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The Effect of Warm Ginger Compresses on the Intensity of Dysmenorrhea Pain in Adolescent Girls Aged 13-14 Years

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Abstract. Dysmenorrhea is a common gynecological complaint among adolescent girls and can interfere with academic activities and quality of life. Safe and easily applicable non-pharmacological interventions are essential, particularly in school settings. One potentially effective intervention is warm ginger compresses, which combine the warming effect and anti-inflammatory properties of ginger. This study aims to analyze the effect of warm ginger compresses on the intensity of dysmenorrhea pain in 13–14-year-old adolescent girls at SMP 4 Muara Teweh. The study used a quantitative approach with a pre-experimental design and a one-group pretest–posttest design. The study sample consisted of 30 female students who experienced dysmenorrhea and were selected using total sampling technique. The intensity of dysmenorrhea pain was measured before and after the intervention using the Numeric Rating Scale (NRS). The intervention, in the form of warm ginger compresses, was administered for 15–20 minutes on the first or second day of menstruation. The data were analyzed univariately and bivariately, with statistical tests to compare pain levels before and after the intervention. The results showed that before the intervention, most respondents experienced moderate to severe pain, while after the intervention, the majority of respondents experienced mild pain and no severe pain was found. Statistical analysis showed a significant difference between pain levels before and after the application of warm ginger compresses ($p = 0.000$). The conclusion of this study shows that warm ginger compresses have a significant effect in reducing the intensity of dysmenorrhea pain in adolescent girls. This intervention can be recommended as an effective and easy-to-apply non-pharmacological alternative in the management of dysmenorrhea in school settings.

Keywords: Adolescent Girls; Dysmenorrhea; Menstrual Pain; School Health; Warm Ginger Compress

1. INTRODUCTION

Dysmenorrhea (menstrual pain) is a very common gynecological complaint among adolescent girls and often begins in the first few years after menarche. The pain usually takes the form of suprapubic cramps that can radiate to the waist or thighs, accompanied by nausea, weakness, dizziness, and disruption of daily activities, thus directly impacting quality of life as well as school attendance and concentration (Nagy & Kaur, 2023). Among middle school-aged adolescents, dysmenorrhea is an important adolescent health issue because it occurs during a phase of biological and psychosocial transition, when adolescents begin to develop self-confidence, study habits, and social participation ( ). Several reviews report that primary dysmenorrhea (without pelvic organic disorders) dominates cases in adolescents, while secondary dysmenorrhea should be suspected if the pain is progressive, unresponsive to standard therapy, or accompanied by other symptoms suggestive of endometriosis (ACOG, 2018).

Epidemiologically, dysmenorrhea in adolescents is reported to vary greatly between countries and populations, but remains consistently high. Studies in college-aged/young populations show that primary dysmenorrhea is a dominant complaint affecting physical and emotional functioning (Katib et al., 2024). In a literature review discussing the adolescent

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population, the global prevalence of primary dysmenorrhea is also often reported to be high, and this complaint is one of the main reasons for the decline in daily activities among adolescents (Kirsch et al., 2024). In the Indonesian context, several publications mention that the rate of dysmenorrhea is still high; reports referring to the 2018 National Health Survey describe the prevalence of dysmenorrhea as around 64.25% with a predominance of primary dysmenorrhea, indicating that menstrual pain is a widespread reproductive health problem in the community (Meliani et al., 2024). This high rate is relevant in school health services because menstrual pain is often considered "normal," leading many adolescents to endure the pain or self-medicate without proper guidance.

From a clinical theory perspective, primary dysmenorrhea is primarily associated with increased prostaglandin production (especially PGF2α and PGE2) in the endometrium during menstruation. Prostaglandins increase myometrial contractions and uterine blood vessel vasoconstriction, which triggers tissue ischemia and the accumulation of anaerobic metabolites; this combination of processes activates nociceptors and causes the characteristic cramping pain sensation (Itani et al., 2022). Because the pathophysiological basis is related to inflammatory mediators and uterine contractions, effective therapy generally targets the reduction of prostaglandins/inflammatory reactions or smooth muscle relaxation and improvement of local blood flow. In clinical practice, NSAIDs are effective but not always suitable for all adolescents (e.g., due to gastrointestinal side effects, limited access, or family preferences), making safe and easy-to-implement nonpharmacological interventions an important option, especially in school and community settings.

One widely used non-pharmacological intervention is warm compresses/heat therapy. Scientific evidence shows that heat therapy can reduce dysmenorrhea pain; meta-analyses report that heat therapy is associated with a reduction in menstrual pain in primary dysmenorrhea, and in some RCT studies, its effects are even comparable to certain analgesic drugs (Jo & Lee, 2018). The mechanisms often described include vasodilation, increased local perfusion, muscle relaxation, and modulation of pain transmission through "gate control" so that spasms and pain perception are reduced (Rodrigues et al., 2024). In Indonesia, studies on adolescents also show that warm compresses are effective in significantly reducing the intensity of dysmenorrhea pain, confirming that simple heat-based interventions can be applied in a school setting (Sumiaty et al., 2021).

In addition to heat, ginger (Zingiber officinale) is widely known as an herbal ingredient with anti-inflammatory and analgesic effects. Clinical studies on ginger for dysmenorrhea highlight that ginger's active components (e.g., gingerol and shogaol) can modulate

inflammatory pathways and potentially reduce prostaglandin production through cyclooxygenase enzyme inhibition, making it relevant to the pathophysiology of menstrual pain (Nazarpour et al., 2024; Ginger for Pain Management in Primary Dysmenorrhea, 2023). In line with this, a therapeutic review cites ginger as a promising alternative with a relatively good safety profile when used appropriately, both orally and topically (Kirsch et al., 2024).

In community practice, ginger is often applied not only orally but also as a warm ginger compress—combining the heat effect and the potential local pharmacological effects of ginger. Several studies in Indonesia have reported a reduction in the intensity of dysmenorrhea pain in adolescents after ginger-based interventions and/or warm compresses. For example, a study comparing ginger decoction compresses with regular warm compresses in junior high school students showed that ginger compresses tended to be more effective in reducing pain intensity (Handajani et al., 2023). Another study reported that the combination of ginger-based interventions (e.g., ginger water) and warm compresses effectively reduced the intensity of dysmenorrhea in adolescents (Dari et al., 2024). In general, these findings support that ginger-based and heat interventions are worth considering as easily applicable non-pharmacological strategies, especially for adolescents who need a safe, inexpensive, and self-administered approach.

However, there are still important research gaps. First, some studies evaluated ginger interventions in oral form, while specific evidence regarding warm ginger compresses as topical therapy in early adolescents (13–14 years old) is still limited, and results may vary due to factors such as compliance, application technique, temperature, compress duration, and individual pain thresholds. Second, research in school settings often involves a wider range of adolescent ages, so specific evidence on the early junior high school group—which is adapting to menstruation and self-care skills—needs to be clarified. Third, local contexts such as Muara Teweh (Central Kalimantan) have different characteristics in terms of service access, culture, and availability of natural ingredients; ginger is relatively easy to obtain and familiar in household practices, so it has high potential to be adopted as a school health intervention if its effectiveness is proven.

From an urgency perspective, poorly managed dysmenorrhea pain has the potential to reduce learning quality, increase school absenteeism, disrupt participation in extracurricular activities, and trigger menstruation-related anxiety. A "youth-friendly" non-pharmacological approach that can be practiced in a school environment will help adolescents build self-control over pain without dependence on medication. Therefore, the study at SMP 4 Muara Teweh is

relevant to provide local evidence on realistic, inexpensive, and context-appropriate interventions.

Based on the above description, the purpose of this study is to analyze the effect of warm ginger compresses on the intensity of dysmenorrhea pain in 13- to 14-year-old female adolescents at SMP 4 Muara Teweh. The results of this study are expected to form the basis for recommendations for non-pharmacological interventions in school health services, strengthen adolescent reproductive health education, and support promotive and preventive community midwifery practices.

2. RESEARCH METHOD

This study used a quantitative approach with a pre-experimental design and a one-group pretest–posttest design. This design was chosen because the study aimed to determine the effect of warm ginger compresses on changes in the intensity of dysmenorrhea pain by comparing pain levels before and after intervention in the same group without a control group. This design is appropriate for non-pharmacological intervention studies in school settings, considering ethical considerations and the limited number of respondents.

The study was conducted at SMP 4 Muara Teweh, North Barito Regency, which is a junior high school with female students aged 13–14 years who have experienced menstruation and reported complaints of dysmenorrhea. The selection of the research location was based on the high incidence of menstrual pain complaints among adolescent girls and the availability of support from the school in implementing non-pharmacological health interventions.

The population in this study consisted of all female students aged 13–14 years at SMP 4 Muara Teweh who experienced dysmenorrhea during menstruation. The research sample consisted of female students who met the inclusion criteria, namely female adolescents aged 13–14 years, had experienced menstruation, experienced dysmenorrhea pain on the first or second day of menstruation, were willing to be respondents, and were not taking analgesics or other pain therapy during the study. Exclusion criteria included female students with a history of gynecological diseases, secondary menstrual disorders, allergies to ginger, or other health conditions that could affect pain perception.

The sample size was determined using total sampling, meaning that all female students who met the inclusion criteria during the study period were included as respondents. This technique was chosen to maximize the number of respondents and increase the power of the analysis, given that the target population was limited and specific to one school.

The sampling technique used was total sampling, as the entire population that met the research criteria could be reached and involved. This technique also helped to describe the actual conditions of dysmenorrhea and the response to warm ginger compress intervention in adolescent girls in a school environment.

The independent variable in this study was the application of warm ginger compresses, namely warm compresses made from boiled ginger at a lukewarm temperature (±38–40°C) and applied to the lower abdomen. The dependent variable is the intensity of dysmenorrhea pain, which is measured using a numeric rating scale (NRS) with a range of 0–10, where a score of 0 indicates no pain and a score of 10 indicates severe pain.

Data collection was conducted through pretest and posttest measurements. In the pretest stage, dysmenorrhea pain intensity was measured before the warm ginger compress intervention was administered. Next, respondents were given a warm ginger compress intervention for ±15–20 minutes on the first or second day of menstruation. After the intervention was completed, pain intensity was remeasured as a posttest using the same instrument. All procedures were carried out in a standardized manner and supervised by the researcher.

Data analysis was performed in stages. Univariate analysis was used to describe the characteristics of the respondents and the distribution of dysmenorrhea pain levels before and after the intervention. Next, data normality was tested using the Shapiro–Wilk test to determine the type of statistical test to be used. If the data were normally distributed, the analysis of the effect of warm ginger compresses on dysmenorrhea pain intensity was performed using a paired t-test. If the data were not normally distributed, the Wilcoxon Signed Rank Test was used. The statistical significance level was set at $\alpha = 0.05$, where a p-value < 0.05 indicated a significant effect of warm ginger compresses on reducing the intensity of dysmenorrhea pain.

With this research method, it is hoped that scientific evidence can be obtained regarding the effectiveness of warm ginger compresses as a simple, safe, and easy-to-apply non-pharmacological intervention to reduce dysmenorrhea pain in 13-14-year-old adolescent girls. The results of this study are expected to form the basis for the implementation of adolescent reproductive health interventions in schools and support the role of health workers and educators in improving the comfort and quality of life of adolescent girls.

3. RESULTS AND DISCUSSION

Table 1. Demographic data.

Var		n	F (%)
Grade	VII	15	50.0
	IX	15	50.0
Pain level before	Mild	0	0
	Moderate	20	66.7
	Severe	10	33.3
Pain level post	Mild	20	66.7
	Moderate	10	33.3
	Severe	0	0
Total		30	100

Source: primary data, 2025.

Based on the results of a study of 30 female students at SMP 4 Muara Teweh, the distribution of respondents according to grade level shows a balanced number. There were 15 respondents from grade VII (50.0%), while there were also 15 respondents from grade IX (50.0%). This distribution shows that the study involved adolescent girls from two different grade levels, but they were still within the same age range, namely 13–14 years old.

Before the warm ginger compress intervention was given, the intensity of dysmenorrhea pain felt by the respondents was dominated by moderate pain, namely 20 people (66.7%). Meanwhile, 10 respondents (33.3%) experienced severe pain, and none experienced mild pain. These findings indicate that most adolescent girls experienced dysmenorrhea pain that significantly interfered with their activities before the intervention.

After the warm ginger compress intervention, there was a clear change in the intensity of dysmenorrhea pain. Most respondents experienced mild pain, namely 20 people (66.7%). There were 10 respondents (33.3%) with moderate pain, while there were no respondents experiencing severe pain. This change in pain level distribution indicates a decrease in the intensity of dysmenorrhea pain after the application of warm ginger compresses.

Overall, these results indicate that the application of warm ginger compresses is associated with a decrease in the level of dysmenorrhea pain in adolescent girls aged 13–14 years. The shift in pain levels from the moderate–severe category before the intervention to mild–moderate after the intervention indicates that warm ginger compresses have the potential to be an effective and easily applied non-pharmacological intervention in reducing dysmenorrhea pain in a school setting.

Table 2. Statistical analysis.

Independent variable	N	P Value	Dependent variable
Pain level pre	30	0.000	Pain level post
Independent t-test			

Source: primary data, 2025.

The analysis of the effect of warm ginger compresses on the intensity of dysmenorrhea pain in adolescent girls was conducted by comparing pain levels before and after the intervention. The statistical test used was an independent t-test. The analysis results showed a p-value of 0.000, which is less than the significance threshold of $\alpha = 0.05$.

This p-value indicates that there is a statistically significant difference between the intensity of dysmenorrhea pain before and after the application of warm ginger compresses. Thus, it can be concluded that the application of warm ginger compresses has a significant effect in reducing the intensity of dysmenorrhea pain in 13–14-year-old adolescent girls at SMP 4 Muara Teweh.

Clinically, these results are consistent with the observed changes in pain level distribution, where before the intervention most respondents experienced moderate to severe pain, while after the intervention the majority of respondents were in the mild pain category and no severe pain was found. These findings reinforce the evidence that warm ginger compresses are an effective, safe, and easy-to-apply non-pharmacological intervention to help reduce dysmenorrhea pain in adolescent girls in a school setting.

Discussion

This study aimed to analyze the effect of warm ginger compresses on the intensity of dysmenorrhea pain in 13–14-year-old adolescent girls at SMP 4 Muara Teweh. The results showed a significant reduction in the intensity of dysmenorrhea pain after the intervention. The p-value obtained ($p = 0.000$) indicates that warm ginger compresses have a statistically significant effect on reducing menstrual pain. Clinically, this result is evident from the shift in pain levels, where before the intervention, most respondents experienced moderate to severe pain, while after the intervention, the majority of respondents were in the mild pain category and no severe pain was found.

These findings indicate that warm ginger compresses are an effective non-pharmacological intervention in helping to reduce dysmenorrhea pain in early adolescents. These results are in line with the concept that dysmenorrhea pain in adolescents is often primary and related to normal physiological changes after menarche. At this stage, adolescents are generally still in the hormonal adaptation phase, so the response to non-pharmacological interventions tends to be good, especially those that are supportive and calming.

Clinically, the pain-reducing effect of warm ginger compresses can be explained through two main mechanisms: the heat effect and the pharmacological effect of ginger. Heat therapy is known to cause local vasodilation, increase blood flow, reduce uterine smooth muscle spasms, and decrease pain impulse transmission through the gate control mechanism in the peripheral nervous system (Akin et al., 2018). Increased tissue perfusion due to heat also helps reduce myometrial ischemia, which is one of the main causes of pain in primary dysmenorrhea.

Additionally, ginger contains bioactive compounds such as gingerol and shogaol, which have anti-inflammatory and analgesic effects. Several pharmacological studies have reported that ginger can inhibit the cyclooxygenase and lipoxygenase pathways, thereby reducing the production of prostaglandins, which play a role in uterine contractions and menstrual pain (Daily et al., 2016). The combination of the heat effect and the active compounds in ginger is thought to have a synergistic effect in relieving dysmenorrhea pain, making the pain reduction results in this study more pronounced.

The results of this study are in line with various previous studies that reported the effectiveness of ginger and heat therapy in reducing dysmenorrhea pain. A study by Ozgoli et al. (2019) showed that the non-pharmacological use of ginger can significantly reduce the intensity of primary dysmenorrhea pain in adolescents and young women. Another study also reported that warm compresses are effective in reducing menstrual pain and increasing comfort in adolescents during menstruation (Bai et al., 2021). These findings support the results of this study that simple heat- and herb-based interventions can provide real benefits in managing menstrual pain.

On the other hand, several studies mention that responses to non-pharmacological interventions may vary between individuals, depending on pain thresholds, psychological factors, and levels of anxiety about menstruation (Armour et al., 2020). However, in this study, almost all respondents showed improvement in pain levels after the intervention, indicating that warm ginger compresses are relatively acceptable and effective in the 13–14 age group. This is important because early adolescents often have limited access to or use of pharmacological therapies independently.

The clinical implications of this study are quite significant, particularly in the context of adolescent health services and school health. Warm ginger compresses are an intervention that is easy to perform, inexpensive, relatively safe, and can be applied independently by adolescents with minimal supervision. This intervention can be incorporated into school health

programs or adolescent reproductive health education as a promotive and preventive measure in managing menstrual pain without reliance on analgesic drugs.

In addition, the application of warm ginger compresses also has the potential to increase adolescents' self-efficacy in managing menstrual complaints. When adolescents have effective non-pharmacological strategies, they tend to be more confident and less anxious about menstruation. This can have a positive impact on school attendance, concentration in learning, and overall quality of life.

Although this study shows significant results, there are several limitations that need to be considered. The pre-experimental design without a control group limits the ability to eliminate other factors that may affect pain reduction, such as psychological effects or natural adaptation to pain over time. Therefore, further research using a quasi-experimental or experimental design with a control group is recommended to strengthen the evidence of causality.

Overall, the results of this study confirm that warm ginger compresses are an effective non-pharmacological intervention in reducing the intensity of dysmenorrhea pain in early adolescent girls. These findings make an important contribution to community midwifery and school health practices in developing adolescent-friendly, evidence-based approaches that are appropriate to the local context.

4. CONCLUSION

This study proves that the application of warm ginger compresses has a significant effect in reducing the intensity of dysmenorrhea pain in 13–14-year-old female adolescents at SMP 4 Muara Teweh. The results of the analysis show a significant difference between the pain levels before and after the intervention, where there was a decrease in pain from moderate to severe to mild to moderate after the application of warm ginger compresses. These findings indicate that warm ginger compresses are an effective, safe, and easy-to-apply non-pharmacological intervention to help adolescents manage menstrual pain. Therefore, warm ginger compresses can be recommended as an alternative to pharmacological therapy or as the primary choice in the management of dysmenorrhea in adolescents, especially in school and community settings.

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