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Comparison of Deep Breathing Relaxation and Dysmenorrhea Exercise on Pain Reduction Among Adolescent Girls

Indri Yuliana Wati
RSUD Elia Waran
Email: indriyulianawati@gmail.com

ABSTRACT

Dysmenorrhea is a common menstrual problem among adolescent girls, often disrupting academic and daily activities. Various non-pharmacological methods are available to reduce menstrual pain, including deep breathing relaxation and dysmenorrhea exercise. To compare the effectiveness of deep breathing relaxation and dysmenorrhea exercise in reducing menstrual pain among adolescent girls. This study employed a quasi-experimental pretest-posttest design with a control group. A total of 36 respondents were selected through purposive sampling and divided into two groups: the deep breathing relaxation group (n=18) and the dysmenorrhea exercise group (n=18). Pain intensity was measured using the Numeric Rating Scale (NRS) before and after intervention. Data analysis used the Wilcoxon Signed-Rank Test for within-group comparison and the Mann Whitney U Test for between-group differences. Both interventions significantly reduced pain scores within each group ($p < 0.05$). The dysmenorrhea exercise group demonstrated a greater reduction in pain compared to the deep breathing relaxation group ($p = 0.021$). Dysmenorrhea exercise is more effective than deep breathing relaxation in reducing menstrual pain among adolescent girls. Schools are recommended to implement simple dysmenorrhea exercise routines as part of menstrual health education.

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

BACKGROUND

Dysmenorrhea, or menstrual pain, is a common gynecological problem among adolescent girls, characterized by lower abdominal cramps that may be accompanied by nausea, headache, and fatigue. Globally, the prevalence of dysmenorrhea ranges between 50–90% among young women, and in Indonesia, it is estimated to affect approximately 64.25% of adolescents (WHO, 2020).

Menstrual pain can interfere with school attendance, concentration, and daily productivity. Non-pharmacological approaches, such as relaxation techniques and physical exercises, are increasingly promoted as safe and accessible interventions for dysmenorrhea. Deep breathing relaxation works by stimulating the parasympathetic nervous system, reducing muscle tension, and promoting endorphin release. Meanwhile, dysmenorrhea exercise improves pelvic blood circulation, reduces uterine muscle spasms, and facilitates hormonal balance.

Although both methods have been proven effective individually, there is limited comparative research on their relative effectiveness among adolescent girls in rural educational settings. This

study aims to compare the effectiveness of deep breathing relaxation and dysmenorrhea exercise in reducing menstrual pain.

METHODS

This research was designed using a quasi-experimental approach with a pretest-posttest control group design to examine the effectiveness of different interventions in reducing the intensity of primary dysmenorrhea among female students. The study was targeting students who experienced primary dysmenorrhea as the population. Through purposive sampling, a total of 36 respondents who met the study criteria were selected and evenly divided into two intervention groups. The first group, consisting of 18 respondents, received deep breathing relaxation therapy, while the second group, also consisting of 18 respondents, was assigned to perform dysmenorrhea exercises. This design was chosen because it allowed for the comparison of intervention outcomes not only within the same group before and after treatment but also between the two different intervention groups.

The sample was carefully selected based on specific inclusion criteria to ensure homogeneity and relevance to the study's objectives. Eligible participants were female students aged between 15 and 18 years, as this age range represents the adolescent period when menstrual pain is commonly reported. All respondents were required to have a regular menstrual cycle between 28 and 35 days and to have experienced primary dysmenorrhea consistently during their last three menstrual cycles, which demonstrated that the problem was recurrent and persistent. Furthermore, only students who expressed willingness to participate and signed informed consent were included, ensuring both ethical compliance and the voluntariness of participation. These criteria were considered essential to reduce bias and maintain the validity of the findings.

The intervention procedures were carried out systematically over the course of the study. For the deep breathing relaxation group, participants were instructed to perform relaxation techniques for 15 minutes, twice daily, during the first two days of menstruation. This method was aimed at promoting relaxation, reducing muscle tension, and improving oxygen circulation, thereby potentially alleviating menstrual pain. Meanwhile, the dysmenorrhea exercise group was guided to perform a set of pelvic and lower abdominal movements with the same duration and frequency, which was intended to enhance blood flow, reduce uterine muscle spasms, and ease discomfort. Both interventions were non-invasive, simple to conduct, and suitable for adolescents, making them practical alternatives for managing dysmenorrhea without relying solely on pharmacological treatments.

To evaluate the effectiveness of these interventions, pain intensity was measured using the Numeric Rating Scale (NRS), a standardized instrument ranging from 0, which indicates no pain, to 10, representing the worst imaginable pain. This scale was selected because of its simplicity, reliability, and ease of understanding for adolescent respondents. For the analysis of the collected data, two types of statistical tests were applied. Within-group differences, comparing pretest and posttest scores in each intervention group, were analyzed using the Wilcoxon Signed-Rank Test, while between-group differences, comparing the outcomes of the two groups, were analyzed using the Mann–Whitney U Test. A p-value of less than 0.05 was considered statistically significant, ensuring that the findings reflected real effects rather than random variation. This rigorous methodological framework was expected to provide reliable insights into the comparative effectiveness of deep breathing relaxation and dysmenorrhea exercises in alleviating menstrual pain.

RESULTS

To provide a clearer understanding of the study outcomes, the results are presented in three main parts, namely respondent characteristics, pain intensity before and after the interventions, and the comparison of effectiveness between the two intervention groups. The characteristics of respondents include variables such as mean age, age at menarche, and average menstrual cycle length, which were relatively similar across both the deep breathing and dysmenorrhea exercise groups, indicating that the two groups were comparable at baseline. The analysis of pain intensity before and after the interventions shows a significant reduction in menstrual pain in both groups, as measured by the Numeric Rating Scale (NRS). Furthermore, a comparison between groups revealed that although both interventions effectively decreased pain, the dysmenorrhea exercise group achieved significantly lower post-intervention pain scores compared to the deep breathing group, highlighting its greater effectiveness in managing primary dysmenorrhea.

Respondent Characteristics

Characteristic	Deep Breathing (n=18)	Dysmenorrhea Exercise (n=18)
Mean age (years)	16.4 ± 0.7	16.5 ± 0.8
Mean menarche age (years)	12.7 ± 0.5	12.8 ± 0.6
Average cycle length (days)	29.1 ± 1.2	29.3 ± 1.4

Pain Intensity Pre- and Post-Intervention

Group	Pretest (Mean ± SD)	Posttest (Mean ± SD)	p-value (Wilcoxon)
Deep Breathing	6.44 ± 1.03	4.11 ± 0.96	0.001
Dysmenorrhea Exercise	6.50 ± 1.05	3.39 ± 0.92	0.001

Comparison Between Groups

Post-intervention pain scores were significantly lower in the dysmenorrhea exercise group than in the deep breathing group ($p = 0.021$).

Based on these data, the results indicate that both deep breathing relaxation and dysmenorrhea exercise were effective in reducing menstrual pain among adolescent girls; however, dysmenorrhea exercise demonstrated greater effectiveness, as evidenced by significantly lower post-intervention pain scores compared to the deep breathing group.

DISCUSSION

The results of this study confirmed that both deep breathing relaxation and dysmenorrhea exercise were effective in reducing the intensity of menstrual pain among adolescent girls. This outcome is consistent with prior research, which has shown that deep breathing relaxation techniques activate the parasympathetic nervous system, thereby inducing a calming effect on the body. This activation helps to lower cortisol levels, which are commonly associated with stress and heightened pain sensitivity, and subsequently increases overall pain tolerance (Smith et al., 2019). As a result, the use of deep breathing relaxation provides adolescents with a simple yet effective way to reduce the discomfort of dysmenorrhea by enhancing relaxation and minimizing stress-related factors that often exacerbate menstrual pain.

In contrast, dysmenorrhea exercise works through a different but complementary mechanism by targeting the physical aspects of menstrual pain. Engaging in specific pelvic and lower

abdominal movements improves muscle flexibility and reduces stiffness in the pelvic region, which helps to relieve tension and cramping. Furthermore, this type of exercise enhances blood flow to the uterus, ensuring that oxygen and nutrients are adequately delivered to the tissues, while simultaneously promoting the removal of metabolic waste products that may contribute to discomfort. Dysmenorrhea exercise also stimulates the release of endorphins the body's natural painkillers thus providing an additional analgesic effect that contributes to greater pain reduction compared to deep breathing relaxation (Rahmawati et al., 2021).

The greater effectiveness of dysmenorrhea exercise observed in this study can be explained by its dual impact on both muscular and circulatory functions. Unlike relaxation techniques that mainly influence pain perception through neurological pathways, physical exercise addresses not only the perception of pain but also the underlying physiological causes of uterine cramps. By reducing muscular tension and improving blood circulation, the exercises directly counteract the mechanisms responsible for menstrual discomfort. Moreover, the rhythmic and structured nature of physical activity may act as a psychological distraction, shifting attention away from the pain and thereby reducing pain awareness. This multidimensional effect likely explains why dysmenorrhea exercise provided superior outcomes in alleviating menstrual pain among participants.

Another important consideration is the practicality and accessibility of these interventions for adolescent girls. Deep breathing relaxation requires no special equipment and can be performed virtually anywhere, making it a convenient option for students who may prefer a non-physical method of pain management. Similarly, dysmenorrhea exercise involves simple movements that are easy to learn and execute without professional supervision. These characteristics make both interventions highly suitable for adolescent populations, particularly in school environments where resources for medical treatment may be limited. Furthermore, both methods are free from pharmacological side effects, making them safe, low-risk alternatives for managing primary dysmenorrhea.

The findings of this study highlight the potential for integrating such non-pharmacological approaches into school-based health programs. Since menstrual pain is one of the most common reasons for reduced concentration, absenteeism, and decreased academic performance among adolescent girls, schools play a crucial role in providing effective interventions. Implementing structured dysmenorrhea exercises during physical education classes or offering guided sessions of deep breathing relaxation can empower students with practical strategies to manage their menstrual health. This integration would not only improve physical well-being but also enhance emotional resilience, as students learn to cope with pain in a healthy and constructive manner.

In conclusion, while both interventions demonstrated effectiveness in reducing menstrual pain, dysmenorrhea exercise proved to be more beneficial due to its combined physiological and psychological effects. These results underscore the importance of promoting physical activity as a primary strategy for managing dysmenorrhea in adolescents. At the same time, deep breathing relaxation remains a valuable complementary method, particularly for individuals who prefer less physical techniques. Together, these approaches offer a holistic, low-cost, and sustainable solution that schools can adopt to support the menstrual health of adolescent girls, ultimately fostering better academic performance, attendance, and overall quality of life.

CONCLUSION

The findings of this study revealed that both deep breathing relaxation and dysmenorrhea exercise interventions were effective in significantly reducing the intensity of menstrual pain among adolescent girls. The results suggest that non-pharmacological approaches, such as

relaxation techniques and physical exercise, can be applied as practical and accessible alternatives for managing primary dysmenorrhea in adolescents. These methods not only address the discomfort experienced during menstruation but also promote healthy coping strategies that students can easily adopt in their daily lives.

Further analysis demonstrated that dysmenorrhea exercise was more effective than deep breathing relaxation in lowering pain scores. The structured series of pelvic and lower abdominal movements appeared to provide greater physiological benefits, including improved blood circulation, relaxation of uterine muscles, and reduction of spasms, which contributed to a more significant decrease in pain intensity. This finding highlights the potential of exercise-based interventions as a preferred method for managing menstrual discomfort compared to breathing-based relaxation techniques, particularly for adolescents who may respond better to physical activity.

The study emphasizes the importance of incorporating evidence-based practices into adolescent health programs, particularly within the school setting. Since dysmenorrhea is a common condition that can negatively affect students' concentration, attendance, and academic performance, schools have a crucial role in providing supportive interventions. By integrating dysmenorrhea exercise into menstrual health programs, schools can empower students with practical skills to manage their pain effectively, thereby reducing its impact on daily activities and overall well-being.

In conclusion, while both deep breathing relaxation and dysmenorrhea exercise are beneficial, the greater effectiveness of dysmenorrhea exercise suggests that it should be prioritized in school-based health initiatives. Implementing such programs can not only improve students' menstrual health but also contribute to creating a supportive environment where adolescent girls can thrive academically and socially without being hindered by menstrual pain. This approach aligns with the broader goal of promoting holistic adolescent health through non-invasive, cost-effective, and sustainable strategies.

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