The Effectiveness of Counterpressure Massage in Reducing Labor Pain Intensity among Childbearing Women

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ABSTRACT:

Background: Labor pain is a subjective experience reported by more than 90% of women during childbirth. If inadequately managed, labor pain may contribute to increased maternal anxiety, prolonged labor, and potential obstetric complications. Non-pharmacological pain management strategies, such as counterpressure massage, have gained attention as safe, cost-effective, and low-risk alternatives to pharmacological interventions.

Objective: This study aimed to evaluate the effectiveness of counterpressure massage in reducing labor pain intensity among childbearing women.

Methods: A quasi-experimental study with a pretest–posttest control group design was conducted among laboring women in the working area of Kuala Bhee Primary Health Center in March 2025. A total of 28 respondents were selected and divided into an experimental group (n = 14), who received counterpressure massage for 20 minutes, and a control group (n = 14), who were provided with deep breathing techniques. Data were analyzed using the Wilcoxon Signed-Rank Test and the Mann–Whitney U Test.

Results: The findings demonstrated a statistically significant reduction in labor pain intensity in the experimental group (p = 0.001), with the mean pain score decreasing to 3.21. In contrast, the control group did not show a significant reduction in pain intensity (p = 0.084), with a mean pain score of 5.64. Furthermore, the majority of participants in the experimental group experienced a reduction in pain to the mild category (57.1%) following the intervention.

Conclusion: Counterpressure massage was proven to be more effective than deep breathing techniques in reducing labor pain intensity. This method is recommended as a non-pharmacological intervention to be integrated into routine midwifery care for laboring women.

KEYWORDS: Labor Pain, Counterpressure Massage, Non-Pharmacological Pain Management, Childbearing Women.

INTRODUCTION

Childbirth is a complex, unique, and transformative physiological process in a woman's life. While it is often associated with joy and anticipation, labor is almost invariably accompanied by significant pain, making it one of the most challenging experiences for many women[1], [2]. Labor pain arises from a combination of uterine contractions, cervical dilation and effacement, stretching of the lower uterine segment, and pressure exerted by the fetus on surrounding tissues and nerves. The perception of labor pain is highly subjective and varies widely among individuals, influenced by biological factors, psychological state, sociocultural background, and previous childbirth experiences[3], [4]. Epidemiological evidence indicates that more than 90% of women report labor pain as one of the most distressing aspects of childbirth. Poorly managed pain can trigger adverse emotional responses, including anxiety, fear, loss of control, and psychological distress, which may persist into the postpartum period and increase the risk of negative birth experiences or postpartum psychological disorders. From a physiological perspective, intense and unmanaged pain stimulates stress responses characterized by increased heart rate, blood pressure, and catecholamine release[5], [6]. These responses may interfere with uterine contractility, prolong labor, and potentially compromise uteroplacental blood flow and fetal oxygenation.

Effective labor pain management is therefore a critical component of contemporary maternity care aimed at promoting maternal comfort, safety, and overall birth satisfaction. Pain management strategies are broadly categorized into pharmacological and non-pharmacological approaches. Pharmacological methods, such as epidural analgesia, are widely recognized for their effectiveness in pain reduction[7], [8]. However, their use may be limited by side effects including hypotension, nausea, pruritus, reduced maternal mobility, and a potential prolongation of labor. Additionally, the requirement for specialized personnel, advanced facilities, and higher costs restricts their accessibility, particularly in low-resource healthcare settings. In response to these limitations, non-

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pharmacological pain management methods have gained increasing attention due to their safety, minimal risk, cost-effectiveness, and compatibility with woman-centered and holistic models of care[9], [10]. One promising non-pharmacological intervention is massage counterpressure, a technique involving the application of firm and sustained pressure to the lower back, particularly the sacral area, during uterine contractions. This technique is simple, non-invasive, and can be administered by healthcare providers or birth companions[7], [11].The analgesic effect of massage counterpressure is commonly explained by the Gate Control Theory of Pain proposed by Melzack and Wall. According to this theory, non-noxious stimuli such as touch or pressure transmitted by large-diameter A-beta nerve fibers can inhibit the transmission of pain signals carried by small-diameter C fibers at the spinal cord level, thereby reducing pain perception[12], [13], [14]. By providing strong sensory input, counterpressure competes with nociceptive stimuli and effectively diminishes the intensity of perceived labor pain.

Previous studies have demonstrated the potential effectiveness of massage counterpressure in reducing labor pain, particularly during the active phase of the first stage of labor. Meta-analytic evidence suggests that women who received counterpressure experienced a statistically significant reduction in pain intensity, with an average decrease of approximately 2.5 points on a 10-point Visual Analog Scale (VAS) compared to those who did not receive the intervention[15], [16], [17]. Beyond pain reduction, counterpressure has been associated with increased maternal comfort, relaxation, emotional support, and a greater sense of control during labor. Its feasibility for involvement of birth companions further enhances emotional bonding and maternal empowerment. Given its non-invasive nature, accessibility, and potential clinical benefits, massage counterpressure represents a valuable complementary intervention in labor pain management. Therefore, the objective of this study is to evaluate the effectiveness of massage counterpressure in reducing labor pain among women in labor, thereby providing robust empirical evidence to support its integration into standard maternity care protocols, particularly in settings with limited resources.

METHODS

Research Design

This study employed a quasi-experimental design, as the researchers did not perform full randomization of research subjects into the experimental and control groups. A pretest–posttest with control group design was used to measure differences in pain levels before (pretest) and after (posttest) the intervention in both groups. This design allowed the researchers to assess the effect of the treatment administered to the experimental group by comparing the outcomes with those of the control group.

Population and Sample

The study population consisted of all women in labor within the working area of Kuala Bhee Public Health Center, Aceh Barat Regency, who were estimated to give birth in March 2025. The sampling technique used was consecutive sampling, in which all individuals who met the inclusion criteria and presented sequentially during the study period were included in the sample until the required sample size was achieved. The total sample size was 28 participants, divided equally into two groups: 14 participants in the experimental group and 14 participants in the control group.

Intervention and Measurement

The experimental group received a counterpressure massage intervention for 20 minutes, while the control group was provided with a long-breathing technique. Pain intensity was measured using the Numerical Rating Scale (NRS), a valid and reliable instrument for assessing pain intensity. Measurements were conducted twice for each group, namely before the intervention (pretest) and after the intervention (posttest).

Data Analysis

Data analysis in this study utilized two non-parametric statistical tests appropriate to the characteristics of the data: the Wilcoxon Signed-Rank Test and the Mann–Whitney U Test. The Wilcoxon test was applied to evaluate the internal effectiveness of each intervention by comparing labor pain scores before and after the counterpressure massage in the experimental group and the long-breathing technique in the control group. Meanwhile, the Mann–Whitney U Test was used to compare the external effectiveness of the two interventions by examining whether there was a significant difference in pain score reduction between the experimental and control groups after the interventions were administered. Together, these statistical tests provided a comprehensive overview of the effects of each intervention and a comparison of their effectiveness in reducing labor pain.

Characteristics of Respondents
Table 1. Distribution of Respondents' Characteristics in the Experimental and Control Groups

Variable	Category	Experimental n (%)	Control n (%)	Total n (%)	p-value
Age	<20 or >35 years	0 (0.0)	0 (0.0)	0 (0.0)	1.000
	20–35 years	14 (100.0)	14 (100.0)	28 (100.0)	
Education	Primary	8 (57.1)	8 (57.1)	16 (57.1)	1.000
	Secondary	6 (42.9)	6 (42.9)	12 (42.9)	
Occupation	Employed	7 (50.0)	9 (64.3)	16 (57.1)	0.446

Parity	Unemployed	7 (50.0)	5 (35.7)	12 (42.9)	
	Primiparous	7 (50.0)	6 (42.9)	13 (46.4)	0.705
	Multiparous	7 (50.0)	8 (57.1)	15 (53.6)	

Based on the respondents' characteristics, all participants were within the reproductive age range of 20–35 years (100%). The majority of respondents had a primary level of education (57.1%), while the remaining participants had a secondary level of education (42.9%). In the experimental group, the proportion of employed and unemployed respondents was equal (50.0% each). In contrast, the control group consisted of a higher proportion of employed respondents (64.3%) compared to unemployed respondents (35.7%). Regarding parity, the experimental group showed an equal distribution between primiparous and multiparous women (50.0% each). Meanwhile, the control group was predominantly composed of multiparous women (57.1%), with a smaller proportion of primiparous women (42.9%). Statistical analysis indicated no significant differences between the experimental and control groups across all baseline characteristics (p > 0.05). Therefore, it can be concluded that the respondents' baseline characteristics were relatively homogeneous between the two groups.

Distribution of Labor Pain Intensity Before and After Intervention
Table 2. Distribution of Labor Pain Intensity in the Experimental and Control Groups Before and After Intervention

Pain Scale	Experimental Group (n = 14)		Control Group (n = 14)	
	Before n (%)	After n (%)	Before n (%)	After n (%)
Mild	0 (0.0)	8 (57.1)	0 (0.0)	2 (14.3)
Moderate	5 (35.7)	4 (28.6)	5 (35.7)	6 (42.9)
Severe	7 (50.0)	2 (14.3)	7 (50.0)	5 (35.7)
Very Severe	2 (14.3)	0 (0.0)	2 (14.3)	1 (7.1)
Total	14 (100.0)	14 (100.0)	14 (100.0)	14 (100.0)

In the experimental group (n = 14), prior to the intervention, the majority of respondents experienced moderate pain (35.7%) and severe pain (50.0%), with a smaller proportion reporting very severe pain (14.3%). Notably, no respondents were classified as experiencing mild pain before the intervention. Following the intervention, a substantial shift in pain intensity was observed. None of the respondents reported very severe pain, and the proportion of respondents experiencing severe pain decreased markedly to 14.3%. Most respondents transitioned to the mild pain category, accounting for 57.1% of the experimental group after the intervention. This pattern indicates a pronounced reduction in labor pain intensity following the intervention administered to the experimental group. In contrast, the control group (n = 14) demonstrated a different pattern of change. Before the intervention, the distribution of pain intensity was comparable to that of the experimental group, with most respondents experiencing moderate pain (35.7%) and severe pain (50.0%), and 14.3% reporting very severe pain. After the intervention, a slight improvement was observed, as the proportion of respondents experiencing very severe pain decreased to 7.1%. However, the majority of respondents continued to report moderate pain (42.9%) and severe pain (35.7%), while only a small proportion shifted to the mild pain category (14.3%). Overall, the reduction in pain intensity in the control group appeared limited compared to the experimental group.

Comparison of Mean Pain Scores Before and After Intervention
Table 3. Comparison of Mean Pain Scores Before and After Intervention in the Experimental and Control Groups

Group	n	Mean ± SD	p-value
Experimental Group	14	3.21 ± 1.27	0.001
Control Group	14	5.64 ± 1.08	0.084

The statistical analysis further supported these findings. In the experimental group, the mean pain score after the intervention decreased to 3.21 ± 1.27. The Wilcoxon Signed-Rank Test yielded a p-value of 0.001, indicating a statistically significant reduction in labor pain following the intervention. This result suggests that the intervention was effective in alleviating pain among women in labor in the experimental group. Conversely, in the control group, the mean pain score remained relatively high at 5.64 ± 1.08 after the intervention. The p-value obtained from the statistical test was 0.084, which exceeds the conventional level of statistical significance (p > 0.05). This finding indicates that the intervention applied in the control group did not result in a statistically significant reduction in labor pain. Collectively, these results demonstrate that the intervention administered to the experimental group was more effective in reducing labor pain compared to the control intervention.

DISCUSSION
Based on the study results, the characteristics of respondents in the experimental and control groups were relatively homogeneous, as indicated by the absence of statistically significant differences in age, education level, occupation, and parity (p > 0.05). All respondents were within the reproductive age range of 20–35 years (100%), allowing age-related factors to be adequately controlled

in the analysis of labor pain. This homogeneity of baseline characteristics indicates that the observed differences in labor pain intensity can be more confidently attributed to the use of counterpressure massage rather than to demographic or obstetric factors. Prior to the intervention, the majority of women in both groups experienced moderate (35.7%) and severe (50.0%) labor pain, with 14.3% reporting very severe pain. Following the implementation of counterpressure massage, the experimental group demonstrated a significant reduction in pain intensity, characterized by the complete absence of very severe pain (0.0%), a decrease in severe pain to 14.3%, and an increase in mild pain to 57.1%. Statistically, the mean pain score in the experimental group decreased to 3.21 ± 1.27, with a p-value of 0.001, indicating a statistically significant reduction in labor pain.

In contrast, the control group showed only a limited reduction in pain intensity, with most respondents remaining in the moderate (42.9%) and severe (35.7%) pain categories. The mean pain score in the control group was 5.64 ± 1.08, with a p-value of 0.084, indicating that the reduction in pain was not statistically significant. These findings confirm that the use of counterpressure massage is more effective in reducing labor pain among women in labor compared to the intervention applied in the control group and support its application as a safe and practical non-pharmacological pain management method in midwifery practice. The findings of this study are consistent with previous research highlighting the effectiveness of non-pharmacological pain management interventions, particularly counterpressure massage, during labor. Brown and Douglas (2019) reported that counterpressure applied during the active phase of labor significantly reduced pain intensity and improved maternal comfort compared to standard care. Similarly, [18]that Indonesian women who received counterpressure massage experienced a significant shift in pain intensity from severe to moderate and mild levels (p < 0.05). Furthermore, [15]explained that firm pressure applied to the sacral area can stimulate large-diameter nerve fibers, thereby inhibiting the transmission of pain impulses through the gate control mechanism and reducing the perception of pain. Taken together, these findings provide strong evidence that the intervention used in the experimental group is an effective, safe, and practical non-pharmacological approach to reducing labor pain. Given its simplicity, low cost, and minimal risk, this intervention has the potential to be widely implemented in maternity care settings, particularly in primary healthcare facilities where access to pharmacological pain management options may be limited.

CONCLUSIONS

The intervention of massage counterpressure has been statistically proven to be effective in reducing labor pain intensity among parturient women. In the experimental group, a significant decrease in pain scores was observed, with a p-value of 0.001, resulting in an average pain score reduction to 3.21. In contrast, the breathing technique employed in the control group demonstrated a statistically insignificant outcome (p-value = 0.084), with a relatively high average pain score of 5.64. Prior to the intervention, the majority of respondents in both groups reported moderate to severe pain. However, following the application of massage counterpressure, approximately 57.1% of respondents reported experiencing light pain, with none experiencing severe pain. Conversely, most respondents in the control group continued to experience moderate to severe pain. Based on these findings, it can be concluded that massage counterpressure is a safe, practical, cost-effective, and low-risk non-pharmacological method. Therefore, this intervention is strongly recommended for integration into standard midwifery care, particularly in healthcare facilities with limited resources, to enhance the comfort of parturient women.

CONFLICT OF INTEREST
The authors declare that there is no conflict of interest.

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