

Original Article

Changes in low back pain intensity following red ginger warm compresses among pregnant women in the third trimester: A pre-experimental study

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Abstract

Background: Pregnancy is a natural process experienced by every woman, during pregnancy the mother can experience various complaints, one of which is back pain, especially in the third trimester. If not addressed, back pain can disrupt daily activities and reduce the quality of life of pregnant women. One non-pharmacological intervention to reduce back pain is the red ginger warm compress therapy. Red ginger contains essential oils that are warm, thus increasing blood flow, helping muscle relaxation, and reducing pain.

Objective: This study aims to determine the effectiveness of giving a red ginger warm compress in reducing back pain in pregnant women in the third trimester.

Methods: This study is a quasi-experimental study using a one-group pretest-posttest design, with a sample of 32 pregnant women in the third trimester. Sampling used non-probability sampling with purposive sampling technique. The research instrument includes an observation sheet using the Numeric Rating Scale (NRS) for pain.

Results: The results show a significant decrease in back pain scores among pregnant women $p < 0,001$, with baseline back pain scores of $4,56 \pm 1,900$ and after therapy $2,47 \pm 1,344$.

Conclusion: The results of this study indicate that red ginger warm compress therapy is effective in reducing back pain intensity among pregnant women in the third trimester. Therefore, red ginger warm compress therapy can be recommended as a non-pharmacological intervention to help alleviate back pain intensity in this population.

Background

Pregnancy is a natural and physiological process. Some problems experienced by pregnant women include leg edema, striae gravidarum, shortness of breath, and back pain (Dewi, 2023). In the third trimester (28-40 weeks of gestation), pregnant women are susceptible to back pain due to changes in posture and fetal weight. The uterus enlarges, the center of gravity shifts, the spine curves more (lordosis), pregnancy hormones (relaxin and progesterone) loosen ligaments, making joints less stable, abdominal muscles weaken, and body weight increases, causing the lower back to work harder to support the weight (Veronica, 2021).

According to Mantle and Ostergaard (2021), 50% of pregnant women surveyed in the UK and Scandinavia reported experiencing significant back pain. Rezi and Novianti (2022) reported that 70% of Australian women experience back pain at some stage in their pregnancy, starting in the 28th week or third trimester. The prevalence of

pregnant women with back pain in Indonesia is 68%, of which 32% experience moderate pain. Nearly 80-90% do not treat the symptoms that arise to relieve the pain. The most common discomfort is in the second and third trimesters (Yuliani, 2023). Data obtained from the Aceh Besar Health Office shows that the number of pregnant women in the third trimester in 2023 was 6,675 people, representing 81.8%, and 3,337 people experienced back pain from 28 Community Health Centers (Puskesmas) spread across Aceh Besar (Aceh Besar Health Office, 2023). The prognosis for low back pain will be poor if not treated properly. If the pain has spread to the pelvic and lumbar areas, it can cause difficulty in standing, sitting, and even affect their daily routine and quality of life (Armeyanti et al., 2023).

Back pain, if not treated promptly, can result in long-term back pain and chronic back pain that will be difficult to treat or cure. The impact of chronic back pain in pregnant women can disrupt their quality of life, such as walking, sleep quality, stress, and insomnia (Listia et al., 2022).

Management of back pain during pregnancy varies, including both pharmacological and non-pharmacological approaches. The use of analgesics such as paracetamol and ibuprofen is included in pharmacological management, while non-pharmacological management includes therapies such as warm water compresses, cold compresses, and a combination of warm ginger compresses (Mulyani, 2021).

Warm water compresses can be used to help relieve back pain. Warm temperatures can help soothe tense back muscles, thus reducing pain. To gain this benefit, apply a warm compress to the back area for 15-20 minutes. This method can also be repeated several times until the pain subsides (Uliyah & Hidayat, 2020). According to Hederson (2021), one non-pharmacological method that can reduce pain is a warm compress, which can provide comfort, reduce or relieve pain, reduce or prevent muscle spasms, and provide warmth. Furthermore, ginger is also believed to have properties that work by stimulating pain-relieving receptors (non-nociceptors) in the same receptors as in injuries. Ginger is effective as a medicine due to its pharmacological effects as an analgesic. The heat effect of ginger is what relieves acute pain and muscle spasms (Yelvita, 2022). Based on research by Meda (2023), ginger water compress therapy is effective in reducing back pain in pregnant women in the third trimester, because the essential oils in ginger are warming and can increase blood flow to achieve analgesic effects and muscle relaxation, thus reducing pain.

Based on the research results of Riyansih (2022), that lower back pain in pregnant women after being given ginger compresses for three days, the results were mild pain in 12 people with a percentage of 80% and the lowest was moderate pain in 3 people with a percentage of 20%. After administering the warm ginger compress intervention, there was a change in pain experienced by pregnant women from moderate pain to mild pain and also severe pain to moderate pain. Then from the research results of Arummega and Rahmawati (2022), there were 20 pregnant women respondents who experienced back pain, 9 respondents with a moderate pain scale and 16 respondents with a moderate pain scale after being given a warm ginger compress for pregnant women in the third trimester with 9 respondents who experienced back pain with a moderate pain scale decreasing to a mild pain scale while 16 respondents who experienced a mild pain scale with a warm ginger compress experienced no reduction in pain.

The novelty in this study is that the respondents were pregnant women in the third trimester who were in the working area of the Aceh Besar Community Health Center, whereas in previous studies, there was no specific focus on which trimester the warm red ginger compress was given. Furthermore, in terms of the intervention time given, in this study the intervention time was given for seven days. Whereas in previous studies it was only given for three days. Based on preliminary data obtained using the interview method, it showed that 12 of the 15 pregnant women in the third trimester experienced back pain, with a pain scale of 4-6. In addition, the mothers stated that the pain was often felt during daily activities, the management carried out by the mothers usually used painkillers. This study aims to determine the effectiveness of giving warm red ginger compresses in reducing back pain in pregnant women in the third trimester.

Methods

Study Design

This study employed a quasi-experimental design using a one-group pretest-posttest approach. Measurements were conducted twice, before the intervention (pretest) and after the intervention (posttest), to evaluate the effectiveness of a warm red ginger compress therapy in reducing back pain among third-trimester pregnant women.

Sampling dan Setting

The study was conducted from September 5th–14th, 2025, in one of the Aceh Besar Community Health Centers (Puskesmas) working areas. Participant recruitment was carried out from September 5th–7th, 2025, through a screening process based on the predetermined inclusion and exclusion criteria.

The study population consisted of all third-trimester pregnant women experiencing back pain in one of the working areas of the Aceh Besar Community Health Center (Puskesmas). A non-probability sampling technique with a purposive sampling method was employed, in which participants were selected based on predetermined inclusion and exclusion criteria. All eligible participants who met the study criteria were recruited as the study sample, resulting in a total sample of 32 respondents. The inclusion criteria were: third-trimester pregnant women with a gestational age of 28–40 weeks, experiencing lower back pain, having a singleton

pregnancy, able to communicate effectively, willing to participate in the study, and able to complete the red ginger warm compress intervention for seven consecutive days. The exclusion criteria included: pregnant women with obstetric complications, neurological disorders affecting pain perception, a history of spinal abnormalities, acute fever or infection, or a known allergy to red ginger.

Instruments

The research instruments included a participants characteristics questionnaire covering demographic data such as age, history of back pain, and actions taken when experiencing back pain. Additionally, pain intensity was measured using the Numeric Rating Scale (NRS), which ranges from 0 to 10 on this scale, a score of 0 indicates no pain, while a score of 10 represents the worst pain imaginable. Participants were asked to rate the pain intensity they were experiencing at the time of measurement (current pain), rather than the worst pain they had ever experienced over a specific period. Pain intensity measurements were taken at two time points: before the intervention (pretest) and after the intervention (posttest). To ensure consistency, assessments were conducted under standardized conditions: respondents were seated comfortably after resting for approximately five minutes. All respondents were then asked to rate their back pain while at rest. Both pretest and posttest measurements were performed by the same assessor using identical procedures to minimize measurement bias.

Data Collection

Data collection began with the completion of a respondent characteristics questionnaire and the assessment of back pain intensity using the Numeric Rating Scale (NRS) prior to the intervention (pretest). Participants then received warm red ginger compress therapy for 7 consecutive days, administered once daily for 30 minutes per session. Following completion of the intervention period, back pain intensity was reassessed using the same instrument (posttest). The warm red ginger compress intervention was prepared using fresh red ginger. The fresh ginger was thoroughly washed under running water, peeled, and grated into a fine consistency. A total of 200 g of grated red ginger was mixed with 1,500 mL of water and heated until the solution reached

a temperature of 35–40°C. The temperature was verified using a digital thermometer before application to the participants.

A clean towel was used as the compress medium. The towel was immersed in the warm red ginger solution, wrung out, and applied to the participant's lower back, corresponding to the area of pain. During the procedure, participants were seated in a comfortable position to facilitate access to the lower back. The compress was applied for 30 minutes, with the towel being re-immersed in the warm solution every 5 minutes to maintain an adequate temperature. The solution temperature was monitored periodically using a digital thermometer to ensure that it remained within the therapeutic range of 35–40°C, thereby ensuring participant safety and comfort. Before and throughout the intervention, the skin condition was assessed to detect any signs of excessive redness, irritation, or discomfort. If a participant reported excessive heat or discomfort, the compress was immediately removed and the solution temperature was adjusted accordingly.

Participant adherence was monitored using a daily observation checklist. Any missed intervention sessions due to participant absence were documented but were not rescheduled, and these missed sessions were reported as part of the study evaluation. Data collection began with respondents completing a questionnaire on their characteristics and having their back pain intensity measured using the Numeric Rating Scale (NRS) prior to the intervention (pre-test). Subsequently, respondents received a red ginger warm compress therapy for seven consecutive days, administered once daily for 30 minutes per session. Upon completion of the entire intervention series, back pain intensity was measured again using the same instrument (post-test).

Data Analysis

Data analysis was performed using statistical software. Univariate analysis was used to describe respondent characteristics, including age, history of back pain, actions taken during back pain, medication use, and the distribution of pain scales before and after the intervention. Bivariate analysis was performed to assess differences in average back pain intensity before and after the administration of red ginger warm compress therapy using a paired sample t-test with a

significance level (α) of 0.05. Statistical analyses were performed using SPSS (version 26).

Ethical Consideration

This research received ethical approval from the Akademi Keperawatan Kesdam Iskandar Muda Banda Aceh with (No.17/KEP/AKIMBA/VIII/2025), where the researcher will maintain all confidentiality of the respondents in the research and the data will not be disseminated.

Table 1. Characteristic of participants

Variable	Frequency (n)	Percentage (%)
Age		
23-26 years	3	9,4
27-35 years	19	59,4
36-40 years	10	31,3
Back pain history		
Yes	17	53,1
No	15	46,9
Actions taken when experiencing back pain		
Yes	14	43,7
No	18	56,3

Table 1 shows that most participants were aged 27–35 years (59.4%), followed by those aged 36–40 years (31.3%) and 23–26 years (9.4%). More than half of the participants had a previous history

Results

A total of 32 third-trimester pregnant women completed the seven-day red ginger warm compress intervention and were included in the analysis. The findings are presented in three sections: participants' characteristics, the distribution of back pain intensity before and after the intervention, and differences in mean back pain scores following the intervention.

of back pain (53.1%). However, the majority reported that they had not taken any action to manage the back pain they experienced (56.3%).

Table 2. Characteristics of pregnant women's back pain scale before and after therapy warm compress red ginger

Pain Scale	Pretest		Posttest	
	Frequency	Percentage	Frequency	Percentage
Mild Pain	13	40.6	22	68.8
Moderate Pain	16	50.0	10	31.3
Severe Pain	3	9.4	0	0

Table 2 demonstrates a shift in back pain intensity following the red ginger warm compress intervention. Before the intervention, most participants experienced moderate pain (50.0%), followed by mild pain (40.6%) and severe pain (9.4%). After the intervention, the proportion of participants with mild pain increased to 68.8%,

while the proportion with moderate pain decreased to 31.3%. Moreover, no participants reported severe pain after completing the intervention. These findings indicate an overall reduction in back pain intensity following seven days of red ginger warm compress therapy.

Table 3. The effect of warm red ginger compresses on the scale of back pain in pregnant women in the third trimester

Back Pain Scale	Mean $\pm$ SD	Z score	p- value
Pre Test	4.56 $\pm$ 1.900	-5.024	<0.001
Post Test	2.47 $\pm$ 1.344		

Table 3 shows that the mean back pain score decreased from 4.56 ± 1.900 before the intervention to 2.47 ± 1.344 after the intervention, representing a mean reduction of 2.09 points. Statistical analysis demonstrated that the difference in back pain scores before and after the intervention was statistically significant ($Z = -5.024$; $p < 0.001$). Thus, participants experienced significantly lower back pain intensity after receiving red ginger warm compress therapy for seven consecutive days.

Discussion

This study shows that there is a decrease in the pain scale in pregnant women in the third trimester after receiving red ginger warm compress therapy with a pain scale before red ginger warm compress therapy of 4.56 ± 1.900 and after being given red ginger warm compress therapy decreased to 2.47 ± 1.344 . The findings of this study are in line with research conducted by Harmavani and Lestari (2022), red ginger contains active compounds such as gingerol and shogaol which have anti-inflammatory and analgesic properties gingerol is the main component in red ginger which is responsible for reducing inflammation by inhibiting the production of pro-inflammatory cytokines. By reducing the production of these mediators, red ginger can reduce swelling and irritation in the muscles and joints of the lower back, thereby reducing back pain in pregnant women in the third trimester.

In addition, according to Mota (2020), the mechanism of the warm ginger compress can reduce pain; this is due to the warm properties contained in ginger. Ginger contains essential oil constituents that are warm, thus able to enhance blood flow to achieve analgesic and muscle relaxation effects and reduce inflammatory/pain processes. The warm sensation received by the impulse receptor will be transmitted to the posterior hypothalamus, resulting in a reflex sympathetic inhibition response that dilates blood vessels, thereby increasing blood flow and alleviating back pain in pregnant women in the third trimester.

Based on the research findings, several factors support the success of warm ginger compress therapy, including family support and frequency of therapy administration. The family support provided to pregnant women in this study consisted of emotional support; pregnant women

who receive emotional support from family tend to be more motivated and compliant in undergoing therapy. According to the researchers' assumption, family support is considered one of the important factors in the success of therapy. Family involvement, such as helping prepare therapy or giving attention to pregnant women, can create a sense of comfort that supports the effectiveness of therapy. This is supported by Tesselonika et al. (2024), who state that one of the factors affecting the condition of pregnant women includes age, family support, and knowledge about food intake. Family support plays an important role in increasing the effectiveness of health interventions, including therapy to overcome back pain. Family involvement in providing time, attention, and needs of pregnant women during therapy increases adherence and the success of the therapy.

The second factor supporting the success of therapy is the frequency of therapy administration. The warm ginger compress therapy is administered routinely every afternoon for 7 consecutive days, thereby supporting optimal results in reducing back pain severity in pregnant women in the third trimester. The therapy intensity, performed consistently, provides a relaxing effect and ultimately improves the mother's pregnancy quality and reduces pain levels. According to the researchers' assumption, the intensity of therapy administered regularly is an important factor in the success of reducing back pain scale in pregnant women in the third trimester. With consistent therapy administration, pregnant women can experience a relaxant effect that ultimately improves the mother's pregnancy quality and reduces pain levels. This is in line with Veronica's (2021) study, where the pain scale decreased from moderate to mild during 7 days of care with warm ginger compress. This study aligns with previous studies showing the effectiveness of ginger in addressing musculoskeletal pain. Pratiwi's (2021) study found that applying warm ginger compress for 7 days reduced the average pain scale by 3 points on the lower back.

In addition to reducing lower back pain in pregnant women in the third trimester, the safety of using warm ginger compresses also needs to be considered. This non-pharmacological intervention is generally considered safe when performed according to procedure, particularly regarding the temperature of the compress, the

duration of application, and the condition of the pregnant woman's skin. Warm compresses work through a vasodilation mechanism that increases local blood flow, thereby reducing muscle spasms and decreasing pain perception. The addition of ginger provides natural anti-inflammatory and analgesic effects through its gingerol and shogaol content. Research by Nasution and Mutmainnah (2024) explains that the essential oil content in ginger can increase skin permeability and improve blood circulation without causing irritation when used correctly (Nasution & Mutmainnah, 2024).

However, the risk of skin irritation remains a concern because ginger contains active compounds that can cause a warming or even mild burning sensation in individuals with sensitive skin. Possible reactions include redness, itching, or excessive heat in the area where the compress is applied. Therefore, before any intervention is performed, it is important to observe the pregnant woman's skin condition and ensure there are no open wounds, dermatitis, or a history of allergies to ginger. Another safety aspect to consider is the temperature of the compress. Temperatures that are too hot can cause minor burns, especially in pregnant women who have increased skin sensitivity due to hormonal changes during pregnancy. Literature on warm compresses in pregnant women recommends using a comfortable warm temperature, generally around 38–40°C, and avoiding excessive heat exposure, which can cause discomfort or skin tissue damage (Amalia et al., 2020).

In addition to the risk of irritation and excessive heat, discomfort during the intervention also needs to be monitored. Some pregnant women may experience excessive heat, excessive sweating, or discomfort when the compress is applied for too long. Therefore, the duration of warm ginger compresses is generally limited to around 15–20 minutes and the mother's response is monitored regularly. The intervention should be stopped immediately if the mother complains of burning or other discomfort. Several studies on warm ginger compresses in pregnant women in the third trimester have reported reduced pain and no serious side effects as long as the procedure is performed according to standards. The use of warm ginger compresses is considered a relatively safe, easy-to-apply, and minimally invasive complementary therapy compared to the

use of analgesic medications during pregnancy (Ahmad & Wijayanti, 2024).

Thus, the safety of warm ginger compresses in pregnant women during the third trimester can be ensured by paying attention to the appropriate temperature, duration, and skin condition of the mother, as well as monitoring for potential irritation and discomfort. These steps are crucial to ensure optimal therapeutic benefits are achieved without adverse effects on the mother or fetus.

Conclusion and Recommendation

Warm ginger compress therapy effectively reduces pain intensity in the third-trimester pregnant woman. Therefore, it can be used by health workers and communities as a safe, simple, and inexpensive nonmedical treatment to reduce and eliminate back pain in pregnant women in the third trimester.

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Declaration of conflict of interest

The authors declare no competing interests.

Declaration on the Use of AI

The authors declare that artificial intelligence (AI) tools were used only to assist in language editing and improving the clarity of the manuscript. All intellectual content, data analysis, and interpretation remain the responsibility of the authors.

Data Availability Statement

Data sharing is not applicable to this article.

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