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Original Article

The effect of warm compresses on reducing pain during the active phase of the first stage of labor

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Abstract:
Labor pain is a physiological response during childbirth, but unmanaged pain can increase anxiety, fatigue, and discomfort. Warm compress therapy is a simple non-pharmacological method that can be used in primary maternity care. This study aimed to determine the effect of warm compresses on reducing pain during the active phase of first-stage labor at the Dolik Public Health Center in 2025. This study used a pre-experimental one-group pretest-posttest design. The study was conducted from May to June 2025. The population consisted of all women in the active phase of first-stage labor who came to the Dolik Public Health Center. Quota sampling was used to recruit 30 respondents. Pain intensity was measured before and after warm compress therapy. Univariate analysis used frequency distribution, and bivariate analysis used the Wilcoxon signed-rank test. Before the intervention, 19 respondents (63.3%) experienced moderate pain, 9 respondents (30.0%) experienced severe pain, and 2 respondents (6.7%) experienced very severe pain. After the intervention, 19 respondents (63.3%) experienced mild pain, 6 respondents (20.0%) experienced moderate pain, and 5 respondents (16.7%) experienced severe pain. The Wilcoxon test showed that 27 respondents experienced decreased pain, 3 respondents had unchanged pain, and no respondent experienced increased pain. The p-value was 0.000, lower than alpha 0.05. Warm compress therapy significantly reduced pain during the active phase of first-stage labor. This intervention can support compassionate midwifery care and improve maternal comfort in primary health services.

Keywords:
warm compress, labor pain, active phase, first stage of labor, midwifery care

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INTRODUCTION

Labor pain is a physiological response that occurs during uterine contractions, cervical dilation, cervical effacement, and stretching of the lower uterine segment. During the active phase of the first stage, contractions become stronger, longer, and more frequent. This condition increases pain intensity and can affect the mother's ability to relax, breathe effectively, and cooperate with birth attendants. Women do not experience labor pain in the same way. Pain perception depends on parity, anxiety, fatigue, cultural expectations, family support, prior knowledge of childbirth, and the

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quality of intrapartum care. Uncontrolled pain can increase fear and stress. It may also increase catecholamine release, reduce uterine blood flow, disturb uterine contraction patterns, and contribute to a negative childbirth experience (Tan et al., 2021; Srisopa et al., 2021).

Global maternal health policy now emphasizes not only survival, but also respectful, safe, and positive childbirth. The World Health Organization recommends intrapartum care that respects women's dignity, supports communication, provides companionship, monitors maternal and fetal condition, and offers pain relief options according to women's needs (World Health Organization, 2018). Recent global maternal mortality data still show that maternal deaths remain a major public health concern, especially in low- and middle-income countries (World Health Organization, 2025). In this context, high-quality labor care must combine clinical safety with comfort-oriented care. Pain management becomes one component of quality care because severe pain, fear, and poor support can reduce maternal satisfaction and may increase requests for medical intervention when no obstetric indication exists (Thomson et al., 2019; Zuarez-Easton et al., 2023).

Pharmacological pain relief can reduce labor pain effectively, but it requires specific facilities, trained staff, and continuous monitoring. Epidural analgesia, opioid analgesics, pudendal block, and other medical interventions may not be available in all primary health care settings. They also need careful clinical indication and risk assessment. Non-pharmacological methods are therefore important for community-based maternity services. These methods include breathing relaxation, massage, counter-pressure, warm compress, birth ball, position change, emotional support, music, hydrotherapy, and other comfort measures. Several studies report that non-pharmacological approaches can reduce pain, improve relaxation, increase maternal control, and support a more positive childbirth experience, while pharmacological analgesia remains important when clinically indicated and available (Biana et al., 2021; Beyable et al., 2022; Callahan et al., 2023; Konlan et al., 2021; Pietrzak et al., 2023; Shiferaw et al., 2022).

Warm compress therapy is one of the simplest non-pharmacological interventions. It uses local heat applied to the lower back, sacral area, abdomen, or perineal area, depending on the objective of care. During the active phase of the first stage, warm compresses are often placed on the lower back or lumbosacral region, where many mothers feel radiating contraction pain. Local heat can promote vasodilation, increase local blood circulation, relax tense muscles, and reduce pain transmission through the gate control mechanism. Heat may also support endorphin release and maternal relaxation, which help the mother respond more effectively to contractions. A systematic review and meta-analysis found that heat therapy can reduce labor pain intensity and may shorten the first stage in some trials (Goswami et al., 2022). Other trials and reviews also report positive effects of localized heat and warm compresses on labor pain and maternal comfort (Akbarzadeh et al., 2018; Yazdkhasti et al., 2018; Turkmen & Oran, 2020).

Evidence from Indonesian and regional studies supports the clinical relevance of warm compresses and other non-pharmacological techniques. A recent pre-experimental study found that warm compress therapy significantly reduced labor pain in the active phase of the first stage (Aini et al., 2026). Another study reported a significant reduction in active-phase labor pain after warm compresses (Humaira et al., 2024). Research also demonstrated the usefulness of warm compresses for pregnancy-related low back pain, further strengthening the physiological basis for applying heat to reduce discomfort in maternal care (Novelia et al., 2021). Other evidence on back massage during active-phase labor shows that tactile stimulation and comfort care can reduce labor

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pain among maternity patients (Ismarina et al., 2023). Studies also show that birth ball exercises, endorphin massage, and education on back massage are associated with better labor pain adaptation and maternal comfort (Carolin et al., 2023; Dahlan et al., 2023; Safitri et al., 2025). These studies support the use of simple, low-cost, and midwife-led interventions in primary maternity services.

The Dolik Public Health Center serves women in labor who often report pain as the main complaint during the active phase of the first stage. Preliminary data from the health center in 2025 showed that 43 women gave birth from January to February. Initial observation found that women frequently needed comfort support while waiting for cervical dilation to progress. Warm compresses are practical for this setting because they do not require advanced equipment, can be applied by midwives, and can be integrated into routine observation. However, local evidence remains necessary to justify consistent use in the Dolik Public Health Center. This study therefore aimed to analyze the effect of warm compresses on reducing pain among women in the active phase of the first stage of labor at the Dolik Public Health Center in 2025. The findings are expected to support evidence-based, compassionate, and feasible midwifery care in primary health facilities.

METHOD

This study used a pre-experimental design with a one-group pretest-posttest approach. This design allowed the researchers to compare pain intensity before and after the same respondents received warm compress therapy. The study did not use a control group, so the analysis focused on within-subject change. This design was selected because the intervention was simple, low risk, and suitable for routine maternity care at a public health center. The study was conducted at the Dolik Public Health Center from May to June 2025.

The population consisted of all women in the active phase of the first stage of labor who came to the Dolik Public Health Center during the study period. The sample included 30 respondents selected by quota sampling. Respondents were included when they were in the active phase of first-stage labor, were conscious, could communicate their pain level, and agreed to receive warm compress therapy. Women were excluded when they had emergency obstetric conditions that required immediate referral, received pharmacological analgesia during the observation period, had skin injury at the compress site, or could not complete the pretest and posttest pain assessment.

The independent variable was warm compress therapy. The dependent variable was labor pain intensity during the active phase of the first stage. Pain intensity was categorized as mild, moderate, severe, or very severe based on respondents' pain scale ratings. Before the intervention, each respondent reported her pain level during contraction, and the researcher recorded the result as the pretest score. The warm compress was then applied to the lower back or lumbosacral area, a common pain site during the active phase of labor. The compress was prepared with warm water and a clean cloth or a safe warm compress medium. The midwife checked the warmth before application to prevent skin irritation or burns. The respondent remained under routine labor observation during the procedure.

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After the intervention, the researcher reassessed pain intensity and recorded it as the posttest score. Maternal condition, comfort response, and labor progress were monitored according to routine midwifery care. The data collection instrument consisted of an observation sheet containing the respondent's identity code, pretest pain category, posttest pain category, intervention status, and notes related to the assessment process. The study used primary data from direct pain assessment and, when needed, secondary supporting data from health center records. The researchers protected respondent confidentiality by using codes and by not presenting personal identifiers in the report.

Data analysis consisted of univariate and bivariate analysis. Univariate analysis described the frequency and percentage of pain intensity before and after the warm compress intervention. Bivariate analysis used the Wilcoxon signed-rank test because the study compared paired ordinal data from the same respondents before and after intervention. The level of significance was set at alpha = 0.05. A p-value lower than 0.05 indicated a statistically significant difference in pain intensity before and after warm compress therapy. The analysis was interpreted in conjunction with the direction of ranks: negative ranks for decreased pain, positive ranks for increased pain, and ties for unchanged pain. Ethical principles were applied through informed consent, voluntary participation, confidentiality, and the right to stop participation without affecting the care received.

RESULT

This section presents the distribution of pain intensity before and after warm compress therapy, along with the Wilcoxon signed-rank test results. The analysis involved 30 women in the active phase of the first stage of labor at the Dolik Public Health Center in 2025. Before receiving warm compress therapy, most respondents reported moderate pain. Severe and very severe pain also appeared before intervention, while no respondent reported mild pain. The distribution is shown in Table 1.

Table 1. Pain Intensity Before Warm Compresses in Women in the Active Phase of First Stage Labor

Pain Scale (Pretest)	Frequency	Percentage (%)
Mild	0	0.0
Moderate	19	63.3
Severe	9	30.0
Very severe	2	6.7
Total	30	100.0

After warm compress therapy, most respondents reported mild pain. The number of respondents with severe pain decreased, and no respondent reported very severe pain. The distribution is shown in Table 2.

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Table 2. Pain Intensity After Warm Compresses in Women in the Active Phase of First Stage Labor

Pain Scale (Posttest)	Frequency	Percentage (%)
Mild	19	63.3
Moderate	6	20.0
Severe	5	16.7
Very severe	0	0.0
Total	30	100.0

Table 3. Wilcoxon Signed-Rank Test for the Effect of Warm Compresses on Pain Reduction During the Active Phase of First Stage Labor

Variable	Comparison	Rank	N	Mean Rank	Sum of Ranks	Z	p-value
Labor pain	Before-after	Negative rank	27	14.00	378.00	-5.196	0.000
Labor pain	Before-after	Positive rank	0	0.00	0.00		
Labor pain	Before-after	Ties	3				
Labor pain	Before-after	Total	30				

Table 3 revealed that the Wilcoxon signed-rank test showed that 27 respondents experienced a decrease in pain after warm compress therapy. No respondents experienced increased pain, and 3 respondents maintained the same pain category before and after the intervention. The p-value was 0.000, which was lower than alpha 0.05. This result indicates a statistically significant reduction in labor pain after warm compress therapy.

DISCUSSION

This study found that warm compress therapy significantly reduced pain during the active phase of the first stage of labor at the Dolik Public Health Center. Before the intervention, 19 respondents (63.3%) experienced moderate pain, 9 (30.0%) severe pain, and 2 (6.7%) very severe pain. After the intervention, 19 respondents (63.3%) reported mild pain, 6 (20.0%) moderate pain, 5 (16.7%) severe pain, and none reported very severe pain. The Wilcoxon signed-rank test showed a p-value of 0.000. The rank pattern also supported the clinical direction of the finding: 27 respondents experienced decreased pain, 3 had unchanged pain, and none experienced increased pain. This pattern suggests that warm compresses provide meaningful comfort for most women in active labor.

The finding agrees with the physiological mechanism of heat therapy. Labor pain during the first stage mainly arises from cervical dilation, uterine contraction, lower uterine segment stretching, and pressure on pelvic structures. Heat applied to the lumbosacral area can reduce muscle tension and improve blood flow in tissues around the painful area. Improved circulation may reduce ischemic discomfort and support relaxation. The warmth also stimulates cutaneous receptors that can inhibit pain impulse transmission to the central nervous system via gate-control pathways. This mechanism explains why a simple intervention can reduce perceived pain even though uterine contractions continue. Goswami et al. (2022) reported that heat therapy can reduce labor pain intensity and may

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shorten labor duration. Akbarzadeh et al. (2018) and Yazdkhasti et al. (2018) also reported beneficial effects of warm or localized heat application on labor pain and birth outcomes.

The result also aligns with recent clinical evidence on warm compress therapy during the active phase of labor. Aini et al. (2026) reported that warm compress therapy produced a statistically significant reduction in labor pain during the active phase of the first stage. Humaira et al. (2024) also found a significant relationship between warm compress therapy and decreased active-phase labor pain. These findings support the result at the Dolik Public Health Center because the intervention, population, and outcome were similar. Although study designs and sample sizes differ, the direction of evidence remains consistent. Warm compresses work as a safe, low-cost, and feasible method that midwives can provide in primary care settings.

The finding is also supported by broader evidence on non-pharmacological pain management. Non-pharmacological methods do not replace emergency obstetric care or indicated analgesic procedures, but they fill an important gap in routine intrapartum care. Biana et al. (2021) found that non-pharmacological therapies in pregnancy and labor can support comfort and a positive experience. Beyable et al. (2022) reviewed pain management in resource-limited settings and highlighted the importance of feasible non-pharmacological techniques. Konlan et al. (2021) and Mwakawanga et al. (2022) described how women and midwives use non-pharmacological methods in real care settings. These findings are important for public health centers because access to advanced analgesia may be limited. Warm compress therapy can therefore serve as a practical option that improves comfort without additional medication.

This study is relevant to woman-centered care. The World Health Organization (2018) emphasizes respectful and supportive intrapartum care. Pain relief is not only a technical issue. It also affects dignity, communication, confidence, and maternal satisfaction. Women who feel supported during labor may respond better to contractions and may participate more actively in breathing, position change, and pushing guidance. Thomson et al. (2019) showed that women's experiences of pharmacological and non-pharmacological pain relief are strongly linked to the quality of care and to how women interpret their birth experience. Zuarez-Easton et al. (2023) also emphasized that labor pain management should include pharmacological and non-pharmacological options. The result of the present study strengthens the argument that midwives should routinely offer simple comfort measures, especially in facilities where women may not have many pain relief choices.

Studies provide additional support for integrating comfort interventions into maternal care. Novelia et al. (2021) showed that warm compresses reduced low back pain during pregnancy, indicating that heat application can reduce maternal musculoskeletal discomfort. Ismarina et al. (2023) found that back massage reduced labor pain during the active phase, and Shahbazzadegan and Nikjou (2022) showed that massage timing during cervical dilation can influence labor pain and anxiety, supporting the value of tactile and local stimulation. Other studies also showed that birth ball methods and endorphin massage can reduce or help adapt to labor pain (Carolin et al., 2023; Dahlan et al., 2023; Safitri et al., 2025). Safitri et al. (2025) reported that health education about back massage increased pregnant women's knowledge in adapting to labor pain. These studies support a broader midwifery care model where pain management combines education, touch, position, warmth, breathing, and emotional support.

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The studies also strengthen the discussion from the perspective of nursing documentation, health awareness, and family support. Putri et al. (2021) discussed the completeness of early nursing assessment in hospitals, which is relevant because pain assessment and documentation influence continuity of care. Kurniyawan et al. (2023) emphasized the role of family support in increasing health awareness. Although the population was different, the principle applies to labor care because family involvement can help mothers feel calmer and more supported. Laboring women often need assistance from husbands or family members to maintain their position, communicate needs, and sustain emotional comfort. Warm compress therapy may be more effective when health workers combine it with supportive communication and family participation.

The findings have practical implications for the Dolik Public Health Center. Midwives can include warm compress therapy in the comfort care checklist for women in the active phase of the first stage of labor. The technique requires minimal equipment, can be prepared quickly, and can be applied while routine monitoring continues. However, staff must follow safety procedures. They need to check compress temperature, protect the skin with cloth, observe skin response, and stop the intervention if the mother feels discomfort. Midwives also need to record the pretest and posttest pain categories so that the effect of the intervention becomes part of clinical documentation. Consistent documentation can help the health center evaluate service quality and develop local standard operating procedures.

This study has limitations. The one-group pretest-posttest design cannot fully control external factors such as cervical dilation progress, maternal fatigue, contraction frequency, companion support, breathing technique, and previous childbirth education. The study also used quota sampling and involved only 30 respondents from one public health center, so the findings should be generalized with caution. The pain outcome used categorical assessment, which may not capture small changes in numerical pain intensity. Future studies should use a control group, randomized allocation, when possible, larger samples, and numerical pain scales. Researchers should also measure maternal satisfaction, anxiety, duration of labor, fetal outcomes, and the consistency of compress temperature and duration. Even with these limitations, the current study provides useful local evidence that warm compress therapy can reduce pain during active-phase labor and can be integrated into routine midwifery care.

CONCLUSION

Warm compress therapy reduced pain among women in the active phase of the first stage of labor at the Dolik Public Health Center in 2025. Most respondents shifted from moderate, severe, or very severe pain before the intervention to mild or moderate pain after the intervention. The Wilcoxon signed-rank test showed a significant result with a p-value of 0.000, lower than alpha 0.05. Warm compress therapy can be used as a simple, safe, low-cost, and feasible non-pharmacological intervention to improve maternal comfort during labor. Midwives at the public health center should consider integrating warm compresses into routine intrapartum comfort care while maintaining standard maternal and fetal monitoring.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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