analyze the relationship between fields of study, i.e., medical vs. non-medical, and the belief that the use of medicines will affect their periods negatively. These variables showed a significant relationship: $X^2(1,$

$n=149)=12.23$, $p<0.001$. Participants from non-medical institutes believed that taking medicines would affect their periods negatively.

Discussion

The majority of our participants belonged to the moderate dysmenorrhea category. This finding contrasts with two studies from Lahore (7,9) and one Spanish study (10), which reported the majority having severe dysmenorrhea; however, it coincides with a local study from Karachi (12) and also with international studies from Saudi Arabia (13) and Lebanon (14), which reported moderate pain as the majority.

Factors that increase the risk of severe dysmenorrhea include family history, smoking, early age at menarche, long menstrual cycles, obesity, and alcohol use (15).

No significant correlation between the BMI and the degree of dysmenorrhea was observed in our study. This is consistent with the local study in Karachi (16) and certain international studies (10,17). However, several studies have suggested a positive correlation between low BMI and increased severity of dysmenorrhea (12,18), while others have found a significant correlation between obesity and dysmenorrhea (19). This may be due to location, race, social, and cultural differences.

Our study reported no correlation between dysmenorrhea and the age of menarche. A study in Karachi (6) and Iran (20) reported similar results, but this is inconsistent with the study in Serbia (21) that states an earlier age at menarche is an important determinant of dysmenorrhea. According to a Japanese study, menstrual cycle abnormalities and discomfort were less common with each one-year increase in age (15). While it could be mostly psychological, further research is required in this aspect.

Our study shows that dysmenorrhea significantly decreases the quality of life. Many local (2) and international studies (10,14) support this. The mood had the most interference, followed by interference with work in our study.

Various local studies reported a significant impact of dysmenorrhea on these aspects (9,6). International studies have reported absenteeism from work and school and a significant effect on mood (10,13,14). A Romanian study also determined a significant impact of dysmenorrhea on the university activities of students (22).

In our study, the majority used lifestyle modification, followed by home remedies and medication use (primarily oral analgesics). This finding is consistent with a study from India (23) and other international studies (13,14) but in contrast to a local study by Ashraf, T. et al (9), where medications were the most preferred option. A multi-center study by Sima, R., et al. also reported that the majority of students preferred pharmacological management (22).

Reasons for not taking medication in our study included the belief that the pain was not severe enough, concerns about side effects, and a negative attitude toward drugs. This is similar to Saudi Arabian research, which found that women choose alternative remedies to analgesics because of concerns about the negative effects (24). A study in China showed that girls who didn't talk about dysmenorrhea with their mothers or medical experts had negative feelings toward seeking medical help (25).

Participants were satisfied with their preferred pain management options, similar to previous studies. A Spanish study found physical activities helpful for pain management (10), while a Lebanese study showed medications were more effective in reducing pain scores (14).

Our study has several limitations. We used a self-reported questionnaire, which relied on the respondent's ability to provide accurate answers; however, this study was more concerned with the respondent's subjective feelings than a concrete assessment. People who were not menstruating at the time of filling were at risk of recall bias. There was no comparison group with "no dysmenorrhea." For a comparison group, there were not enough married respondents or people who smoked or had chronic conditions. This study is limited to female students in a single city, limiting its generalizability. To assess the impact of dysmenorrhea on quality of life and compare it across multiple domains, we propose the use of much larger sample sizes in the future.

Conclusion

We conclude that dysmenorrhea negatively affects women's quality of life, particularly mental health, and productivity at work. The Dysmenorrhea System Interference (DSI) Scale is a valid tool for assessing the impact of menstrual pain on a female's quality of life, which indicates the decline in quality of life with increasing pain. There is a general lack of understanding regarding appropriate pain management based on pain intensity as a negative attitude towards medications is observed with a trend of self-medication in the major-

ity, even by the medical students. This pertains to the lack of awareness among the masses and makes it important to encourage women to seek appropriate healthcare.

Recommendations: The pattern of self-medication or complete avoidance of medication indicates a concerning trend. Cultural perceptions of menstruation reinforce periods as a taboo subject, emphasizing the importance of greater awareness among females and, crucially, educating healthcare providers about female-specific health needs to prevent dismissal of their symptoms.

Declarations:

Ethics approval and consent to participate: All participants signed informed written consent before being enrolled in the study. The study was reviewed and approved by the ethics committee of Dow University of Health Sciences on 06th March 2023. The approval number is (Ref: IRB-2808/ DUHS/ Approval/2023/121). A copy of the ethics committee approval letter is provided in the supplementary file section. The study was conducted in accordance with the Declaration of Helsinki. *Availability of data and materials:* The data supporting this study is available through the corresponding author upon reasonable request.

Conflict of interest: The authors declare that they have no conflict of interest.

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