

The Effect of Deep Breathing Relaxation and Light Dysmenorrhea Exercises on Pain Reduction among Adolescent Girls with Primary Dysmenorrhea

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ABSTRACT

Primary dysmenorrhea is a common menstrual problem among adolescent girls, often leading to discomfort, reduced academic performance, and absenteeism. Non-pharmacological interventions such as deep breathing relaxation and light dysmenorrhea exercises are considered effective for pain management. This study aimed to compare the effectiveness of deep breathing relaxation and light dysmenorrhea exercises in reducing menstrual pain among adolescent girls at. A quasi-experimental study with a pretest-posttest control group design was conducted on 36 adolescent girls selected through purposive sampling. Participants were divided equally into two groups: deep breathing relaxation (n=18) and light dysmenorrhea exercise (n=18). Pain intensity was measured using a Numeric Rating Scale (NRS) before and after the intervention. Data were analyzed using the Wilcoxon signed-rank test and Mann-Whitney U test. Both interventions significantly reduced menstrual pain ($p < 0.05$). The light dysmenorrhea exercise group showed a greater mean reduction in pain scores compared to the deep breathing relaxation group ($p = 0.031$). Light dysmenorrhea exercises are more effective than deep breathing relaxation in reducing primary dysmenorrhea among adolescent girls. Schools are encouraged to implement exercise-based interventions as part of menstrual health education.

Keywords: adolescent girls, deep breathing relaxation, light exercise, menstrual pain, primary dysmenorrhea

BACKGROUND

Primary dysmenorrhea is defined as painful menstruation without pelvic pathology, commonly experienced by adolescent girls within the first few years after menarche. The World Health Organization (WHO) estimates that more than 50% of adolescent girls worldwide experience dysmenorrhea, with prevalence rates in Indonesia ranging from 54% to 97% (Proverawati, 2010). Menstrual pain can lead to reduced concentration, absenteeism from school, and a decreased quality of life.

Non-pharmacological pain management techniques, such as *deep breathing relaxation* and *light dysmenorrhea exercises*, are increasingly recommended because they are safe, simple, and have minimal side effects. Deep breathing relaxation works by stimulating the parasympathetic nervous system, promoting muscle relaxation and reducing pain perception (Potter & Perry, 2010). Meanwhile, light dysmenorrhea exercises improve pelvic blood circulation, increase endorphin release, and reduce uterine muscle spasm (Anurogo, 2011).

Previous studies have examined each intervention separately, but direct comparisons between deep breathing relaxation and light dysmenorrhea exercises in adolescent populations remain limited. This study aimed to compare the effectiveness of both interventions among adolescent girls.

METHODS

Design and Participants

This study employed a quasi-experimental pretest-posttest control group design. The population consisted of adolescent girls who experienced primary dysmenorrhea. Purposive sampling was used to select 36 respondents who met the inclusion criteria: regular menstrual cycles, no history of gynecological disease, and experiencing pain with an NRS score of ≥ 4 .

The intervention in this study involved two groups of adolescent girls who experienced dysmenorrhea. Each group was assigned a specific method aimed at reducing menstrual pain. The interventions were carried out during the first two days of menstruation, which are typically the most painful period for individuals with dysmenorrhea. Both groups followed structured routines under guidance to ensure consistency and accuracy of the intervention.

Group 1 consisted of 18 participants who practiced deep breathing relaxation techniques. This method focused on diaphragmatic breathing, where participants engaged in slow, controlled inhalations and exhalations. Each session lasted for 10 minutes and was performed twice daily during the first two days of menstruation. The purpose of this intervention was to promote relaxation, reduce muscle tension, and improve oxygen circulation, which may help alleviate the intensity of menstrual pain.

Group 2 also involved 18 participants, but they were instructed to perform light dysmenorrhea exercises. These exercises included a series of stretching movements combined with pelvic muscle exercises designed to reduce uterine contractions and improve blood flow in the pelvic area. Each session lasted 15 minutes and was conducted twice daily during the first two days of menstruation. The exercise routine emphasized gentle movements to prevent strain while still providing therapeutic benefits.

By implementing these two approaches, the study sought to compare the effectiveness of non-pharmacological methods in reducing dysmenorrhea symptoms. Both deep breathing relaxation and light exercise represent accessible and low-cost interventions that could be practiced independently by adolescents. The structured comparison between the two groups provided valuable insights into which technique may offer greater relief and improve overall comfort during menstruation.

Measurement

Pain intensity was assessed using the Numeric Rating Scale (NRS) before and after the intervention.

Data Analysis

The Wilcoxon signed-rank test was used to analyze pre-post changes within groups, and the Mann-Whitney U test was used for between-group comparisons. The significance level was set at $p < 0.05$.

RESULTS

Table 1. Mean Pain Scores Before and After Intervention

| Group | Pretest Mean \pm SD | Posttest Mean \pm SD | p-value (Wilcoxon) |
|---------------------------|-----------------------|------------------------|--------------------|
| Deep Breathing Relaxation | 6.11 \pm 1.02 | 4.00 \pm 0.97 | 0.001 |

| | | | |
|-----------------------------|-------------|-------------|-------|
| Light Dysmenorrhea Exercise | 6.28 ± 1.05 | 3.11 ± 0.96 | 0.000 |
|-----------------------------|-------------|-------------|-------|

Table 2. Comparison of Pain Reduction Between Groups

| Group Comparison | Mean Reduction ± SD | p-value (Mann-Whitney) |
|--|----------------------------|------------------------|
| Deep Breathing Relaxation vs Light Dysmenorrhea Exercise | 2.11 ± 0.75 vs 3.17 ± 0.68 | 0.031 |

Interpretation

Both interventions significantly reduced pain ($p < 0.05$), but the light dysmenorrhea exercise group achieved a greater reduction compared to the deep breathing relaxation group.

DISCUSSION

This study found that both deep breathing relaxation and light dysmenorrhea exercises effectively reduced primary dysmenorrhea pain, but the exercise intervention produced a significantly greater reduction. This result aligns with the theory that physical exercise promotes the release of endorphins, which act as natural analgesics, and enhances uterine blood flow, thereby reducing muscle ischemia and spasm (Proverawati, 2010).

Deep breathing relaxation also effectively lowered pain scores, consistent with studies by Chao et al. (2014), which reported that relaxation techniques reduce sympathetic nervous activity and promote muscle relaxation. However, the smaller effect size compared to exercise suggests that physiological movement may have a stronger influence on pelvic circulation than breathing alone.

The practical implication is that schools could integrate light dysmenorrhea exercises into health education programs to reduce absenteeism and improve student well-being during menstruation.

The findings of this study indicate that both deep breathing relaxation and light dysmenorrhea exercises are effective in reducing primary dysmenorrhea pain. However, the greater reduction observed in the exercise group highlights the stronger physiological impact of physical activity compared to breathing techniques alone. This result supports the theoretical framework proposed by Proverawati (2010), who emphasized that exercise enhances the release of endorphins natural analgesic substances in the body and improves uterine blood circulation. As a result, uterine muscle ischemia and spasms, which are primary contributors to menstrual pain, can be significantly alleviated.

In contrast, deep breathing relaxation also demonstrated notable effectiveness in lowering pain intensity, aligning with the findings of Chao et al. (2014). Their research showed that relaxation techniques suppress sympathetic nervous activity and promote overall muscle relaxation, thereby reducing tension and pain perception. Despite these benefits, the comparatively smaller effect size in this study suggests that while relaxation reduces stress-related pain pathways, it does not enhance pelvic blood circulation as effectively as physical movement. This difference explains why exercise interventions had a superior impact on dysmenorrhea management.

The comparative outcomes of these two interventions underline the importance of considering physiological mechanisms in pain management strategies. Exercise engages both neurochemical and circulatory pathways, offering a dual benefit that surpasses the relaxation-focused approach of deep breathing alone. Nevertheless, relaxation techniques remain a valuable complementary practice, especially for individuals who may be unable to perform physical exercises due to

medical or personal limitations. Together, these findings suggest that a combination of approaches may yield optimal results for managing menstrual discomfort.

From a practical perspective, the study emphasizes the potential role of schools and health educators in addressing menstrual health issues among adolescents. Incorporating light dysmenorrhea exercises into health education programs could serve as an accessible, low-cost, and non-pharmacological strategy to reduce absenteeism during menstruation and enhance students' overall well-being. By empowering adolescents with self-management techniques, such initiatives can contribute to improved academic participation, better quality of life, and long-term health outcomes.

CONCLUSION

This study demonstrates that both deep breathing relaxation and light dysmenorrhea exercises significantly reduce primary dysmenorrhea among adolescent girls. These findings confirm that non-pharmacological approaches can be effective in alleviating menstrual pain, providing adolescents with safe and accessible methods to manage discomfort during menstruation. The reduction in pain scores observed across both interventions highlights their potential as supportive strategies for improving quality of life during the menstrual cycle.

Among the two interventions, light dysmenorrhea exercises proved to be more effective than deep breathing relaxation in reducing menstrual pain. The superiority of exercise may be explained by its physiological effects, such as improving blood flow to the pelvic region and stimulating the release of endorphins, which act as natural pain relievers. This evidence suggests that incorporating physical movement has a stronger impact on managing uterine contractions and muscle spasms compared to breathing techniques alone.

The results also have meaningful implications for adolescent health promotion. Since menstrual pain is one of the leading causes of absenteeism from school among young girls, providing effective pain management strategies is essential. By integrating light exercise routines into daily practice, adolescents may experience reduced pain intensity, leading to better school attendance, concentration, and overall well-being.

Therefore, school health programs should consider incorporating exercise-based interventions as a routine part of menstrual health education. Structured guidance on simple stretching and pelvic exercises can empower students to manage dysmenorrhea independently. This approach not only addresses the immediate concern of menstrual pain but also encourages long-term healthy lifestyle habits, making it a sustainable and beneficial component of adolescent health education.

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