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Research Article

The Effect of Warm Ginger Compresses on Back Pain Intensity in Third Trimester Pregnant Women at the Jailolo Community Health Centre

Mahla Ahmad [1], Tut Rayani Aksohini Wijayanti [2,*]

[1] Jailolo Community Health Centre, West Halmahera Regency, North Maluku Province, Indonesia
[1-2] Bachelor of Midwifery Program, Faculty of Health Sciences, Institut Teknologi Sains dan Kesehatan Rs. dr. Soepraoen Malang, Indonesia
* Corresponding Author : tutrayani@itsk-soepraoen.ac.id

Abstract: Back discomfort is a common musculoskeletal complaint among pregnant women, particularly in the third trimester, caused by biomechanical and physiological changes during pregnancy. This condition can interfere with daily activities, reduce sleep quality, and decrease overall comfort. Pharmacological treatments during pregnancy are limited due to safety concerns, making non-pharmacological therapies essential in primary healthcare. One alternative is the use of warm ginger compresses, which combine the benefits of heat therapy with the anti-inflammatory properties of ginger. This study aimed to examine the effect of warm ginger compresses on reducing back pain intensity in third-trimester pregnant women at the Jailolo Community Health Centre. The research used a pre-experimental one-group pretest–posttest design. The sample consisted of 16 pregnant women selected through purposive sampling. Pain intensity was measured using the Numeric Rating Scale (NRS) before and after the intervention. The treatment involved applying warm ginger compresses to the lower back following a standardized procedure. Data analysis was conducted using univariate and bivariate methods with the Wilcoxon signed-rank test. The results showed a significant reduction in back pain intensity after the intervention ($p < 0.05$). These findings indicate that warm ginger compresses are an effective, safe, and simple non-pharmacological method for reducing back pain in third-trimester pregnant women.

Keywords: Back Pain; Ginger Compress; Nonpharmacological Therapy; Primary Healthcare; Third Trimester.

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1. Introduction

Low back pain (LBP) is a prevalent musculoskeletal disorder and a public health concern due to its substantial contribution to disability, functional deterioration, and the demand for rehabilitation services. World Health Organization, 2023. Globally, low back pain (LBP) is anticipated to impact hundreds of millions of individuals and is expected to rise due to demographic shifts and primary care demands, particularly among sensitive populations such as pregnant women who undergo significant biomechanical and hormonal alterations during pregnancy. (World Health Organization, 2023). Pregnancy, particularly during the third trimester, is marked by weight gain, alterations in the center of gravity, heightened lumbar lordosis, and ligamentous laxity induced by hormones (e.g., relaxin), collectively augmenting the stress on the lumbosacral region and sacroiliac joints. Pregnancy-Associated Spinal Biomechanics: An Examination of Low Back Pain and Degenerative Spinal Disorders, 2025. This syndrome elucidates why symptoms of back discomfort frequently emerge or intensify towards the conclusion of pregnancy, potentially hindering mobility, sleep quality, productivity, and preparedness for birthing in some moms. Salari et al. (2023).

From an epidemiological standpoint, the prevalence of low back pain (LBP) throughout the general population is substantial, necessitating the prioritization of safe, effective, and accessible pain management measures within healthcare systems. (World Health

Organization, 2023). A new meta-analysis indicates that back discomfort is a widespread issue among pregnant women, with an increased incidence observed in the third trimester relative to earlier trimesters. Salari et al. (2023). These findings align with the clinical observation that alterations in posture, straining of abdominal muscles, and compensation by paraspinal muscles intensify throughout the third trimester, resulting in mechanical pain. Pregnancy-Related Spinal Biomechanics: An Examination of Low Back Pain and Degenerative Spine Disease, 2025. Research in Indonesia indicates a notable prevalence of back pain in pregnant women, correlated with gestational age, activity levels, and personal attributes, so affirming that this issue transcends simply 'natural discomfort' and may necessitate intervention. (Pratama, 2023). Consequently, initiatives to address back pain during pregnancy possess both clinical and programmatic significance, particularly within primary care facilities, which serve as the major access point to maternal health care.

The selection of pain management during pregnancy is constrained by the need to ensure the safety of both the fetus and the mother, so rendering non-pharmacological methods a crucial aspect of prenatal care. Ministry of Health of the Republic of Indonesia, 2020. The national policy framework mandates laws on health services during pregnancy that prioritize enhancing service quality, encompassing counselling, early problem detection, and safe, needs-based solutions for mothers. Regulation No. 21 of 2021 by the Minister of Health of the Republic of Indonesia. Furthermore, Puskesmas, as primary healthcare institutions, are tasked with delivering promotive and preventive services alongside integrated maternal and child health services, rendering straightforward interventions by midwives and nurses in primary care highly crucial. Regulation No. 43 of 2019 by the Minister of Health of the Republic of Indonesia. Within the framework of the Jailolo City Puskesmas, maternal and child health services constitute a standard program; thus, enhancing interventions for pregnancy comfort may directly elevate the service experience and adherence to visitations by pregnant women. (Jailolo City Puskesmas, n.d.).

Local heat application (warm compress) is a prevalent non-pharmacological modality that physiologically enhances blood circulation, alleviates tissue rigidity, facilitates muscle relaxation, and alters pain perception via neurosensory mechanisms, such as the gate control theory. Local heat applications as a treatment for physical and functional parameters in acute and chronic musculoskeletal disorders or pain, 2021. A systematic review indicates that local heat application can positively impact pain and many functional indices in the general musculoskeletal population, while long-term efficacy and variability in protocols are significant factors to consider. Local heat applications as a treatment for physical and functional parameters in acute and chronic musculoskeletal disorders or pain, 2021. A quasi-experimental study in Indonesia indicated that third-trimester pregnant women experienced a decrease in back pain severity following the administration of warm compresses, in contrast to the control group, so affirming the efficacy of warm compresses as a viable community intervention. Novelia et al. (2021). A further study identified a notable impact of warm compresses in alleviating back pain in pregnant women throughout their third trimester, hence corroborating the efficacy of localized heat treatment in pregnancy. Ernamari et al., 2022.

In addition to its thermogenic properties, ginger (Zingiber officinale) possesses significant potential due to its bioactive constituents, including gingerols, shogaols, and zingerone, which are linked to anti-inflammatory and antioxidant effects, as well as the modulation of inflammatory mediator pathways (e.g., COX-2 and PGE2) in diverse pain conditions. (Gupta et al., 2024). Clinical evidence in non-pregnant populations indicates that standardized ginger supplementation can enhance pain perception, reduce stiffness, increase functional capacity, and influence several inflammatory markers in persons with mild to moderate muscular and joint pain. Effects of Ginger Supplementation on Inflammatory Markers and Functional Capacity in Individuals with Mild to Moderate Joint Pain, 2025. Despite the differences between oral treatment and topical application, these data support the biological plausibility that ginger may offer analgesic effects via inflammatory regulation. (Gupta et al., 2024). In Indonesia, the prevalence of complementary therapies during pregnancy is significant—over fifty percent of survey participants in Makassar indicated the utilization of complementary and alternative medicine (CAM), particularly herbal remedies—necessitating rigorous scientific assessment of the efficacy, safety, and incorporation of established herbal practices into formal healthcare services. (Rauf et al., 2025).

Evidence concerning the efficacy of warm ginger compresses for alleviating back pain during pregnancy remains nascent and is primarily characterized by small-scale, pre-experimental, or case study methodologies. (Sinaga et al., 2024). Midwifery practice reports

and case studies indicate a reduction in pain levels following the application of warm ginger compresses over several days to pregnant women in their third trimester; however, the study design is inadequate to definitively ascertain effectiveness due to constraints in control, randomization, and procedural standardization. (Sinaga et al., 2024). An additional applied study in Indonesia indicated that ginger compresses alleviated lower back pain in pregnant women during their third trimester, suggesting potential benefits that necessitate replication in primary care environments with established protocols and stringent measurements. (Retni et al., 2024). Consequently, significant research deficiencies encompass: (1) insufficient standardized quantitative data regarding ginger warm compresses specifically during the third trimester, (2) an absence of studies conducted in primary care facilities (Puskesmas) that reflect geographically and socio-culturally diverse population characteristics, and (3) a scarcity of research that develops pragmatic interventions for incorporation into standard antenatal care (ANC) protocols. Ministry of Health, Republic of Indonesia, 2020.

In eastern Indonesia, particularly in West Halmahera Regency (Jailolo), research based in Puskesmas is crucial as primary services serve both the foundation for maternal health access and the venue for the implementation of scalable, low-cost interventions. Regulation No. 43 of 2019 by the Minister of Health of the Republic of Indonesia. Alongside the clinical imperative to alleviate pain and enhance the quality of life for pregnant women in their third trimester, there is also a programmatic necessity to fortify the ANC service experience, augment visit adherence, and uphold the quality of maternal health services in alignment with national guidelines. Ministry of Health, Republic of Indonesia, 2020. This study seeks to examine the impact of ginger warm compresses on back pain intensity in third trimester pregnant women at the Jailolo Community Health Centre, providing local evidence for the advancement of safe, easily implementable non-pharmacological interventions aligned with primary care requirements. (Novelia et al., 2021).

2. Research Method

This study employed a pre-experimental design utilizing a one-group pretest-posttest methodology to evaluate alterations in back pain severity among third trimester pregnant women before and after the application of a ginger warm compress intervention. This methodology was selected as it is appropriate for assessing the impact of a non-pharmacological intervention within primary health care, particularly when randomization and the establishment of control groups are neither ethically or operationally viable. This design facilitates the detection of the intervention's direct effects by comparing the individuals' conditions at two distinct measurement intervals.

The research was performed at the Jailolo Community Health Centre in West Halmahera Regency, North Maluku Province, a primary healthcare institution offering comprehensive maternal and child health services. This site was selected due to the significant influx of third-trimester pregnant women and the health center's critical function in delivering prenatal care and preventive-promotive services. The study spanned [months, years] and encompassed the preparatory phase, data collecting, intervention execution, and data analysis.

The study population comprised all pregnant women in their third trimester who sought prenatal treatment at the Jailolo Community Health Centre during the study period. The research sample was obtained using purposive sampling, which involves selecting people based on predetermined inclusion and exclusion criteria aligned with the research objectives. The inclusion criteria consisted of: pregnant women in their third trimester (gestational age ≥28 weeks), experiencing mild to moderate lower back pain, having a normal pregnancy without obstetric complications, and consenting to participate by signing an informed consent form. The exclusion criteria comprised: pregnant women having a history of chronic musculoskeletal illnesses, specific systemic diseases, pregnancy complications (including severe pre-eclampsia or hemorrhage), and allergies or sensitivities to ginger. The sample size was established based on the availability of subjects meeting the requirements during the study period and the need for sufficient data for statistical analysis.

The independent variable in this study was ginger warm compresses, whereas the dependent variable was the level of back pain in pregnant women during the third trimester. The pain variable was defined as the mother's subjective assessment of discomfort or pain in the lower back, evaluated before and after the intervention. Potential confounding variables, including maternal age, parity, and gestational age, were documented as respondent characteristic data to contextualize the investigation.

The Numeric Rating Scale (NRS) was employed as the research instrument to quantify pain severity, with a scoring range of 0 to 10, where 0 signifies no pain and 10 denotes extreme pain. This instrument was selected due to its user-friendliness, strong reliability and validity, and frequent application in clinical research, particularly involving pregnant women.

An observation sheet was employed to document respondent characteristics and adherence to the intervention protocol. The research process commenced with the acquisition of study permits and ethical clearance from the appropriate authorities. Subsequently, the researchers disseminated the study to potential participants and performed selection based on inclusion and exclusion criteria. Participants who fulfilled the criteria and consented to engage were requested to sign an informed consent document.

The subsequent phase involved a pretest that assessed the severity of back pain with the NRS prior to the intervention. The intervention was a warm ginger compress, created by boiling fresh ginger to yield warm ginger water at a safe and pleasant temperature (about 38–40°C). The compress was administered to the participants' lower back for roughly 15–20 minutes daily, within a specified timeframe. Throughout the intervention, the researchers prioritized the comfort and safety of the participants while observing for any adverse effects. Upon completion of the intervention series, a final assessment (post-test) of back pain intensity was performed utilizing the same instrument as the pre-test.

The acquired data were analyzed using univariate and bivariate methods. Univariate analysis was employed to delineate the attributes of the respondents and the distribution of pain intensity values prior to and after to the intervention. Bivariate analysis was used to evaluate the difference in back pain severity prior to and following the administration of ginger heated compresses.

The statistical tests employed were tailored to the data distribution; the paired t-test was utilized for normally distributed data, while the Wilcoxon signed-rank test was applied for non-normally distributed data. All data analyses were conducted at a statistical significance level (α) of 0.05. The analytical results were provided in both narrative and tabular formats to enhance interpretation and promote further debate.

3. Results and Discussion

3.1 Results

3.1.1 Characteristics of Respondents in the Third Trimester of Pregnancy

The characteristics of respondents are presented to provide an overview of the demographic and obstetric conditions of women in the third trimester of pregnancy who were the subjects of the study at the Jailolo Community Health Centre.

Table 1. Distribution of Respondent Characteristics (n = 16).

Characteristics	Categories	n	%
Mother's age	< 20 years old	13	81,3
	20–35 years old	3	18,7
Parity	Primigravida	6	37,5
	Multigravida	10	62,5
Gestational age	28–32 weeks	7	43,8
	33–40 weeks	9	56,2

According to Table 1, the majority of respondents fell within the safe reproductive age bracket of 20–35 years (81.3%) and were multigravida (62.5%). Over fifty percent of the respondents were in the 33–40 week gestation period (56.2%), signifying that the majority were in the late third trimester, a phase characterized by an increase in back pain symptoms.

3.1.2 Intensity of Back Pain Before Application of Warm Ginger Compress

The distribution of respondents' back pain intensity before the warm ginger compress intervention was measured using the Numeric Rating Scale (NRS).

Table 2. Intensity of Back Pain Before Intervention (Pre-test).

Intensity of Back Pain	n	%
Mild pain	5	31,3
Moderate pain	11	68,7
Severe pain	0	0,0

Intensity of Back Pain	n	%
Total	16	100

Initial measurements showed that most respondents experienced moderate back pain (68.7%), with an average pain score of 5.94. No respondents were found to have severe pain before the intervention, but all respondents reported back pain that could potentially interfere with their comfort during the third trimester of pregnancy.

3.1.3 Intensity of Back Pain After Application of Warm Ginger Compress

Measurement of back pain intensity after intervention was conducted after respondents received warm ginger compresses according to the research procedure.

Table 3. Intensity of Back Pain After Intervention (Posttest).

Intensity of Back Pain	n	%
No pain	4	25,0
Mild pain	9	56,3
Moderate pain	3	18,7
Severe pain	0	0,0
Total	16	100

Following the application of warm ginger compresses, there was a change in the distribution of back pain intensity. The majority of responders experienced minor pain (56.3%), whereas 25.0% reported the absence of pain. The mean pain intensity diminished to 3.06, signifying a notable reduction in pain reports following the intervention.

3.1.4 Difference in Back Pain Intensity Before and After Intervention

A bivariate analysis was conducted to determine the difference in back pain intensity before and after the application of ginger heat compresses on pregnant women in their third trimester.

Table 4. Difference in Back Pain Intensity Before and After Intervention (n = 16).

Measurement	Mean ± SD	Mean difference	p-value
Pretest	5,94 ± 1,12		
Posttest	3,06 ± 1,23	2,88	0,001*

* Wilcoxon Signed-Rank Test, $\alpha = 0.05$

The Wilcoxon test results indicated a statistically significant difference in back pain severity before and after the administration of ginger heated compresses ($p = 0.001$). The mean pain intensity diminished by 2.88 points post-intervention, signifying that ginger warm compresses substantially alleviate back pain in third trimester pregnant women at the Jailolo Community Health Centre.

3.2 Discussion

This study demonstrates that the use of warm ginger compresses significantly alleviates back pain severity in third trimester pregnant women at the Jailolo Community Health Centre. The bivariate analysis indicates a significant difference in pain scores pre- and post-intervention, with an average reduction of 2.88 points and a p-value less than 0.05. The findings validate that non-pharmacological therapies utilizing heat and local herbs can serve as a viable alternative for alleviating back pain complaints during late pregnancy (Wilcox et al., 2021).

In clinical terms, back discomfort throughout the third trimester is intricately associated with growing biomechanical and physiological alterations occurring in pregnancy, including augmented lumbar lordosis, stretching of abdominal muscles, and heightened pressure on the sacroiliac joints. Wu et al. (2018). These situations compel the back muscles to exert greater effort to sustain bodily equilibrium, consequently eliciting muscle spasms and discomfort sensations. The decrease in pain intensity following intervention in this study corroborates the hypothesis that muscular relaxation and enhanced local circulation are critical processes in the management of musculoskeletal pain in pregnant women. Vermani et al. (2019).

This study's findings on the efficacy of warm compresses align with prior research indicating that local heat therapy alleviates pain by enhancing tissue blood circulation, expediting the clearance of pain-inducing chemicals, and diminishing the activity of pain-

sensitive afferent nerve fibers. Petrofsky et al. (2015). Moreover, the administration of heat can enhance soft tissue elasticity and diminish joint stiffness, thereby aiding in the alleviation of lower back muscle stress. Nadler et al. (2017). This process is pertinent to third-trimester pregnant women who endure heightened mechanical stress on the lumbar region.

The incorporation of ginger as an extra element in warm compresses enhances the analgesic effects achieved. Ginger contains active chemicals like gingerol and shogaol, which exhibit anti-inflammatory properties by inhibiting cyclooxygenase and lipoxygenase pathways, therefore diminishing the synthesis of inflammatory mediators responsible for pain. Daily et al. (2015). Despite the topical application of ginger in this study, the infiltration of heat-conducting volatile ginger chemicals is thought to provide a soothing impact and a warming feeling that amplifies the perception of pain alleviation. (Mashhadi et al., 2019).

The findings of this study align with those of Chen et al. (2020), which indicated that herbal-based complementary therapy and local heat are safe and effective for alleviating mild to moderate musculoskeletal issues in pregnant women. Moreover, a study by Manyozo et al. (2022) demonstrates that uncomplicated non-pharmacological interventions implemented in primary care settings might enhance the comfort of pregnant women and their satisfaction with antenatal care. The congruence of these results substantiates the conclusion that ginger heat compresses are an effective intervention suitable for implementation at the community health center level.

Chen et al. (2020); Manyozo et al. (2022). Nevertheless, some responders continued to have moderate pain following the intervention. The results suggest that the efficacy of ginger warm compresses may be affected by various circumstances, including gestational age nearing delivery, physical activity levels, posture, and individual pain tolerances (George et al., 2021). The restricted time and frequency of the intervention may influence the outcomes, necessitating that some women utilize additional therapies, such stretching exercises, posture education, or ergonomic support. Pennick and Liddle, 2019.

The lack of responders experiencing heightened pain post-intervention suggests that ginger warm compresses are comparatively safe and well-accepted by women in their third trimester of pregnancy. This aligns with evidence-based midwifery practice recommendations advocating for non-pharmacological therapy as the primary treatment for pain during pregnancy to reduce the risk of adverse medication effects on both the mother and fetus. (ACOG, 2020). The safety and simplicity of application render ginger warm compresses a viable intervention for healthcare practitioners in primary care environments. Bishop et al. (2022).

The clinical ramifications of this study are significantly pertinent to maternal health services, particularly within community health centers. The use of warm ginger compresses into antenatal treatment can enhance the quality of life for pregnant women, diminish reliance on pharmacological analgesics, and reinforce a promotive-preventive strategy focused on maternal comfort and well-being. (Liddle et al., 2020). Moreover, the utilization of ginger as a regional element reinforces the tenets of indigenous knowledge and economic efficiency in healthcare services. (World Health Organization, 2019). Consequently, the findings of this study may provide a foundation for the formulation of standard operating procedures (SOPs) regarding non-pharmacological therapies for back pain in pregnant women during their third trimester at primary healthcare facilities.

4. Conclusions

This study seeks to examine the impact of ginger warm compresses on back pain severity in third trimester pregnant women at the Jailolo Community Health Centre as a non-pharmacological intervention to enhance pregnancy comfort. The study's results indicate that warm ginger compresses significantly reduce back pain intensity in pregnant women throughout the third trimester. The findings affirm that the synergy of heat and ginger's anti-inflammatory properties can yield a beneficial therapeutic effect on musculoskeletal pain experienced during late pregnancy.

This study's results substantiate the clinical hypothesis that localized heat application can influence pain perception by augmenting blood flow, promoting muscle relaxation, and diminishing pain nerve activation, while ginger may amplify these effects via its anti-inflammatory properties. This research provides empirical information concerning the application of complementary therapies utilizing natural substances within the realm of pregnancy, specifically in primary healthcare settings.

From a clinical standpoint, ginger warm compresses may be regarded as a supportive intervention in antenatal care due to their relative safety, ease of application, low cost, and suitability for community health centre settings. The implementation of this intervention is anticipated to enhance the quality of life for pregnant women in their third trimester and foster a promotive and preventative strategy in maternal health services.

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