Original Research

PSYCHOLOGICAL IMPACT OF DYSMENORRHEA IN MEDICAL AND ALLIED HEALTH STUDENTS: EVIDENCE FROM NORTH INDIA

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ABSTRACT

Background: Dysmenorrhea is a common gynecological condition associated with significant physical discomfort and psychological distress. Female healthcare students may be particularly vulnerable due to academic pressure and demanding schedules, yet its psychological impact is often overlooked.

Aim and objectives: To assess the psychological impact of dysmenorrhea among female healthcare students.

Method: A quantitative cross sectional study was conducted among 255 undergraduate medical and allied health students at a tertiary care university in North India using convenience sampling. Data were collected through an online questionnaire including sociodemographic details, DASS-21, MMDQ, and WaLIDD, and analyzed using descriptive and inferential statistics.

Results: Dysmenorrhea prevalence was 88.6%, with 80% reporting adverse academic effects. Psychological distress was prevalent, with 54.5% depressive symptoms, 59.3% anxiety, and 38.4% stress. Menstrual distress was mild (48.6%), moderate (40.8%), and severe (15.7%). WaLIDD scores showed significant positive correlations with DASS-21 and MMDQ. Significant associations were observed with selected sociodemographic variables, while age, marital status, and caffeine intake were not associated.

Conclusion: Dysmenorrhea represents a substantial psychological and academic burden among female healthcare students. Integrated menstrual and mental health interventions are essential to improve student well-being.

Keywords: Dysmenorrhea, Psychological Distress, Depression, Anxiety, Stress, Academic Performance, Menstrual Distress, Female Healthcare Students.

INTRODUCTION

Dysmenorrhoea, affecting 75–90% of young women,[1] is marked by cramp-like abdominal pain and associated symptoms include gastrointestinal disturbance, headache, fatigue, irritability and dizziness.[2] Globally, prevalence ranges between 68.7–73.8%, with primary dysmenorrhoea accounting for 68–78% of cases and secondary for 19–56%.[3] Regional variation shows higher rates in Central America (89.6%) and Sri Lanka (97.7%), and lower in Asia (49.4%).[3] In India, prevalence is 70.2%, ranging from 63.9% in western to 78.9% in central areas.[4,5]

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Beyond physical symptoms, dysmenorrhoea also exerts psychological effects, including anxiety, low mood, irritability, fatigue and social withdrawal whereas severe cases have been linked with premenstrual syndrome, self-harm behaviours and suicidal ideation.[6–8] Dysmenorrhoea impairs academic performance, with 70–80% of students globally reporting disruption; in India, this includes absenteeism, poor concentration and reduced study effectiveness.[9,10] Risk factors include early menarche, heavy bleeding, family history, psychosocial stress, sedentary lifestyle and poor diet.[5] The World Health Organization emphasises menstrual health as a global public health priority intersecting with education, gender equality and wellbeing.[11] Among Indian medical and paramedical students, prevalence ranges from 63.7–80%, with many reporting self-medication.[12–14] Nearly half experience severe spasmodic pain, highlighting

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unmet needs for assessment and support.[15] Validated tools such as WaLIDD, DASS-21 and MMDQ enable systematic evaluation of physical severity and psychological distress.[16–21].

MATERIAL AND METHODS

Study Design and Setting

This study utilized experimental design which was a quantitative, non-experimental cross sectional design considered an appropriate study to address the prevalence and associations of psychological problems related to dysmenorrhea without the manipulation of variables. The study was conducted at Uttar Pradesh University of Medical Sciences (UPUMS), a tertiary medical institution located in Saifai, Etawah, Uttar Pradesh, India, among female undergraduate students enrolled in medical and allied healthcare programmes, including Bachelor of Medicine and Bachelor of Surgery (MBBS), Bachelor of Science in Nursing (B.Sc. Nursing), Bachelor of Medical Laboratory Technology (BMLT), Bachelor of Radiology and Imaging Technology (BRIT), Bachelor of Optometry (B.Optom), Bachelor of Pharmacy (B.Pharm), and Bachelor of Physiotherapy (BPT).

Participants

A total of 255 female students were recruited using a convenience sampling technique, based on a sample size calculated from a previously reported prevalence of 78%. Data were collected through Google Forms with mandatory fields to minimize missing data. Each participant was allowed a single submission; duplicate entries were screened and removed. Only fully completed questionnaires were included in the final analysis, while incomplete or partially filled responses were excluded to ensure data accuracy.

The study assessed outcome variables including psychological problems (stress, anxiety, and depression) and dysmenorrhea. Eligible participants were female students enrolled in bachelor-level healthcare programs at UPUMS, including MBBS, B.Sc Nursing, BMLT, BRIT, B.Optometry, B.Pharm, and BPT, who were able to read and write in English or Hindi and were willing to participate. Exclusion criteria comprised male students, female students unwilling to participate, those absent during the data collection period, and students enrolled in diploma or non-healthcare courses.

Instruments

Data collection was conducted using a structured Google form that consisted of four sections. The first section contained a socio demographic questionnaire that collected variables involved in socio-demographic characteristics like age, course and year of study, family income, body mass index (BMI), health conditions, sleep pattern, dietary habits, caffeine use, exercise practices, menstrual cycle features, age at menarche, family history of menstrual issues, medication intake, emotional symptoms, and academic impact. The second section included the use of the Depression Anxiety Stress Scale (DASS 21), to measure psychological distress. The third section used the Modified Menstrual Distress Questionnaire (MMDQ), which was used to assess menstrual morbidity. The fourth section included the WaLIDD scale (Working Ability, Location, Intensity, Days of Pain, Dysmenorrhea) to quantify the severity of dysmenorrhea in regards to the pain location, intensity, duration, and functional ability associated with pain.

Validity and Reliability

Content validity for the instruments was determined through an expert review. Reliability was further established by a pilot study that was carried out on 10% of the sample size resulting in minor modifications for clarity and accuracy. In the present study, all tools showed good psychometric properties. Test-retest reliability coefficients obtained were 0.82 for the DASS 21, 0.76 for the MMDQ and 0.78 for the WaLIDD scale, thus ensuring their consistency and use in repeated measurement.

Ethical Considerations

The study protocol was approved by the Institutional Ethics Committee of Uttar Pradesh University of Medical Sciences, Saifai (Approval No. 222/2025-26), and all procedures were conducted in accordance with the ethical standards of the relevant national and institutional committees and with the Declaration of Helsinki (1975, revised 2013). Permission for data collection was obtained from the deans of the Faculties of Medical Sciences, Nursing, Paramedical Sciences, and Pharmacy. Informed consent was obtained electronically at the start of the online questionnaire. Participants were assured of confidentiality, voluntary participation, and the right to withdraw at any stage. Responses were stored in a secure, password-protected database accessible only to the researchers, ensuring anonymity and data protection.

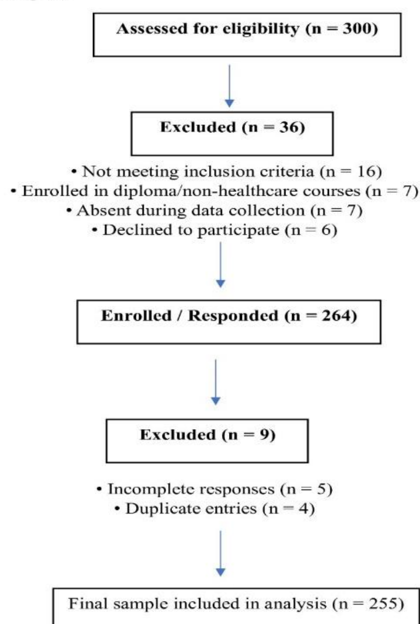
Data Collection and Analysis

Data were collected during the first two weeks of October 2025 using validated instruments, with periodic reminders issued to enhance participation. To minimize potential sources of bias, responses were collected anonymously, and incomplete or duplicate entries were excluded. However, the use of convenience sampling may limit the generalizability of the findings.

Upon completion, responses were exported for statistical analysis. Data were analyzed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics, including mean and standard deviation, were used to summarize the data. Variables were categorized using standard cut-offs (DASS-21 severity levels, MMDQ categories, and WaLIDD scores). Inferential statistics were applied in accordance with the study objectives, including

Pearson's correlation to assess relationships and the Chi-square test to examine associations.

RESULT



Socio-Demographic Profile of participants

The study included 255 female participants, the majority of whom were aged 17–21 years (58.43%) and unmarried (98.04%). Most were enrolled in B.Sc. Nursing (43.52%), followed by BPT (16.47%), BRIT (9.41%), B. Pharma (8.62%), MBBS (7.84%), B. Optometry (7.84%), and BMLT (6.27%). Nearly one-third of participants reported a monthly family income below ₹25,000 or between ₹25,000–50,000. With respect to body mass index (BMI), 38.04% had abnormal values, including 16.96% underweight, 14.90% overweight, and 7.05% obese. Chronic health conditions were reported by a notable proportion, with anemia (15.68%), thyroid disorders (13.72%), pelvic inflammatory disease (13.72%), and migraine (12.54%) being most common.

Lifestyle characteristics revealed that most participants slept 5–7 hours per day (61.56%), with 40% maintaining a regular sleep pattern. Nearly half consumed two to three regular meals daily, and caffeine intake was predominantly occasional (66.66%). A majority (63.92%) did not engage in physical activity; among those who were active, walking (56.07%) was the most common form. Academic performance was impacted in 80% of participants, of whom 38% reported moderate to severe impairment.

Menstrual characteristics showed that 75.68% had regular cycles, and 69.01% experienced menstrual flow lasting 3–5 days. Heavy flow was reported sometimes by 44.31% of participants. Most attained menarche between 13–14 years (60.78%), and 26.66% reported a family history of dysmenorrhea. Dietary habits indicated that nearly one-third consumed canteen food, home-cooked meals, or a mixed diet. For menstrual pain management, 39.21% relied on home remedies, while 41.17% reported no treatment. Psychological symptoms during menstruation were reported by 89.91%, with 21.17% experiencing mood swings and 45.05% reporting multiple symptoms. Dysmenorrhea was highly prevalent, affecting 88.63% of participants, with 20% experiencing severe pain.

Psychological Problems among Female Healthcare Students

Table 1: Frequency and Percentage Distribution of Participants Based on DASS-21 Scores (N = 255)

Domain	Category	Score Range	N (%)
Depression			
	Normal	0–9	116 (45.49)
	Mild	10–13	49 (19.21)
	Moderate	14–20	45 (17.64)
	Severe	21–27	28 (10.98)
	Extremely severe	28+	17 (6.6)

Anxiety			
	Normal	0–7	109 (40.74)
	Mild	8–9	23 (9.01)
	Moderate	10–14	65 (25.49)
	Severe	15–19	23 (9.01)
	Extremely severe	20+	35 (13.72)
Stress			
	Normal	0–14	157 (61.56)
	Mild	15–18	30 (11.76)
	Moderate	19–25	38 (14.90)
	Severe	26–33	19 (7.45)
	Extremely severe	34+	11 (4.31)

Table 1 analysis of DASS-21 reveals, 45.49% of participants were within the normal range for depression, while 19.21%, 17.64%, 10.98%, and 6.60% reported mild, moderate, severe, and extremely severe depression, respectively. Anxiety scores indicated that 40.74% were within the normal range, whereas 25.49% experienced moderate anxiety and 22.73% reported severe to extremely severe anxiety. Stress levels were normal in 61.56% of participants; however, 26.66% experienced moderate to extremely severe stress.

Menstrual Distress

Table 2: Menstrual distress among participants assessed using the Modified Menstrual Distress Questionnaire (N = 255)

Category of MMDQ Impact	Score Range	Respondents n (%)
Mild impact	0–25%	111 (43.53)
Moderate impact	26–50%	104 (40.78)
Severe impact	> 50%	40 (15.69)

According to MMDQ scores, 43.53% of participants experienced mild menstrual distress, 40.78% reported moderate distress, and 15.69% experienced severe distress (table 2).

Severity of Dysmenorrhea

Table 3: Severity of dysmenorrhea among participants assessed using the WaLIDD Questionnaire (N = 255)

Category of WaLIDD	Score Range	Respondents N (%)	Mean ± SD
No dysmenorrhea	0	13 (5.09)	6.17 ± 2.48
Mild dysmenorrhea	1–4	41 (16.07)	
Moderate dysmenorrhea	5–7	114 (44.71)	
Severe dysmenorrhea	8–12	87 (34.12)	

Table 3 demonstrated that only 5.09% of participants reported no dysmenorrhea. Mild dysmenorrhea was reported by 16.07%, while 44.71% experienced moderate dysmenorrhea and 34.12% reported severe dysmenorrhea. The mean WaLIDD score was 6.17 ± 2.48, indicating that dysmenorrhea of moderate severity was common in the study population.

Relationship between Psychological Distress and Dysmenorrhea

Karl Pearson Correlation shows statistically significant positive correlation was observed between DASS-21 and WaLIDD scores ($r = 0.271$, $p < 0.001$) indicating that higher psychological distress was moderately associate with increased severity of dysmenorrhea. Similarly, MMDQ scores were positively correlated with WaLIDD scores ($r = 0.352$, $p < 0.001$), demonstrating that higher levels of menstrual distress were moderately associated with greater severity of dysmenorrhea.

Table 4: Association of Socio-demographic Variables with Depression, Anxiety, and Stress (DASS-21) (N = 255)

Socio-demographic Variable	Depression χ^2 (p)	Anxiety χ^2 (p)	Stress χ^2 (p)
Age	38.94 (0.0001)*	19.83 (0.011)*	17.08 (0.0019)*
Marital status	1.37 (0.50)	4.08 (0.394)	1.36 (0.71)
Course of study	80.40 (0.0001)*	50.35 (0.001)*	93.84 (0.001)*
Family income	84.97 (0.0001)*	44.59 (0.001)*	79.37 (0.001)*
BMI	47.86 (0.0001)*	49.36 (0.001)*	179.04 (0.0001)*

Chronic conditions	82.55 (0.0001)*	89.22 (0.001)*	369.50 (0.0001)*
Avg. sleep (24h)	37.46 (0.0001)*	29.89 (0.003)*	46.36 (0.0001)*
Sleep pattern	105.36 (0.0001)*	109.50 (0.001)*	125.72 (0.0001)*
Eating pattern	26.79 (0.0083)*	31.55 (0.002)*	74.89 (0.0001)*
Caffeine intake	89.59 (0.0001)*	47.98 (0.001)*	150.63 (0.0001)*
Physical activity	78.75 (0.0001)*	93.08 (0.001)*	19.13 (0.0007)*
Type of physical activity	54.46 (0.0001)*	70.76 (0.001)*	174.61 (0.001)*
Menstrual cycle regularity	30.97 (0.0003)*	32.48 (0.001)*	114.37 (0.0001)*
Duration of menstruation	35.97 (0.0001)*	20.09 (0.01)*	37.58 (<0.0001)*
Heavy menstrual flow	131.83 (0.0001)*	49.86 (0.001)*	98.31 (0.0001)*
Age at menarche	104.26 (0.0001)*	22.16 (0.036)*	83.48 (0.0001)*
Family history	128.71 (0.0001)*	33.51 (0.001)*	102.26 (0.0001)*
Type of meals	84.66 (0.0001)*	35.40 (0.001)*	53.63 (0.0001)*
Treatment remedies	33.03 (0.103)	49.98 (0.001)*	92.23 (0.0001)*
Emotional symptoms	93.87 (0.0001)*	64.16 (0.059)	156.20 (0.0001)*
Menstrual pain	83.15 (0.0001)*	42.45 (0.001)*	7.29 (0.294)
Academic impact	56.59 (0.0001)*	28.20 (0.005)*	75.02 (0.0001)*

*$p < 0.05$ = Significant

The table demonstrates that most socio-demographic, lifestyle, and menstrual-related variables showed significant associations with depression, anxiety, and stress scores (DASS-21) among female healthcare students ($p < 0.05$). Variables such as age, course of study, family income, BMI, chronic conditions, sleep duration and pattern, dietary habits, caffeine intake, physical activity, menstrual characteristics (cycle regularity, duration, flow, age at menarche), family history, and academic impact were consistently associated with all three psychological domains.

Table 4 shows that DASS-21 were significantly associated with age, course of study, family income, BMI, chronic conditions, sleep duration and pattern, dietary habits, caffeine intake, physical activity, menstrual characteristics, family history, psychological symptoms, menstrual pain, and academic impact ($p < 0.05$). In contrast, marital status was not significantly associated with any of the DASS-21 components.

Some variables demonstrated domain-specific differences: treatment practices were not significantly associated with depression; emotional/psychological symptoms were not significantly associated with anxiety; and menstrual pain was not significantly associated with stress.

Table 5: Association between socio-demographic variables and MMDQ scale among female healthcare students (N = 255)

Socio-demographic variable	χ^2 value	df	p-value	Significance
Age	6.28	4	0.18	Not significant
Marital status	1.30	2	0.52	Not significant
Course of study	18.50	12	0.11	Not significant
Family monthly income	2.95	6	0.82	Not significant
BMI	36.10	6	0.001	Significant
Chronic conditions	41.20	22	0.01	Significant
Average sleep (24h)	2.51	6	0.90	Not significant
Sleep pattern	5.60	6	0.47	Not significant
Eating pattern	38.30	6	0.001	Significant
Caffeine intake	15.70	6	0.016	Significant
Physical activity (engagement)	0.02	2	0.99	Not significant
Type of physical activity	11.20	6	0.08	Not significant
Menstrual cycle regularity	39.50	6	0.01	Significant
Duration of menstrual period	5.80	6	0.44	Not significant
Heavy menstrual flow	27.20	6	0.001	Significant
Age at menarche	9.80	6	0.13	Not significant
Family history	5.10	2	0.078	Not significant
Type of meals consumed	16.90	6	0.009	Significant
Treatment remedies	45.30	12	0.001	Significant
Emotional/psychological symptoms	88.50	24	0.001	Significant
Menstrual pain	14.20	6	0.027	Significant

Academic impact	5.60	6	0.47	Not significant

Table 5 shows that MMDQ scores showed No significant associations were observed with age, marital status, course of study, income, sleep characteristics, physical activity, age at menarche, family history, or academic impact.

Table 6: Association between socio-demographic variables and WaLIDD scale among female healthcare students (N = 255)

Socio-demographic variable	**χ^2 value**	**df**	**p-value**	**Significance**
Age	7.30	6	0.60	Not significant
Marital status	0.87	3	0.832	Not significant
Course of study	33.97	18	0.0127	Significant
Family monthly income	112.70	9	<0.0001	Significant
BMI	158.29	9	<0.0001	Significant
Chronic conditions	168.27	30	<0.0001	Significant
Average sleep (24h)	55.88	9	<0.0001	Significant
Sleep pattern	127.44	9	<0.0001	Significant
Eating pattern	74.74	9	<0.0001	Significant
Caffeine intake	8.03	6	0.09	Not significant
Physical activity (engagement)	30.01	3	<0.0001	Significant
Type of physical activity	62.53	9	<0.0001	Significant
Menstrual cycle regularity	20.07	9	<0.0001	Significant
Duration of menstrual period	29.93	6	<0.0001	Significant
Heavy menstrual flow	37.74	9	<0.0001	Significant
Age at menarche	42.20	9	<0.0001	Significant
Family history	203.86	3	<0.0001	Significant
Type of meals consumed	64.66	9	<0.0001	Significant
Treatment remedies	59.32	18	<0.0001	Significant
Emotional/psychological symptoms	134.81	36	<0.0001	Significant
Menstrual pain	91.83	9	<0.0001	Significant
Academic impact	41.23	9	<0.0001	Significant

Table 6 illustrates that WaLIDD scores were significantly associated with course of study, family income, BMI, chronic conditions, sleep duration and pattern, eating habits, physical activity, Menstrual cycle regularity, Duration of menstrual period, Heavy menstrual flow, Age at menarche, family history, treatment practices, emotional symptoms, menstrual pain, and academic impact ($p < 0.05$). Age, marital status, and caffeine intake were not significantly associated.

DISCUSSION

The present study examined psychological distress, menstrual morbidity and the severity of dysmenorrhea among female healthcare students, and explored their associations with demographic, lifestyle and menstrual characteristics. The findings support the study objectives and hypotheses, confirming a substantial burden of menstrual and psychological symptoms in this population.

A high prevalence of dysmenorrhea (88.63%) was observed, comparable with reports from university populations across different countries. A Mexican study by Ortiz et al. reported a similarly high prevalence of dysmenorrhea, with significant negative effects on academic performance among university students.[22] Ullah et al. likewise documented a high prevalence and greater pain intensity among university-aged women, emphasising the substantial physical and psychological burden of dysmenorrhea.[23] In the present study, academic performance was affected in 80% of participants, with 38% reporting moderate to severe impairment. These findings are consistent with those of Russell et al., who demonstrated that menstrual pain is highly prevalent among female students and significantly interferes with academic functioning.[24]

Psychological distress was highly prevalent in the present study. More than half of participants reported depressive symptoms (54.5%) and anxiety above normal levels (59.3%), while 38.4% experienced moderate to severe stress according to DASS-21 scores. Similar levels of psychological morbidity among university students were reported by Al-Garni et al., who identified moderate to severe depression, anxiety and stress in a substantial proportion of students.[25] Akter et al. further demonstrated that among women with moderate to severe dysmenorrhea, 62.4% experienced depressive symptoms, 71.3% anxiety and 59.6% stress, highlighting the close association between dysmenorrhea severity and psychological distress.[26]

In the present study, depression scores were significantly associated with a wide range of sociodemographic, lifestyle and menstrual factors, including age, course of study, family income, BMI, chronic health conditions, sleep duration and pattern, dietary habits, caffeine intake, physical activity, menstrual characteristics, family history, pain severity and academic impact. These findings are consistent with those of Alateeq et al., who identified depression as a significant predictor of severe dysmenorrhea among female university students.[27] Pramanik and Pramanik similarly confirmed significant associations between dysmenorrhea and psychological distress, including depression, anxiety and stress, among adolescents in India.[28] Jalaun further reported that 62% of females with dysmenorrhea exhibited depression scores above the moderate level on the DASS-21 scale.[29]
Anxiety scores in the present study were also significantly associated with most sociodemographic, lifestyle and menstrual variables. Similar findings have been reported in previous studies, where females experiencing dysmenorrhea demonstrated significantly higher anxiety levels. Pramanik and Pramanik observed elevated anxiety among adolescents with primary dysmenorrhea,[28] while Jalaun also reported higher anxiety scores among affected females.[29] These findings collectively reinforce anxiety as a key psychological correlate of menstrual pain, with important implications for wellbeing and academic performance.
Stress levels, as measured by the DASS-21, were likewise significantly associated with sociodemographic, lifestyle and menstrual variables. Ullah et al. identified stress as the strongest predictor of dysmenorrhea pain intensity among university-aged women, supporting the present findings.[23] Comparable results were reported by Pramanik and Pramanik and by Jalaun, who demonstrated significantly higher stress levels among females experiencing dysmenorrhea, alongside increased depression and anxiety.[28,29]
Menstrual distress assessed using the Modified Menstrual Distress Questionnaire (MMDQ) was significantly associated with BMI, chronic health conditions, dietary habits, caffeine intake, menstrual cycle regularity, heavy menstrual flow, treatment practices, emotional symptoms and pain severity. These findings highlight the combined influence of physiological and lifestyle factors on menstrual distress. Similar associations were reported by Nayak et al., who demonstrated a strong relationship between menstrual health problems and psychological symptoms among young adults.[30] Pramanik and Pramanik further reinforced the association between primary dysmenorrhea and psychological distress among Indian adolescents.[28] Alateeq et al. also identified BMI and lifestyle behaviours as significant predictors of dysmenorrhea severity,[27] while Akter et al. reported strong associations between moderate to severe dysmenorrhea and depression, anxiety and stress.[26]
Finally, dysmenorrhea severity assessed using the WaLIDD scale was significantly associated with course of study, family income, BMI, chronic health conditions, sleep duration and pattern, dietary habits, physical activity, menstrual characteristics, family history, treatment practices, emotional symptoms, pain severity and academic impact. These findings underscore the multidimensional nature of dysmenorrhea, reflecting the interaction of biological, behavioural and psychosocial factors. Similar predictors of pain intensity have been reported by Ullah et al.[23] Furthermore, Ozerdogan et al. and Kural et al. identified irregular menstrual cycles and heavy menstrual flow as strong predictors of dysmenorrhea severity, consistent with the present findings.[31,32]

CONCLUSION

The present study highlights that dysmenorrhea of moderate to severe intensity is highly prevalent among female healthcare students, with substantial impact on academic performance and daily functioning. Psychological distress including depression, anxiety, and stress—was also common, and both psychological distress (DASS-21) and menstrual distress (MMDQ) were moderately correlated with dysmenorrhea severity (WaLIDD), underscoring the multidimensional nature of this condition. Significant associations with socio-demographic, lifestyle, and menstrual factors further emphasize the role of modifiable behaviors such as physical inactivity, inadequate sleep, and poor dietary practices, alongside chronic health conditions, in exacerbating this burden.
Collectively, these findings demonstrate that dysmenorrhea is not merely a gynecological issue but a biopsychosocial challenge that intertwines physical pain, emotional distress, and academic impairment. Addressing this problem requires integrated menstrual and mental health support within academic environments, complemented by initiatives promoting healthy lifestyle practices to improve overall well-being and educational outcomes among young women in healthcare disciplines.

Clinical Implication

Dysmenorrhoea among female healthcare students constitutes a substantial multidimensional burden, closely interrelated with psychological distress, menstrual symptoms, lifestyle factors, and academic functioning. Integrating menstrual and mental health support within academic institutions, alongside interventions targeting modifiable lifestyle factors such as sleep, physical activity, and diet, may enhance psychological well-being and educational outcomes.

Limitations

This study has several limitations that should be acknowledged. First, it was conducted in a single institution with a relatively small sample of female healthcare students, which may limit the generalizability of the findings to broader student populations or different academic contexts. Second, the use of non-random sampling may have introduced selection bias, thereby affecting representativeness. Third, although multiple socio-demographic, lifestyle, and menstrual variables were examined, certain potential confounders—such as individual lifestyle practices, academic workload, sleep quality, and personal stressors—were not fully controlled and may have influenced the observed associations. Finally, the cross-sectional design restricts causal inference, allowing only the identification of relationships between dysmenorrhea and psychological distress rather than establishing directionality or causation.

Author Contributions

The corresponding author contributed to manuscript preparation. All authors participated in study design, data collection, and statistical analysis. All co-authors have read and approved the final version of the manuscript.

Ethical Approval

The current study was approved by the Institutional Ethics Committee of Uttar Pradesh University of Medical Sciences, Saifai (Approval No. 222/2025-26).

Informed Consent

Written consent was obtained from all participants.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article

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