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Original Article

IMPACT OF PROGRESSIVE MUSCLE RELAXATION AND AROMATHERAPY ON MENSTRUAL PAIN INTENSITY AMONG ADOLESCENT GIRLS WITH PRIMARY DYSMENORRHEA

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ABSTRACT

Background. Primary dysmenorrhea, characterized by cramping pain during menstruation, significantly affects adolescents' quality of life. The purpose of this study was to evaluate the effects of progressive relaxation exercise and aromatherapy on pain intensity in female adolescents with primary dysmenorrhea.
ResearchMethod. A total of 64 participants were divided into four groups: progressive relaxation, aromatherapy, combination therapy, and control. The research method used is a quasi-experimental pretest-posttest control group design. This study employs the Paired T-Test on the third treatment group, and the NGain-Score test is used to determine which independent variable is more closely related to the dependent variable.
Findings. Statistical analysis showed significant reductions in pain intensity in all experimental groups ($p = 0.000$), with the combination therapy demonstrating the highest effectiveness (NGain-Score: 0.7571). Aromatherapy, particularly with lavender, and progressive relaxation exercises effectively reduced physical discomfort and psychological stress associated with dysmenorrhea. The findings suggest that non-pharmacological interventions, especially when combined, are effective in managing dysmenorrhea.
Conclusion. Integrating progressive relaxation exercise and aromatherapy is a promising approach for alleviating primary dysmenorrhea pain in adolescents, offering a safe and natural alternative to conventional pain management.

Keywords: Adolescents, Aromatherapy, Pain Intensity, Primary Dysmenorrhea, Progressive Relaxation Exercise.

BACKGROUND

Primary dysmenorrhea, defined as cramping pain in the lower abdomen occurring before or during menstruation without underlying pelvic pathology, is a common health issue among adolescent females [1]. It is often accompanied by symptoms such as back pain, leg pain, fatigue, and drowsiness, significantly affecting academic performance and daily activities. Hormonal fluctuations, particularly increased prostaglandin levels, contribute to uterine contractions and pain intensity [2]. According to the World Health Organization, approximately 90% of women experience primary dysmenorrhea, with 10–15% reporting severe pain. In Indonesia, high prevalence rates have been documented, including 69.35% in national data and significant proportions in regions like East Java [3].

Primary dysmenorrhea not only disrupts physical well-being but also impacts psychological health, contributing to stress and reduced concentration in adolescents. While pharmacological treatments such as analgesics and oral contraceptives are commonly used, non-pharmacological interventions are increasingly explored due to their safety and holistic

benefits. Techniques such as progressive muscle relaxation and aromatherapy have shown promise in reducing pain perception and improving emotional well-being [4].

Progressive muscle relaxation involves systematic tensing and relaxing of muscle groups to alleviate physical tension and stress. Aromatherapy, particularly with essential oils like lavender, has been found to reduce pain and anxiety through olfactory stimulation and endorphin release. Several studies have demonstrated the individual effectiveness of these interventions, while recent evidence suggests that their combination may enhance pain relief synergistically [5][6].

Given the limitations of pharmacological approaches and the growing interest in complementary therapies, this study investigates the effects of progressive relaxation exercise and aromatherapy, both separately and in combination, on the pain intensity of primary dysmenorrhea among female adolescents. The findings aim to contribute to evidence-based, non-invasive strategies for managing menstrual pain in young women [7][8].

RESEARCH METHOD

This study uses a quasi-experimental research design with the chosen design form, namely the pretest-posttest control group design. This research was conducted on female students with a total of 64 respondents. This study used a total sampling technique. The inclusion criteria in this study were female adolescents who experienced primary dysmenorrhea pain in each menstrual period and female adolescents with mild to moderate pain complaints. Exclusion criteria in this study were female adolescents with a variable frequency of dysmenorrheal pain and female adolescents who managed pain using analgesic drugs.

This study requires bivariate analysis to prove the effect of progressive relaxation exercises and aromatherapy on the intensity of primary dysmenorrhea pain in adolescent girls. The first group was given progressive relaxation exercise. The second group selected the fragrance according to their preferred aroma consisting of lavender, jasmine, rose, sandalwood, and lemon. The third group was a combination group. The fourth group was the control group. The intervention was given for 30 minutes to each treatment group and was given 3 times. This study used an observation sheet to measure pain levels in female adolescents. The pain scale used is an observation sheet with the SF-McGill pain scale (Sort Form-McGill). The validity test in this study was carried out by conducting a score test between the value of each question item and the total value of the questionnaire, with the results of r count < r table. The SF-McGill consists of 15 adjectives divided into two groups, the sensory subscale with 11 words and the affective subscale with four words. Observation sheets were given before and after therapy, with a period of 30 minutes. Measuring pain intensity in young women was only done one day when the respondent felt pain.

The data to be tested are the results of the pain scale during the pretest and posttest and analyzed using the Paired T Test in the SPSS application, with an error value of $\alpha = 0.05$. The study uses multivariate analysis to determine the intervention or independent variable that has a greater effect on the dependent variable. The researcher chose the NGain-Score test, because this test is used to determine which independent variable is closer to the dependent variable. The multivariate test in this study was used to find the effectiveness between the independent variables (progressive relaxation exercises, aromatherapy, and progressive relaxation exercises and aromatherapy) on the intensity of menorrhoea pain. The researcher has conducted an ethical test at the Health Research Ethics Commission (KEPK) of Poltekkes Malang and has been declared ethically fit on April 18, 2023 with letter number No.243/IV/KEPK POLKESMA/2023.

FINDINGS

Table 1. Characteristics of Research Subjects

No.	Age	Frequency	%
1	15 years old	30	53.8%
2	16 years old	34	46.2%
No.	**Menarche**	**Frequency**	**%**
1	11-13 years old	42	66.2%
2	14-15 years old	21	32.3%
3	>15 years old	1	1.5%
	Total	64	100%

Table 1 shows the characteristics of female students based on age, namely the majority of respondents were 15 years old, namely 30 respondents (53.8%). Based on the age of menarche (age of first menstruation), most respondents experienced their first menstruation at the age of 11-13 years, namely 43 respondents (66.2%).

Table 2. Bivariate Analysis of the Effect of Progressive Relaxation Exercise and Aromatherapy on Primary Dysmenorrhea Pain Intensity

	Group	Mean	Std. Deviation	Sig. (2-tailed)	Description
Pair 1	Pretest and posttest experimental group 1	7.375	3.160	.000	Significant
Pair 2	Pretest and posttest experimental group 2	4.313	2.626	.000	Significant
Pair 3	pretest and posttest experimental group 3	9.188	1.940	.000	Significant
Pair 4	Pretest and posttest experimental group 4	5.235	2.142	.063	Not Significant

Based on the Paired T Test conducted on experimental group 1 with progressive relaxation exercise therapy, it showed a significance figure or sig (2-tailed) of 0.000. The Paired T Test in experimental group 2 with aromatherapy therapy showed a significance figure or sig (2-tailed) of 0.000. The Paired T Test conducted on experimental group 3 with progressive relaxation exercise and aromatherapy therapy showed a significance figure or sig (2-tailed) of 0.000. The significance figure of 0.000 <less than 0.05, then it can be stated that progressive relaxation exercise, aromatherapy, progressive relaxation exercise and aromatherapy therapy have a significant effect on the intensity of primary dysmenorrhea pain in adolescent girls.

Based on the NGain-Score test in experimental group 1 with progressive relaxation exercise therapy treatment showed an average of 0.4027, a maximum of 0.9000, and a minimum of 0.1688. The NGain-Score test in experimental group 2 with aromatherapy treatment showed an average of 0.2408, a maximum of 0.8600, and a minimum of 0.0750. The NGain-Score test in experimental group 3 with progressive relaxation exercise and aromatherapy treatment showed an average of 0.7571, a maximum of 0.20323, and a

minimum of 0.2267. The normal average value of the NGain-Score test is $0.3 \leq g \geq 0.7$, so it can be interpreted that progressive relaxation exercise and aromatherapy therapy are very effective in treating primary dysmenorrhea pain in adolescent girls.

Tabel 3. Multivariate Analysis of the Effect of Progressive Relaxation Exercise and Aromatherapy on Primary Dysmenorrhea Pain Intensity

No.	Experiment group 1	Experiment group 2	Experiment group 3
	NGain Score	NGain Score	NGain Score
1	0.2432	0.2533	0.9600
2	0.9000	0.1875	0.6000
3	0.8163	0.3000	0.4769
4	0.2400	0.0750	0.6167
5	0.2267	0.1733	0.10667
6	0.2817	0.2083	0.6230
7	0.1688	0.2817	0.13250
8	0.2817	0.1013	0.20323
9	0.5000	0.1538	0.6500
10	0.1948	0.1125	0.2267
11	0.2714	0.1646	0.4000
12	0.3846	0.2000	0.3571
13	0.5167	0.4667	0.4154
14	0.6727	0.1125	0.5500
15	0.3143	0.8600	0.5862
16	0.4308	0.2025	0.12273
Rate	0.4027	0.2408	0.7571
Max	0.9000	0.8600	0.20323
Min	0.1688	0.0750	0.2267

DISCUSSIONS

The findings of this study demonstrate that progressive relaxation exercise and aromatherapy significantly reduce the intensity of primary dysmenorrhea pain in female adolescents. These results align with previous studies that have shown the efficacy of non-pharmacological interventions in managing menstrual discomfort [9][1]. Notably, the combination of both interventions showed the highest effectiveness, suggesting a synergistic effect in alleviating pain and improving comfort during menstruation [10].

In line with existing literature, progressive muscle relaxation was found to effectively reduce physical tension and promote muscular relaxation, thereby decreasing pain perception. The systematic tensing and relaxing of muscles help regulate autonomic nervous system responses, reducing stress and enhancing pain tolerance [11]. In this study, participants who underwent progressive relaxation therapy reported a significant decline in pain levels from pretest to posttest, corroborating findings by [12], which emphasized its role in relieving uterine contractions and associated discomfort.

Aromatherapy, particularly with lavender essential oil, also demonstrated a strong analgesic effect. Lavender has been widely studied for its ability to stimulate endorphin release, reduce anxiety, and induce relaxation through olfactory stimulation [13]. In this study, most respondents preferred lavender scent, which corresponded with a marked decrease in pain intensity. This is consistent with [14], who reported similar pain-relieving effects of lavender aromatherapy among adolescent girls. Other scents such as jasmine, rose,

sandalwood, and lemon were also used, though lavender appeared to be the most effective in reducing dysmenorrheal symptoms [15].

The combination of progressive relaxation and aromatherapy yielded the most pronounced reduction in pain intensity, as indicated by the normalized gain (NGain) score of 0.7571, categorized as "high adequate" effectiveness. This suggests that integrating physical relaxation techniques with sensory-based therapy enhances overall pain relief. The combined intervention may work through multiple physiological pathways: progressive relaxation reduces somatic tension, while aromatherapy modulates emotional and psychological responses to pain, leading to improved coping mechanisms and reduced pain perception.

Furthermore, this study supports the growing body of evidence advocating for non-pharmacological approaches in managing primary dysmenorrhea, especially among adolescents who may prefer natural alternatives to medication [16]. Given the high prevalence of dysmenorrhea—reported globally at 90% (WHO, 2018), with 69.35% in Indonesia—non-invasive and accessible interventions like those explored in this study are crucial for improving adolescent health outcomes and minimizing school absenteeism and reduced academic performance [17].

Progressive relaxation exercise and aromatherapy are effective non-pharmacological strategies for reducing primary dysmenorrhea pain in female adolescents. Their combined use demonstrates superior efficacy compared to individual application, highlighting the potential of integrative therapies in menstrual pain management. Future research should explore long-term adherence, optimal frequency of intervention, and broader demographic applicability to further strengthen the evidence base for these interventions in clinical and educational settings [18]. The limitations of this study are the lack of data on risk factors that can cause increased primary dysmenorrhea pain in adolescent girls, where risk factors that were not studied include weight, height, and lifestyle of adolescents.

CONCLUSION

This study demonstrates that progressive relaxation exercise and aromatherapy, both individually and in combination, effectively reduce the intensity of primary dysmenorrhea pain in female adolescents. The most significant improvement was observed in the group receiving combination therapy. These findings support the use of non-pharmacological interventions as safe, accessible, and effective alternatives for managing menstrual pain, particularly in adolescent populations where pharmacological options may be limited or undesirable. Implementing these therapies in school health programs could improve students' well-being, attendance, and academic performance.

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