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Physical Activity and Dysmenorrhea Among Female Allied Health Sciences Students in Peshawar, Pakistan: A Cross-Sectional Study

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Abstract

Dysmenorrhea is a common menstrual health problem among adolescents and young women and may interfere with daily functioning, academic participation, physical activity, and quality of life. Physical activity has been proposed as an accessible non-pharmacological strategy for reducing menstrual pain, although the association between habitual activity and dysmenorrhea remains complex. This study examined physical activity levels and their association with dysmenorrhea among female Allied Health Sciences students at Iqra National University, Peshawar, Pakistan. A descriptive cross-sectional study was conducted among 234 female students aged 18–25 years. Participants were recruited using convenience sampling. Demographic information, body mass index, physical activity, dysmenorrhea status, and pain-related information were collected. Physical activity was assessed using the Global Physical Activity Questionnaire and Rapid Assessment of Physical Activity, while menstrual pain and symptoms were assessed using the Numeric Pain Rating Scale and Cox Menstrual Symptom Scale. Data were analyzed using SPSS version 27 with descriptive statistics, chi-square analysis, independent-samples t test, Pearson correlation, and binary logistic regression. Participants had a mean age of 20.40 ± 1.61 years and mean BMI of 21.45 ± 0.77 kg/m². Dysmenorrhea was reported by 45.1% of participants. The most frequent RAPA score was 4 (58.5%). A statistically significant association between RAPA score and dysmenorrhea was reported ($\chi^2 = 22.728$, df = 30, p = .03). The

correlation between pain level and RAPA score was statistically significant but very weak ($r = .070$, $p = .03$). Mean dysmenorrhea scores were also very similar between physically active and sedentary groups. Physical activity was statistically associated with dysmenorrhea in this sample, but the magnitude of the observed relationships was small. The findings support a multifactorial understanding of dysmenorrhea and indicate that physical activity should be considered as one component of broader menstrual-health assessment and management rather than as an isolated determinant.

Keywords: *dysmenorrhea; female students; GPAQ; menstrual pain; Pakistan; physical activity; physiotherapy; RAPA.*

Introduction

Dysmenorrhea, or painful menstruation, is one of the most common menstrual health complaints among adolescents and young women. It is typically characterized by cramping pelvic or lower abdominal pain occurring shortly before or during menstruation and may be accompanied by back pain, headache, nausea, fatigue, dizziness, mood changes, and reduced ability to perform routine activities. Although menstrual pain is common, its impact can extend beyond physical discomfort to academic participation, social functioning, sleep, emotional well-being, and quality of life.

Dysmenorrhea is broadly classified as primary or secondary. Primary dysmenorrhea occurs in the absence of an identifiable pelvic pathology and is generally associated with prostaglandin-mediated uterine contractions. Secondary dysmenorrhea results from an underlying gynecological condition, including endometriosis, adenomyosis, fibroids, pelvic inflammatory disease, or other pelvic pathology. This distinction is clinically important because persistent, severe, atypical, or treatment-resistant menstrual pain may require evaluation for secondary causes. Contemporary clinical guidance continues to emphasize appropriate assessment rather than normalizing severe menstrual pain as an inevitable part of menstruation.

The burden of dysmenorrhea among students is substantial. A meta-analysis involving 96 studies and 78,068 students estimated an overall prevalence of primary dysmenorrhea of 66.1%, although prevalence varied considerably between populations and study periods. The review also identified several factors associated with primary dysmenorrhea, including poor sleep, psychological stress, family history, irregular menstrual cycles, dietary factors, and insufficient physical exercise. More recent global evidence similarly indicates a high prevalence of dysmenorrhea, while emphasizing substantial heterogeneity across countries, populations, definitions, and assessment methods.

The consequences are particularly relevant in university populations. Students experiencing dysmenorrhea may have difficulty concentrating, attending classes, completing academic work, or participating in routine activities. A large systematic review and meta-analysis has demonstrated that dysmenorrhea can negatively affect academic performance and daily productivity among young women. Thus, menstrual pain is not simply an episodic physical symptom; for some students it represents a recurring barrier to educational and social participation.

The Pakistani context is also important. Menstrual health can remain difficult to discuss openly in conservative social environments, and cultural expectations may contribute to normalization of menstrual pain or reluctance to seek professional assistance. Recent Pakistani research among female students has demonstrated that primary dysmenorrhea is associated with meaningful health-related quality-of-life consequences. In a cross-sectional study of 484 female students in Sargodha, most participants were

unmarried and within the young-adult age range, with moderate dysmenorrhea being common. Such findings reinforce the need for locally generated evidence rather than relying exclusively on prevalence estimates from other populations.

Physical activity is one potentially modifiable factor that has received considerable attention in dysmenorrhea research. Physical activity includes bodily movement that increases energy expenditure and encompasses exercise, walking, transportation-related activity, occupational activity, household tasks, and recreational movement. Regular activity has established benefits for cardiovascular fitness, muscular function, psychological well-being, and general health. Its potential relevance to menstrual pain may involve several pathways, including improved circulation, neuromuscular relaxation, endogenous analgesic mechanisms, improved mood, and reduction in stress.

Evidence from intervention research generally supports exercise as a useful component of primary dysmenorrhea management. A systematic review and meta-analysis of randomized controlled trials found that physical activity reduced menstrual pain intensity and pain duration, although the authors noted heterogeneity and limitations in the methodological quality of the underlying studies. More recent evidence has strengthened this literature. A 2024 network meta-analysis involving 29 randomized controlled trials and 1,808 participants found that different exercise modalities, including relaxation, strength, aerobic, yoga, mixed exercise, and Kegel exercises, were associated with reductions in menstrual pain after intervention periods. Another 2024 network meta-analysis including 49 studies and 3,129 participants similarly reported beneficial effects of exercise interventions for primary dysmenorrhea, with effects varying according to exercise type, duration, frequency, and training characteristics.

Evidence published in 2025 provides further support while also highlighting an important distinction between structured exercise interventions and habitual physical activity. A 2025 systematic review and meta-analysis of observational studies included 82 studies involving more than 100,000 women. Lower physical activity was associated with higher odds of menstrual pain, but the authors noted that much of the evidence was cross-sectional, physical activity was frequently self-reported, and definitions of menstrual health outcomes varied considerably. A separate 2025 meta-analysis of randomized trials reported that exercise reduced pain intensity among individuals with primary dysmenorrhea and suggested beneficial effects associated with sustained exercise programs.

These findings suggest that physical activity may have an important role in menstrual health, but they do not establish that activity level alone determines whether an individual develops dysmenorrhea. Dysmenorrhea is multifactorial. Biological factors, prostaglandin activity, hormonal changes, menstrual characteristics, family history, sleep, stress, diet, psychological factors, and pain perception may all contribute. Consequently, an observational association between physical activity and dysmenorrhea should not be interpreted as evidence that increasing activity will necessarily prevent dysmenorrhea.

Measurement also requires consideration. The Global Physical Activity Questionnaire (GPAQ) was developed for population-level physical activity surveillance and has demonstrated acceptable reproducibility and concurrent validity, although criterion validity against objective measures is more limited. The Rapid Assessment of Physical Activity (RAPA) is a brief self-report instrument developed to classify physical activity levels, although its original validation focused on adults older than 50 years. These measurement characteristics are relevant when interpreting self-reported activity among young university students.

Despite growing international evidence, relatively limited research has examined the relationship between physical activity and dysmenorrhea specifically among female Allied Health Sciences students in Peshawar.

The present study therefore examined physical activity levels and their association with dysmenorrhea among female students at Iqra National University, Peshawar. The study aimed to determine participants' physical activity levels and assess whether physical activity was associated with dysmenorrhea status and pain-related outcomes.

Methodology

Study design and setting

A descriptive cross-sectional study was conducted among female students of Allied Health Sciences at Iqra National University, Peshawar, Pakistan. The study was conducted during 2026, with literature review and data collection undertaken from February to April and statistical analysis and preparation of the research report undertaken during May and June. The original thesis describes the study as a convenience-sampling cross-sectional investigation.

Participants and sample size

The final analysis included 234 participants. The thesis reports that an initial sample size of 235 was calculated using the Raosoft sample-size calculator, based on a 5% margin of error, 95% confidence level, and 50% response distribution. Participants were female Allied Health Sciences students aged 18–25 years. Participants were included if they were female Allied Health Sciences students, aged 18–25 years, single, had a BMI between 19 and 23 kg/m², and reported dysmenorrhea. Pregnant or lactating women, participants with severe gynecological pathology requiring hospitalization, participants using hormonal therapy, and those with recent lower-limb, pelvic, or spinal injuries were excluded.

Data collection

After institutional permission and ethical approval, eligible participants were informed about the study procedures and provided written informed consent. Demographic and relevant menstrual information was collected. Participants completed physical-activity and menstrual-health measures. The study protocol included the GPAQ and RAPA for physical activity, the Numeric Pain Rating Scale (NPRS) for pain intensity, and the Cox Menstrual Symptom Scale for menstrual symptoms. The thesis reports that privacy and confidentiality were maintained and that participation was voluntary.

The GPAQ assesses physical activity in work, transport, and recreational domains as well as sitting time. Evidence indicates that GPAQ provides reasonably reproducible population-level estimates, although self-report introduces limitations in criterion validity. RAPA was used to characterize the participants' activity level. The NPRS was used to quantify pain intensity on a 0–10 scale.

Statistical analysis

Data were analyzed using IBM SPSS Statistics version 27. Continuous variables were summarized using means and standard deviations, while categorical variables were presented as frequencies and percentages. Inferential analyses included chi-square testing, an independent-samples *t* test, Pearson correlation, and binary logistic regression. Statistical significance was defined as $p < .05$.

Because the design was cross-sectional, analyses were interpreted as associations rather than causal relationships.

Results

Participant characteristics

A total of 234 female students were included in the final analysis. The mean age was 20.40 ± 1.61 years, while the mean BMI was 21.45 ± 0.77 kg/m². All participants were single. Most participants were

undergraduate students (78.2%), followed by participants with intermediate-level education (19.7%) and secondary-level education (2.1%).

Table 1. Demographic characteristics of participants

Characteristic	Result
Sample size	234
Age, mean $\pm$ SD	20.40 $\pm$ 1.61 years
BMI, mean $\pm$ SD	21.45 $\pm$ 0.77 kg/m ²
Single	234 (100.0%)
Secondary education	5 (2.1%)
Intermediate education	46 (19.7%)
Undergraduate	183 (78.2%)

Physical activity level

RAPA scores ranged from 1 to 6. The largest group consisted of participants with a RAPA score of 4, representing 137 participants (58.5%). A score of 5 was reported by 58 participants (24.8%), while 18 participants (7.7%) had a score of 6. Nineteen participants (8.1%) scored 3, and one participant each scored 1 and 2.

Table 2. Distribution of RAPA scores

RAPA score	N	%
1	1	0.4
2	1	0.4
3	19	8.1
4	137	58.5
5	58	24.8
6	18	7.7
Total	234	100.0

The distribution indicates that the sample was concentrated around the middle RAPA categories rather than the lowest activity levels. This is relevant when interpreting the association with dysmenorrhea because the sample contained relatively few participants at the lowest levels of activity.

Dysmenorrhea prevalence

Dysmenorrhea was reported by 106 participants (45.1%), whereas 128 participants (54.5%) reported no dysmenorrhea. One response (0.4%) was coded as an invalid/miscoded value in the SPSS output. The thesis notes that this value should be checked against the original dataset before final publication.

Table 3. Dysmenorrhea status

Dysmenorrhea status	N	%
Yes	106	45.1
No	128	54.5
Invalid/miscoded	1	0.4
Total	234	100.0

Association between physical activity and dysmenorrhea

The cross-tabulation demonstrated that dysmenorrhea occurred across several physical-activity categories. Among participants with a RAPA score of 4, 60 reported dysmenorrhea and 77 did not. Among those with a score of 5, 26 reported dysmenorrhea and 31 did not. Among participants scoring 6, nine reported dysmenorrhea and nine did not. The complete cross-tabulation is presented below.

Table 4. RAPA score according to dysmenorrhea status

RAPA score	Dysmenorrhea yes	Dysmenorrhea no	Invalid	Total
1	1	0	0	1
2	0	1	0	1
3	9	10	0	19
4	60	77	0	137
5	26	31	1	58
6	9	9	0	18
Total	106	128	1	234

The reported Pearson chi-square test indicated a statistically significant association between physical activity level and dysmenorrhea ($\chi^2 = 22.728$, $df = 30$, $p = .03$). However, the thesis also reports a likelihood-ratio test of 16.471 with 30 degrees of freedom and $p = .978$, as well as a linear-by-linear association of 0.035 with $p = .852$. These discrepant values warrant verification of the original SPSS contingency-table output before submission to a peer-reviewed journal.

Dysmenorrhea scores and physical activity status

The independent-samples comparison reported a mean dysmenorrhea score of 1.80 ± 0.90 among physically active participants and 1.79 ± 0.59 among sedentary participants. Thus, although the thesis reports statistical significance for the group comparison, the absolute difference in means was only 0.01 points.

Correlation between pain and physical activity

Pearson correlation demonstrated a statistically significant but very weak positive association between pain level and RAPA score ($r = .070$, $p = .03$; $N = 234$). The very small correlation coefficient indicates that the statistical association accounted for little variation in pain level.

Table 5. Main inferential findings

Analysis	Statistic	Result	Interpretation
Pearson chi-square	$\chi^2 = 22.728$, $df = 30$	$p = .03$	Reported statistically significant association
Mean dysmenorrhea score	Active: 1.80 ± 0.90 ; sedentary: 1.79 ± 0.59	Difference = 0.01	Very small absolute difference
Pearson correlation	$r = .070$	$p = .03$	Statistically significant, very weak association
Binary logistic regression	OR reported as close to 1	Not a strong predictor	Physical activity alone showed limited predictive value

The thesis further reports that binary logistic regression indicated that physical activity was not a strong predictor of dysmenorrhea. Although the regression analysis was described as statistically significant, the odds ratio was close to one and the model explained very little variation in dysmenorrhea occurrence.

Discussion

This study examined physical activity levels and their relationship with dysmenorrhea among female Allied Health Sciences students in Peshawar. The principal finding was that dysmenorrhea was reported by 45.1% of participants, while most participants were concentrated around the middle RAPA score categories. The reported inferential analyses suggested an association between physical activity and dysmenorrhea, but the correlation and group differences were very small. Taken together, the findings indicate that physical activity may be related to menstrual health without being sufficient to explain dysmenorrhea on its own.

The prevalence observed in this study was lower than the pooled prevalence reported in international student populations. A 2022 meta-analysis of 96 studies estimated that approximately 66.1% of students experienced primary dysmenorrhea. More recent global evidence has also reported a high overall prevalence of dysmenorrhea, although estimates vary substantially by setting and diagnostic definitions. The 45.1% prevalence observed in the present sample should therefore be interpreted in the context of its narrow age range, single-institution setting, inclusion criteria, cultural context, and measurement procedures. Differences in prevalence across studies are expected when populations and case definitions differ.

The relatively high proportion of students with dysmenorrhea nevertheless demonstrates the relevance of menstrual health within university populations. Previous research has consistently shown that menstrual pain can interfere with daily activities, academic participation, and quality of life. This is particularly important in students because recurring menstrual symptoms may coincide with lectures, examinations, clinical placements, and other academic responsibilities.

Most participants in the present study had a RAPA score of 4, with 58.5% falling in this category. The sample therefore did not consist predominantly of highly inactive individuals. This finding is important because the relationship between physical activity and dysmenorrhea may differ according to the intensity, frequency, duration, and type of activity. A general activity questionnaire may identify broad activity patterns but may not adequately distinguish between structured aerobic exercise, strength training, walking, transportation-related activity, household work, and other forms of movement.

This distinction is supported by contemporary intervention research. A 2024 network meta-analysis reported beneficial effects across several exercise modalities, but the magnitude and timing of benefits differed according to exercise type and duration. Another 2024 analysis similarly found that resistance, multi-component, aerobic, stretching, and mind-body exercise could reduce menstrual pain, with effects depending on training characteristics. Thus, the absence of a large association between a general activity score and dysmenorrhea in the present study does not contradict evidence that structured exercise interventions can reduce menstrual pain.

The reported Pearson correlation between pain and RAPA score was statistically significant but extremely small ($r = .070$). From a practical perspective, this is the more important aspect of the result. Statistical significance does not necessarily indicate a clinically meaningful relationship. With 234 observations, even a very small coefficient can reach conventional statistical significance. An r of .070 indicates that the linear association between the two measures was minimal. Therefore, the present results should not be interpreted as demonstrating a meaningful relationship between increasing physical activity and increasing or decreasing pain intensity.

The direction of the correlation also deserves careful interpretation. The coefficient was positive, meaning that higher RAPA scores were associated with slightly higher reported pain scores in this sample. This

contrasts with much of the intervention literature suggesting that structured exercise can reduce dysmenorrhea pain. Several explanations are possible, but because the present study was cross-sectional, causality cannot be established. It is possible that participants with greater menstrual discomfort modified their activity patterns, or that individuals who remained active despite pain differed in other unmeasured characteristics. Reverse causation and residual confounding are therefore plausible.

The very small difference in mean dysmenorrhea scores between physically active and sedentary participants provides additional context. The physically active group had a mean score of 1.80, whereas the sedentary group had a mean of 1.79. Although the thesis reports a statistically significant group comparison, the difference of 0.01 is extremely small. This finding illustrates why statistical significance should be considered alongside effect magnitude and clinical relevance.

The regression findings further support a cautious interpretation. According to the thesis, physical activity was not a strong predictor of dysmenorrhea, with an odds ratio close to one and very limited explanatory power. This is compatible with the broader understanding of dysmenorrhea as a multifactorial condition. Biological processes, menstrual characteristics, family history, sleep, stress, diet, psychological factors, and underlying gynecological disorders may contribute to pain. Current clinical guidance emphasizes assessment and appropriate management rather than attributing menstrual pain to a single lifestyle factor.

The present findings can therefore be understood as complementary to, rather than contradictory to, evidence supporting exercise. Intervention studies ask whether a defined exercise program changes pain over time, whereas the present study examined whether naturally occurring physical activity levels were associated with dysmenorrhea in a cross-sectional sample. These are different research questions. A participant may report moderate habitual activity while still experiencing dysmenorrhea. Conversely, an inactive participant may report little menstrual pain. The present findings illustrate this distinction.

Recent observational evidence provides useful context. A 2025 systematic review and meta-analysis found that lower physical activity levels were associated with higher odds of menstrual pain, but the authors also emphasized substantial methodological limitations, including widespread use of cross-sectional designs and self-reported activity measures. This is particularly relevant to the present study because physical activity was assessed using self-report questionnaires. Self-reported activity is practical and inexpensive but may be affected by recall and social-desirability bias.

The use of the GPAQ is appropriate for population-level physical activity assessment, but its measurement limitations should be acknowledged. Validation research indicates reasonable reliability and concurrent validity, while criterion validity against accelerometry is more limited. RAPA also provides a simple activity classification system, but its original validation was conducted primarily among older adults. Consequently, future research among young Pakistani women would benefit from combining questionnaire-based assessment with objective activity monitoring where feasible.

The Pakistani context further strengthens the relevance of the study. Recent research from Pakistan has demonstrated substantial quality-of-life consequences among female students experiencing primary dysmenorrhea. Menstrual health education, appropriate clinical assessment, and physiotherapy-based lifestyle interventions may therefore be relevant within university health services. However, severe or persistent menstrual pain should not simply be addressed through exercise advice; clinical evaluation is important when symptoms suggest possible secondary dysmenorrhea. The 2025 Canadian guideline continues to emphasize systematic investigation and treatment of primary dysmenorrhea.

Overall, the study adds local evidence from Peshawar showing that physical activity and dysmenorrhea are related in a statistical sense within this sample, while also demonstrating that the observed relationships were weak. The results support a broader biopsychosocial understanding of menstrual pain rather than a single-factor explanation.

Limitations

Several limitations should be considered. First, the cross-sectional design prevents conclusions about temporal direction or causality. Second, convenience sampling from a single Allied Health Sciences institution limits generalizability to female students in other disciplines, universities, regions, or age groups. Third, physical activity and menstrual symptoms were primarily assessed through self-report, which may introduce recall and reporting bias. Fourth, the sample was restricted to single women with a relatively narrow BMI range, limiting the ability to examine potentially important demographic and clinical factors. Fifth, the sample contained very few participants in the lowest RAPA categories, producing an uneven distribution of activity levels. Finally, the thesis contains a miscoded dysmenorrhea response and an apparent discrepancy between some reported chi-square statistics and their associated probability values; these values should be checked against the original SPSS output before journal submission.

Recommendations

Future studies should recruit larger and more diverse samples from multiple universities and provinces in Pakistan. Prospective longitudinal designs would help determine whether changes in physical activity precede changes in menstrual pain. Randomized controlled trials should examine specific exercise prescriptions, including aerobic, resistance, stretching, core-strengthening, relaxation, and combined programs, rather than relying only on broad activity classifications. Objective measures such as accelerometers could complement GPAQ or other self-report instruments. Future analyses should also consider menstrual cycle characteristics, age at menarche, family history, sleep, psychological stress, dietary patterns, analgesic use, sedentary time, and clinically confirmed gynecological conditions. For physiotherapy practice, education about safe regular physical activity can be integrated into menstrual-health counseling, while students with severe, persistent, or atypical pain should be referred for appropriate medical assessment.

Conclusion

Dysmenorrhea affected 45.1% of the female students included in this study, while the majority of participants demonstrated middle-range physical activity according to RAPA scores. The reported analyses identified a statistical association between physical activity level and dysmenorrhea, but the relationship between pain and physical activity was very weak and the difference in mean dysmenorrhea scores between activity groups was minimal. Physical activity also showed limited predictive value in the reported regression analysis. These findings indicate that physical activity should not be viewed as a sole determinant or predictor of dysmenorrhea. Instead, menstrual pain should be understood as a multifactorial health problem influenced by biological, menstrual, behavioral, psychological, and lifestyle factors. Physical activity remains a reasonable component of healthy menstrual-health practice, particularly given contemporary evidence supporting structured exercise for primary dysmenorrhea, but its role should be considered within a broader assessment and management framework.

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