Original Article

The Effects of Exercise on Reducing Primary Dysmenorrhea among Rural Women: A Quasi-Experimental Study

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Abstract

Background: Dysmenorrhea is a common health problem among reproductive-age women that can affect daily activities and quality of life. Exercise and home remedies are commonly used for pain relief, but their comparative effectiveness requires further evaluation.

Objective: To compare the effectiveness of exercise and home remedies in reducing pain associated with primary dysmenorrhea among females residing in rural areas.

Methods: This quasi-experimental pretest–posttest study was conducted in rural areas of District Mirpur Khas, Sindh, from July to September 2024. A total of 68 females aged 18–35 years residing in rural areas were recruited using convenience and purposive sampling. Participants were divided into two groups of 34 each. Group A performed 30 minutes of moderate-intensity exercise three times per week for three months, whereas Group B used home remedies, including ginger tea three times daily during menstruation and heating and massaging therapy, over the same period. Pain intensity was assessed before and after the interventions using a 0–10 numerical pain rating scale. Data were analyzed using SPSS version 23.

Results: The mean age of the participants was 26.5 ± 4.2 years. Pain intensity was assessed using a 0–10 numerical pain rating scale. Pain intensity was decreased in both groups following the interventions. The exercise group (Group A) demonstrated a mean reduction in pain score of 2.47 ± 1.12 points ($p < 0.05$), whereas the home remedies group (Group B) showed a mean reduction of 1.85 ± 1.24 points ($p < 0.05$). The corresponding percentage reductions in mean pain scores were 33.6% and 26.0% in both groups, respectively. Comparison between the two groups demonstrated that exercise was significantly more effective than home remedies in reducing menstrual pain ($p < 0.05$).

Conclusion: Exercise was associated with a greater reduction in pain intensity than home remedies among females with primary dysmenorrhea. It may provide a cost-effective, non-pharmacological approach to manage primary dysmenorrhea.

Keywords: Dysmenorrhea; Exercise; Exercise Therapy; Female; Rural Population.

Introduction

Primary dysmenorrhea is a frequent and common condition among females of reproductive age, characterized by painful menstruation without underlying pelvic pathology. This condition is most commonly observed in females within the first three years after menarche, affecting approximately 50–90% of menstruating women globally.[1] Primary dysmenorrhea occurs in the absence of identifiable pelvic pathology, whereas secondary dysmenorrhea is associated with underlying

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pelvic disorders, such as endometriosis.[2] Primary dysmenorrhea is caused by the excessive production of prostaglandins during menstruation, which leads to reduced blood flow and increased uterine contractions. This results in ischemic pain and the development of symptoms such as nausea, vomiting, abdominal cramps, headache, fatigue, and bowel discomfort, which may last for 12–72 hours.[3,4] This condition not only causes fatigue but also affects the quality of life, making daily activities less productive and more difficult to perform.[5]

The management of primary dysmenorrhea includes pharmacological interventions, such as nonsteroidal anti-inflammatory drugs (NSAIDs) and hormonal contraceptives, as well as non-pharmacological approaches, including exercise and massage.[6] Exercise is an effective approach to managing primary dysmenorrhea, as it improves blood circulation, promotes muscle relaxation, and stimulates the release of endorphins.[7–9]

Rural populations often have limited access to healthcare services, which poses significant challenges in the management of primary dysmenorrhea. Women in these populations usually depend on home remedies to cope with menstrual pain because of limited resources. This study aimed to compare the effectiveness of exercise and home remedies in reducing primary dysmenorrhea among females residing in rural areas of Sindh, Pakistan.

Methods

This quasi-experimental pretest–posttest study was conducted in rural areas of Mirpur Khas District, Sindh, Pakistan, from July to September 2024. Ethical approval was obtained from the Institutional Ethical Review Committee of Mekran Medical College (Letter No. MMC/ERC/2024/April/1). A total of 68 females aged 18–35 years with regular menstrual cycles and primary dysmenorrhea were recruited through convenience sampling after obtaining written informed consent. Females who were pregnant, had been diagnosed with secondary dysmenorrhea, or declined to provide consent were excluded from the study.

Participants were divided into two groups: Group A (exercise group; n = 34) and Group B (home remedies group; n = 34). Participants in Group A performed supervised, moderate-intensity exercise for 30 minutes, three times per week, over three months. Each session consisted of a 5-minute warm-up, 20 minutes of aerobic activity, and a 5-minute cool-down involving stretching and relaxation exercises. Participants in Group B used home remedies over the three-month study period. These included consuming ginger tea three times daily during menstruation and using massage and local heat therapy with a hot-water bottle. Pain intensity was assessed before and after the interventions using a 0–10 numerical pain rating scale. To ensure consistency, pain scores were recorded on the first day of menstruation at both assessments.

Data were analyzed using SPSS software, version 23. The Shapiro–Wilk test indicated that the data were normally distributed ($p > 0.05$), supporting the use of parametric statistical tests. Paired-samples t-tests were used for within-group comparisons, while independent-samples t-tests were used to compare pain scores between the two groups at baseline and after the interventions. The mean reductions in pain scores were also compared between the groups using an independent-samples t-test.

Results

The sociodemographic characteristics of the study participants are presented in Table 1.

A comparison of pain scores before and after the interventions in the exercise and home remedies groups is presented in Table 2.

The independent-samples t-test showed no significant difference in baseline pain scores between the exercise and home remedies groups ($p = 0.434$). Similarly, post-intervention pain scores did not differ significantly between the groups ($p = 0.250$).

However, comparison of mean changes using an independent-samples t-test demonstrated a significantly greater reduction in pain in the exercise group than in the home remedies group (2.47 ± 1.12 vs. 1.85 ± 1.24; $p = 0.034$).

Within-group changes were assessed using paired-samples t-tests. The paired-samples t-test demonstrated a significant reduction in pain scores following the intervention in the exercise group ($t(33) = 12.86$, $p < 0.001$) and the home remedies group ($t(33) = 8.70$, $p < 0.001$).

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Table 1. Sociodemographic characteristics of study participants

Parameter	Group A: Exercise (n = 34)	Group B: Home Remedies (n = 34)	Total N = 68
Age (years)			
Mean ± SD	26.2 ± 4.1	26.8 ± 4.3	26.5 ± 4.2
Range	18-34	19-35	18-35
Marital Status, n (%)			
Single	16 (47.1)	15 (44.1)	31 (45.6)
Married	18 (52.9)	19 (55.9)	37 (54.4)
Education Level, n (%)			
No formal education	8 (23.5)	9 (26.5)	17 (25.0)
Primary education	12 (35.3)	11 (32.4)	23 (33.8)
Secondary education	10 (29.4)	9 (26.5)	19 (27.9)
Higher education	4 (11.8)	5 (14.7)	9 (13.2)
Occupation, n (%)			
Housewife	22 (64.7)	24 (70.6)	46 (67.6)
Student	8 (23.5)	6 (17.6)	14 (20.6)
Employed	4 (11.8)	4 (11.8)	8 (11.8)

Note: Data are presented as mean ± standard deviation (SD) or frequency (percentage), as appropriate

Table 2: Comparison of pain scores before and after intervention in the exercise and home remedies groups

Group	Pre-Intervention Pain Score	Post-Intervention Pain Score	Mean Reduction	% age Reduction
Group A: Exercise (n = 34)	7.35 ± 1.23	4.88 ± 1.45	2.47 ± 1.12	33.6%
Group B: Home Remedies (n = 34)	7.12 ± 1.18	5.27 ± 1.32	1.85 ± 1.24	26%

Note: Values are presented as mean ± standard deviation (SD). Percentage reduction represents the reduction in mean pain score relative to the pre-intervention mean.

Discussion

This quasi-experimental study aimed to compare the effectiveness of exercise and home remedies in reducing pain associated with primary dysmenorrhea among females residing in rural areas. The findings demonstrated a greater reduction in menstrual pain among participants in the exercise group than among those in the home remedies group. Before the intervention, there was no statistically significant difference in menstrual pain between the two groups, suggesting that the groups were comparable at baseline (p = 0.434). After the intervention, the difference in pain scores between the groups was not statistically significant (p = 0.250). However, the difference in pain reduction was statistically significant, with a greater reduction in the exercise group than in the home remedies group (2.47 ± 1.12 vs. 1.85 ± 1.24; p = 0.034).

Exercise is a beneficial approach to improving physiological mechanisms. Regular physical activity helps increase the production of endorphins, which may act as natural analgesics and mood enhancers.[10] Exercise also helps improve blood circulation to the pelvic area, thereby reducing ischemic pain associated with uterine contractions.[11] Furthermore, exercise may help regulate prostaglandin levels and reduce inflammation, which is a major contributor to menstrual pain.[12] Among other factors, stress is an important factor that may contribute to primary dysmenorrhea.[13] Studies have suggested that regular exercise may reduce stress and help alleviate menstrual pain.[14–16] Several other studies support our findings. Several studies support the beneficial effects of lifestyle interventions in managing primary dysmenorrhea. Armour *et al.* reported that self-care and lifestyle interventions may help alleviate menstrual pain.[17] Other studies have also highlighted the potential benefits of physical activity and exercise in reducing menstrual pain and improving quality of life.[18]

Home remedies may also play a beneficial role in alleviating menstrual pain. Ginger possesses anti-inflammatory properties and may exert analgesic effects, making it a potential complementary approach to managing dysmenorrhea.[19] The findings of the present study are consistent with those of Crasta *et al.* and Latha *et al.*, who reported reductions in dysmenorrhea-related pain following ginger consumption.[20,21]

Studies involving rural populations highlight limited access to healthcare facilities and therapeutic medications. In this context, exercise represents a cost-effective, accessible, and practical approach to reducing pain

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associated with primary dysmenorrhea, particularly in resource-limited rural communities.

Conclusion

Exercise was more effective than home remedies in reducing pain associated with primary dysmenorrhea among women residing in rural areas. Therefore, community-based exercise programs may be considered an accessible and cost-effective strategy for managing primary dysmenorrhea in rural populations. These findings have potential implications for public health policy and clinical practice, particularly in resource-limited settings where affordable and accessible interventions are needed.

Limitations of the Study

This study had several limitations, including a small sample size, a non-randomized quasi-experimental design, and a relatively short intervention and follow-up period. Therefore, the findings should be interpreted cautiously, as the study design does not allow definitive conclusions about causality. Furthermore, potential confounding factors, including body mass index (BMI), baseline physical activity levels, medication use, and stress, were not systematically measured or controlled and may have influenced the results. Future studies should employ randomized controlled trial designs with larger sample sizes and longer follow-up periods to confirm the effectiveness of these interventions. Additionally, investigating inflammatory markers may help elucidate the underlying mechanisms involved in pain reduction.

Recommendations and Future Research

Community-based exercise programmes should be encouraged as an accessible and affordable approach to managing primary dysmenorrhea among women in rural areas. Health education initiatives should also promote awareness of non-pharmacological pain management strategies. Future studies should employ randomized controlled trials with larger sample sizes, longer follow-up periods, and standardized intervention protocols to further evaluate the effectiveness of exercise and home remedies. Potential influencing factors, including body mass index, baseline physical activity, stress, and medication use, should also be considered.

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