ORIGINAL ARTICLE

Jurnal Ilmiah Kebidanan (The Journal of Midwifery)
2026, Volume 14, Number 1 : 59-65
DOI: https://doi.org/10.33992/jik.v14i1.4947

e-ISSN: 2721-8864
p-ISSN: 2338-669X

Effectiveness of Ginger Patch Therapy in Reducing Back Pain in Third Trimester Pregnancy

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Article history:

Submitted, 2025/12/18
Accepted, 2026/04/06
Published, 2026/04/13

Keywords:

Ginger patch; lower back pain; pregnant women; third trimester.

Cite This Article:

Silalahi UA, Purnamasari WM, Marliani Y. Effectiveness of ginger patch therapy in reducing back pain in third trimester pregnancy. J Ilm Kebidanan (The J Midwifery). 2026;14(1):59-65. DOI: 10.33992/jik.v14i1.4947

ABSTRACT

Lower back pain is a common complaint among third-trimester pregnant women due to physiological and postural changes during pregnancy. If not properly managed, this condition may reduce maternal comfort and daily activity. Ginger patch therapy is a non-pharmacological intervention that provides a warming effect and analgesic properties to relieve pain. This study aimed to analyze the effect of ginger patch application on lower back pain intensity among third-trimester pregnant women in the working area of UPTD Puskesmas Cisayong. A quantitative pre-experimental study with a one-group pretest–posttest design was conducted involving 19 pregnant women selected using accidental sampling. Pain intensity was measured using the Numeric Rating Scale before and after the intervention. Data analysis included univariate analysis and bivariate analysis using the Wilcoxon Signed Rank Test with a significance level of $p < 0.05$. The results showed a decrease in the mean pain score from 7.53 before the intervention to 2.42 after the intervention. Statistical analysis indicated a significant effect of ginger patch application on pain reduction ($p = 0.000$). These findings indicate that ginger patch therapy is effective in reducing lower back pain among third-trimester pregnant women and can be recommended as a safe and practical complementary therapy during pregnancy.

INTRODUCTION

Pregnancy is a complex physiological process that requires continuous adaptation of the maternal body to support fetal growth and development. Throughout pregnancy, significant changes occur in the cardiovascular, musculoskeletal, respiratory, and endocrine systems, with these adaptations becoming more pronounced during the third trimester[(1)]. One of the most common musculoskeletal complaints experienced by pregnant women during this period is lower back pain, which arises due to increased maternal and fetal weight, postural changes, and exaggerated lumbar lordosis. Although often considered a normal discomfort of pregnancy, untreated back pain can substantially affect maternal comfort, mobility, sleep quality, and overall well-being[(2)].

Lower back pain during the third trimester of pregnancy is multifactorial in nature and primarily associated with hormonal and biomechanical changes. Increased production of relaxin, progesterone, and estrogen leads to ligament laxity and reduced joint stability, particularly in the lumbosacral region, thereby increasing strain on supporting muscles[(3)]. Additionally, the forward shift of the center of gravity caused by uterine enlargement alters posture and increases muscular tension in the lower back.

Published by Midwifery Department of Health Polytechnic, Ministry of Health, Denpasar.

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These physiological mechanisms explain why the intensity and frequency of back pain tend to peak during late pregnancy, when fetal weight, amniotic fluid volume, and uterine size reach their maximum.

In Indonesia, pregnancy-related back pain remains a prevalent maternal health concern. Data from the 2018 Basic Health Research (Riskesdas) indicated that approximately 68% of pregnant women experienced moderate back pain, while 32% reported mild pain[4]. With more than 5.2 million pregnancies annually, this suggests that millions of Indonesian women are affected by musculoskeletal discomfort during pregnancy. In Indonesia, pregnancy-related back pain remains a major maternal health concern, with recent studies indicating that approximately 60–80% of pregnant women experience lower back pain during pregnancy. This high prevalence highlights the substantial burden of musculoskeletal discomfort among pregnant women, particularly during the third trimester [5,6].

A preliminary study conducted in June 2025 at the working area of Cisayong Public Health Center, Tasikmalaya Regency, revealed that back pain was a common complaint among third-trimester pregnant women. Among eight women interviewed, seven (87.5%) reported experiencing lower back pain, particularly during prolonged standing, walking, or at night. Assessment using the Numerical Rating Scale (NRS) showed that most participants experienced moderate pain, characterized by stiffness, soreness, and a pulling sensation in the lumbar and pelvic regions. Notably, the majority had never received or practiced non-pharmacological pain management strategies, indicating a gap in accessible and practical interventions at the primary healthcare level[7].

Management of back pain during pregnancy requires careful consideration due to potential risks associated with pharmacological treatments. Routine use of analgesics is generally discouraged because of possible adverse effects on the fetus and placenta. Consequently, non-pharmacological approaches are strongly recommended as safer alternatives. Common interventions include pregnancy exercise, warm compresses, acupressure, posture modification, and herbal therapies. However, many of these methods require specific skills, time commitment, or assistance from healthcare providers, which may limit adherence and long-term use in daily life[8,9].

Ginger (Zingiber officinale) is a widely recognized herbal plant with anti-inflammatory and analgesic properties. Bioactive compounds such as gingerol, shogaol, and zingerone have been shown to inhibit inflammatory mediators involved in pain perception[10]. While ginger is commonly consumed orally, this route may be less practical for pregnant women due to dosing concerns and potential gastrointestinal side effects. Topical application of ginger, particularly in the form of a patch, offers a localized warming effect that stimulates thermal receptors, promotes vasodilation, and reduces muscle tension through the gate control theory of pain.

The use of ginger patches is considered practical, safe, cost-effective, and easy to apply independently, making it suitable for pregnant women. Previous studies have demonstrated the effectiveness of ginger patches in reducing musculoskeletal pain and labor pain without systemic side effects. A study by Mardiani et al. (2025) reported that ginger patch therapy significantly reduced pain intensity and improved comfort among women during the active phase of labor[7]. Despite these promising findings, scientific evidence regarding the use of ginger patches specifically for managing lower back pain in third-trimester pregnant women remains limited, particularly in primary healthcare settings. Therefore, this study aims to examine the effect of ginger patch application on lower back pain among third-trimester pregnant women in the working area of Cisayong Public Health Center, Tasikmalaya Regency.

METHOD

This study employed a quantitative pre-experimental design using a one-group pretest–posttest approach to evaluate the effect of ginger patch application on lower back pain among third-trimester pregnant women. This design allowed the comparison of pain intensity before and after the intervention within the same group of participants.

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The ginger patch used in this study was based on a red ginger formulation that has been previously tested in clinical research for pain reduction. The formulation refers to the preparation of red ginger extract obtained by boiling approximately 50 grams of red ginger in 500 ml of water until reduced, which has been shown to produce analgesic and warming effects[12]. The patch was designed to deliver a localized thermal and phytochemical effect through the skin, allowing better absorption and sustained action compared to conventional compress methods[12].

The study was conducted from August to October 2025 at the working area of Cisayong Public Health Center, Tasikmalaya Regency. The study population consisted of all third-trimester pregnant women who experienced lower back pain and attended antenatal care at the health center during the study period, totaling 49 individuals. Sample size was determined using the Slovin formula, resulting in 17 participants, with an additional 10% added to anticipate potential dropouts. A total of 19 respondents were included using non-probability accidental sampling.

The intervention consisted of applying a ginger patch to the painful area of the lower back for 30 minutes in a single session. Participants were positioned comfortably during the application, and post-intervention pain assessment was conducted using the same NRS instrument to ensure measurement consistency. The patch was designed to deliver a localized thermal and phytochemical effect through the skin, allowing better absorption and sustained action compared to conventional compress methods[12].

Data analysis was performed using statistical software. Univariate analysis was used to describe respondent characteristics and pain scores. Normality testing was conducted using the Shapiro–Wilk test, which indicated that the data were not normally distributed. Therefore, bivariate analysis was performed using the Wilcoxon signed-rank test to determine differences in pain intensity before and after the intervention. Statistical significance was set at a 95% confidence level ($\alpha = 0.05$).

Ethical considerations were strictly observed throughout the study. Ethical approval was obtained from the Health Research Ethics Committee prior to data collection. All participants provided written informed consent, and confidentiality as well as participant safety were maintained in accordance with ethical research principles.

RESULT AND DISCUSSION

This study involved 19 third-trimester pregnant women who experienced lower back pain in the working area of Cisayong Public Health Center. The results are presented descriptively to illustrate changes in back pain intensity before and after the ginger patch intervention, followed by inferential analysis to determine the effect of the intervention.

Table 1. Frequency Distribution of Back Pain Intensity Data Among Third-Trimester Pregnant Women Before and After Ginger Patch Intervention

Data	Min	Max	Mean	St. Dev
Pretest	6	10	753	1.020
Posttest	2	3	2.42	0.507

Based on Table 1, the mean back pain intensity score before the intervention was 7.53, with a standard deviation of 1.020, indicating that most respondents experienced moderate to severe pain prior to treatment. This finding confirms that lower back pain is a prominent complaint among women in the third trimester of pregnancy. The high pain intensity observed can be attributed to physiological and biomechanical changes, including increased fetal weight, postural alterations, and excessive lumbar lordosis, which place additional strain on the lower back muscles and spinal structures.

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These findings are consistent with previous studies reporting that more than 70% of pregnant women experience back pain, particularly during the third trimester. Hormonal changes, especially increased relaxin levels, contribute to ligament laxity and reduced joint stability, further exacerbating musculoskeletal discomfort[13]. In addition, psychological factors such as stress and fatigue may heighten pain perception by activating the sympathetic nervous system and increasing cortisol levels, thereby intensifying pain sensitivity[8].

After the ginger patch intervention, the mean pain score decreased markedly to 2.42, with a lower standard deviation of 0.507, indicating a substantial and consistent reduction in pain intensity among participants. This result demonstrates that ginger patch application was effective in alleviating lower back pain in third-trimester pregnant women.

The reduction in pain intensity following the intervention can be explained by the pharmacological properties of ginger (Zingiber officinale). Ginger contains bioactive compounds such as gingerol and shogaol, which exhibit anti-inflammatory and analgesic effects by inhibiting cyclooxygenase (COX) enzymes involved in prostaglandin synthesis, thereby reducing pain and inflammation[8]. Moreover, the warming sensation produced by the ginger patch promotes local vasodilation, improves blood circulation, and facilitates muscle relaxation in the affected area.

Physiologically, heat therapy stimulates large-diameter nerve fibers (A-beta fibers), which suppress pain signal transmission carried by smaller fibers (A-delta and C fibers). This mechanism aligns with the Gate Control Theory proposed by Melzack and Wall, whereby thermal stimulation can "close the pain gate" at the spinal level, reducing pain perception (Rahayu et al., 2024). Similar findings were reported by Lukmana et al. (2024), who demonstrated that ginger compress therapy significantly reduced musculoskeletal pain among third-trimester pregnant women[9,14].

Table 2. Wilcoxon Test Analysis of the Effect of Ginger Patch Application on the Reduction of Back Pain Intensity in Third-Trimester Pregnant Women

Description	n	Mean Rank	Sum of Ranks	Sig.
Negative Ranks	19	10.00	190.00	
Positive Ranks	0	0	0	0.000
Ties	0	-	-	
Total	19			

The effect of ginger patch application on the reduction of lower back pain intensity among third-trimester pregnant women is clearly demonstrated by the results of the Wilcoxon Signed Rank Test, as presented in Table 2. The findings indicate that the mean pain intensity score prior to the intervention was 7.53, which decreased substantially to 2.42 after the ginger patch application. This considerable reduction reflects a clinically meaningful improvement in maternal comfort following the intervention.

Statistical analysis revealed a Z value of –3.916 with a significance level of $p = 0.000$ ($p < 0.05$), indicating a statistically significant difference between pain intensity before and after the intervention. These results confirm that the ginger patch application had a significant effect on reducing lower back pain among third-trimester pregnant women at Cisayong Public Health Center. Furthermore, all 19 respondents (100%) experienced a decrease in pain intensity after the intervention, with no respondents showing increased pain or remaining at the same pain level. This uniform pattern of pain reduction highlights the consistency and effectiveness of the ginger patch as a non-pharmacological pain management strategy.

The significant decrease in pain intensity can be explained by the combined physiological effects of heat therapy and the active bioactive compounds contained in ginger, particularly gingerol,

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shogaol, and zingerone. These compounds possess anti-inflammatory, analgesic, and natural vasodilatory properties, which help inhibit cyclooxygenase (COX) enzyme activity involved in prostaglandin synthesis—chemical mediators responsible for pain and inflammation. Reduced prostaglandin production leads to decreased nociceptive stimulation in the central nervous system, thereby lowering pain perception and improving maternal comfort following ginger patch use[15,16].

In addition, the warming sensation produced by the ginger patch increases local blood circulation in the lower back area, which helps relieve muscle tension and promotes relaxation of tissues subjected to mechanical stress caused by postural changes during pregnancy. Improved blood flow enhances oxygen delivery to tissues and accelerates the removal of metabolic waste products that contribute to muscle stiffness and discomfort. Lukmana et al. (2024) reported that ginger compress therapy applied for 20–30 minutes significantly reduced musculoskeletal pain intensity among pregnant women, supporting the findings of the present study[9].

The analgesic mechanism of the ginger patch is also consistent with the Gate Control Theory proposed by Melzack and Wall, which explains that thermal stimulation activates large-diameter nerve fibers that inhibit pain signal transmission carried by smaller nociceptive fibers at the spinal cord level. As a result, pain signals are blocked from reaching the brain, leading to a reduction in perceived pain intensity. This mechanism further explains the rapid and consistent pain reduction observed among all participants following ginger patch application.

Previous studies further reinforce these findings. Muryani, demonstrated that the application of ginger patches for three consecutive days reduced lower back pain intensity by approximately 60–70% among pregnant women[17]. Importantly, these therapeutic benefits were achieved without adverse side effects, highlighting the safety of ginger-based interventions for pregnant women[18].

From a physiological perspective, lower back pain during the third trimester of pregnancy is primarily caused by increased maternal weight, shifts in the center of gravity, and weakening of back muscles due to elevated relaxin hormone levels. These factors increase pressure on the lumbar spine and surrounding structures. Ginger patch application helps alleviate this condition by enhancing tissue elasticity, improving circulation, and stimulating endorphin release, which acts as the body's natural analgesic [6]. This multifaceted mechanism supports the role of ginger patches in addressing both the physical and neurological components of pain.

The findings of this study are consistent with complementary and alternative therapy theories described by Usman *et al.* (2022), which emphasize that localized heat therapy can reduce pain by increasing oxygen supply to tissues, accelerating metabolic waste removal, and decreasing muscle spasms [12]. Therefore, ginger patch therapy not only alleviates pain but also provides a relaxation effect that enhances maternal comfort during late pregnancy[13].

Supporting evidence from Rahayu et al. (2024) showed that regular ginger compress application over five days reduced mean back pain intensity from 7.4 to 2.8, with a statistically significant p-value of 0.000[20]. These results further strengthen the evidence that ginger has a consistent therapeutic effect on musculoskeletal pain, particularly lower back pain in late pregnancy.

The results of this study demonstrate that ginger patch application is highly effective in reducing lower back pain intensity among third-trimester pregnant women at Cisayong Public Health Center. This intervention represents a safe, affordable, and easily applicable non-pharmacological therapy that can be implemented both at home and in primary healthcare settings. Healthcare providers are encouraged to educate pregnant women about the benefits of ginger patch use as part of self-care strategies to manage pregnancy-related back pain without reliance on pharmacological analgesics.

CONCLUSION

Based on the results of this study on the effect of ginger patch application on lower back pain among third-trimester pregnant women, it can be concluded that ginger patch therapy has a significant

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effect in reducing pain intensity. The findings showed a substantial decrease in the mean pain score from 7.53 before the intervention to 2.42 after the intervention. Statistical analysis using the Wilcoxon Signed Rank Test revealed a Z value of –3.916 with a p-value of 0.000 ($p < 0.05$), indicating a statistically significant difference between pain intensity before and after ginger patch application.

All respondents (100%) experienced a reduction in lower back pain intensity following the intervention, with no participants reporting increased or unchanged pain levels. This result suggests that ginger patch therapy is consistently effective in alleviating pregnancy-related lower back pain. The pain reduction can be attributed to the combined effects of local heat and the bioactive compounds in ginger, such as gingerol, shogaol, and zingerone, which possess anti-inflammatory, analgesic, and vasodilatory properties that help relieve muscle tension and inhibit pain transmission.

Therefore, ginger patch application can be considered a safe, non-pharmacological, affordable, and easily applicable intervention for managing lower back pain in third-trimester pregnant women. The use of ginger patches may serve as an alternative or complementary therapy in primary healthcare settings to improve maternal comfort and quality of life during late pregnancy. Healthcare providers are encouraged to incorporate education on ginger patch use into antenatal care services as part of holistic pain management strategies.

Ginger patch application has a significant effect in reducing lower back pain intensity among third-trimester pregnant women. The intervention is safe, practical, and can be used as a complementary non-pharmacological therapy. However, due to the pre-experimental design without a control group, further studies using randomized controlled trials are recommended to evaluate its effectiveness more robustly.

ACKNOWLEDGMENTS

The authors would like to express their sincere gratitude to all pregnant women who willingly participated as respondents in this study. The authors also extend their appreciation to the management and healthcare personnel of UPTD Puskesmas Cisayong for their cooperation, support, and assistance throughout the research process, which contributed significantly to the successful completion of this study.

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