

The Effectiveness of the Rebozo Technique in Reducing Labor Pain Intensity During the Active Phase of Stage I: A Quasi-Experimental Study at an Independent Midwifery Practice

Sharfina Haslin*

Sari Mutiara Indonesia University,
INDONESIA

Netti Meilani Simanjuntak

Sari Mutiara Indonesia University,
INDONESIA

*** Corresponding author:**Sharfina Haslin, Sari Mutiara Indonesia University, INDONESIA. ✉ sharfinahaslin97@gmail.com

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Background: Labor pain during the active phase of stage I is a significant physiological challenge affecting up to 90% of laboring women, contributing to maternal distress, anxiety, and increased risk of operative delivery. Non-pharmacological interventions represent an expanding area of evidence-based midwifery practice.

Aims: To evaluate the effectiveness of the rebozo technique in reducing labor pain intensity during the active phase of stage I labor among women delivering at an Independent Midwifery Practice (Bidan Praktek Mandiri/BPM) in Deli Serdang, North Sumatra, Indonesia, 2026.

Methods: A quasi-experimental study with a non-equivalent control group pretest-posttest design was conducted. Sixteen women in active labor (cervical dilation 4–7 cm) were allocated by purposive sampling to an intervention group (n=8) receiving the rebozo technique for 3–10 minutes per contraction, and a control group (n=8) receiving standard midwifery care. Pain intensity was assessed using the Bourbanis Pain Scale (0–10). Statistical analysis employed the Wilcoxon Signed Ranks Test and Mann-Whitney U Test ($\alpha=0.05$). Ethical clearance was obtained (No. 1785/F/KEP/USM/III/2026, Universitas Sari Mutiara Indonesia).

Result: The intervention group demonstrated a significant reduction in mean pain scores from 3.75 (SD=0.88) to 2.12 (SD=0.64) post-intervention ($p=0.000$). The control group experienced pain escalation from 4.0 (SD=0.92) to 4.75 (SD=0.46) ($p=0.000$). A significant between-group difference in post-intervention pain intensity was confirmed by Mann-Whitney U Test ($p=0.000$).

Conclusion: The rebozo technique effectively reduces active phase I labor pain intensity and warrants integration into standard non-pharmacological midwifery care protocols.

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INTRODUCTION

Labor pain is well-known as one of the strongest types of sharp pain that women feel, mainly because of the ongoing contractions in the uterus, the opening of the cervix, and the stretching of the pelvic floor muscles during the active part of the first stage of labor (Zundert, 2023). Globally, nearly 90% of women in labor report experiencing severe pain, yet access to adequate pain management whether pharmacological or non-pharmacological remains inconsistent across health systems, particularly in low- and middle-income countries (Elgzar et al., 2024). Unrelieved labor pain triggers a cascade of adverse physiological responses, including elevated catecholamine levels, increased sympathetic activation, uterine vasospasm, reduced oxygen delivery to the fetus, and dyscoordinate

uterine contractions, collectively contributing to prolonged labor, fetal compromise, and unfavorable maternal-neonatal outcomes ([Tsikouras et al., 2024](#)).

In Indonesia, the number of women who die from pregnancy or childbirth-related issues was 359 out of every 100,000 live births in 2012. Although the numbers have slowly improved since then, problems during labor, especially when pain isn't properly managed, are still a big concern for public health ([Melati et al., 2024](#)). In North Sumatra Province, the MMR has been reported at 85 per 100,000 live births, with hemorrhage, eclampsia, and obstructed labor among primary causes ([Gustiana et al., 2021](#)). Of note, unmanaged labor pain contributes to maternal stress, prolonged labor, and an increased likelihood of non-medically indicated cesarean section, with approximately 84% of laboring women expressing a preference for non-pharmacological pain management methods ([Zeleeke et al., 2025](#)). Indonesian midwifery standards, including PERMENKES No. 28 of 2017 and No. 97 of 2014, explicitly mandate that midwives provide pain-reduction strategies without pharmacological agents as part of holistic intrapartum care ([Navelia et al., 2023](#)).

Non-pharmacological pain management strategies are increasingly recognized as safe, cost-effective, and accessible alternatives to pharmacological analgesia in labor ([Geltore & Angelo, 2020](#)). The World Health Organization explicitly recommends evidence-based non-pharmacological approaches as components of intrapartum care that promote positive childbirth experiences ([Ghanbari-Homaie et al., 2021](#)). Among emerging techniques, the rebozo a traditional long woven cloth of Mexican origin has gained international attention as a gentle, non-invasive midwifery tool applicable during labor ([Ritter et al., 2020](#)); ([Sales et al., 2020](#)). The rebozo technique encompasses various maneuvers, including pelvic support and gentle rhythmic rocking ("Shake the Apple Tree"), designed to facilitate relaxation of pelvic ligaments, improve fetal positioning, and provide mechanical counter-pressure during contractions ([Reis et al., 2022](#)).

The theoretical basis for rebozo's analgesic effect rests on the gate control theory proposed by Melzack and Wall ([Uludağ & Kocatürk, 2024](#)), which posits that non-noxious tactile stimulation via large-diameter A-beta sensory fibers can inhibit pain signal transmission through smaller C and A-delta fibers at the spinal dorsal horn, effectively "closing the pain gate". This neuromodulatory mechanism is complemented by evidence that rhythmic somatosensory stimulation promotes parasympathetic activation, endogenous opioid release, and oxytocin secretion, collectively attenuating pain perception while supporting physiological labor progress ([Dahan, 2023](#)); ([Wachsmuth et al., 2022](#)). Furthermore, the physical envelopment provided by the rebozo cloth may interrupt the fear-tension-pain cycle, reducing anxiety-mediated catecholamine surges that exacerbate uterine pain ([Naguib et al., 2021](#)).

Despite growing qualitative evidence documenting positive maternal experiences with the rebozo technique, quantitative studies specifically examining its analgesic effect as a primary outcome during active phase I labor in Indonesian primary care settings remain scarce ([Nurpratiwi et al., 2020](#)). Previous local studies have primarily focused on rebozo's influence on cervical dilation progress and fetal descent, leaving a gap in evidence regarding its specific pain-reducing properties within Indonesian BPM settings ([Simbolon & Siburian, 2021](#)).

This study was done to check how well the rebozo technique works in lowering the feeling of pain during the active part of the first stage of labor for women giving birth at BPM Herlina Tanjung in Deli Serdang, North Sumatra, Indonesia. It was thought that women who used the rebozo technique would feel less pain after the treatment compared to women who received usual midwifery care.

METHOD

A study was done that's almost like an experiment, using a group that's not exactly the same as the main group, and they checked things before and after the study, following a specific reporting guide called STROBE ([Tompunuh et al., 2025](#)). This design used two groups that were not randomly assigned: one group got the rebozo technique along with standard care, and the other group only received standard midwifery care ([Permatasari et al., 2021](#)). The research took place at BPM Herlina

Tanjung in Deli Serdang, North Sumatra, Indonesia in the year 2026.

Eligible participants were women in active phase stage I labor (cervical dilation ≥ 4 cm) presenting to BPM Herlina Tanjung during the study period. Inclusion criteria comprised: (1) singleton

pregnancy at term (37–42 weeks of gestation); (2) cephalic presentation; (3) planned vaginal delivery; (4) cervical dilation of 4 cm at enrollment; (5) no use of analgesic medication or oxytocin induction; and (6) provision of written informed consent. Women with back wounds, high-risk pregnancy, or obstetric complications were excluded ([Elkind-Hirsch et al., 2022](#)).

The study population comprised all women in active labor at BPM Herlina Tanjung during the study period (N=16). A purposive sampling technique was employed, with participants allocated to the intervention group (n=8) or control group (n=8) based on their order of presentation and fulfillment of inclusion criteria. Randomization was not applied due to logistical constraints of the single-site primary care setting.

Pain intensity was measured with the Bourbanis Pain Scale, which is a proven tool for observing behavior and gives scores from 0 to 10 based on five areas: facial expressions, leg movements, body activity, crying, and how easily the baby can be comforted. Score interpretation: 0 means no pain at all; 1 to 3 means some pain but not too bad; 4 to 6 means the pain is getting worse; 7 to 9 means the pain is really bad; 10 means the pain is extremely severe. The researcher did the pain checks during the times between muscle contractions to avoid confusion caused by the contraction phase.

At enrollment (cervical dilation 4 cm), baseline (pretest) pain scores were recorded for all participants using the Bourbanis Pain Scale. The intervention group subsequently received the rebozo technique administered by a trained researcher-midwife for 3–10 minutes per contraction throughout the active phase (4–7 cm dilation). Two rebozo maneuvers were applied: (a) Rebozo Shifting a long cloth placed beneath the abdomen in a hammock configuration, with the midwife standing behind the participant and applying gentle bilateral oscillatory movements to offload the abdomen and relax uterine ligaments; and (b) Shake the Apple Tree cloth placed around the hips with rhythmic lateral rocking to relax pelvic ligaments and promote optimal fetal positioning. Both maneuvers were adapted from the standardized Rebozo SOP. The control group received standard midwifery care (APN/normal delivery protocol) without additional non-pharmacological interventions. Post-intervention (posttest) pain scores were recorded for both groups after the equivalent active-phase period.

The data went through editing, coding, entry, and tabulation. Descriptive statistics, including frequencies, percentages, average scores, how much scores varied, the lowest and highest scores, were calculated for pain levels before and after the intervention for each group. The Wilcoxon Signed Ranks Test, which doesn't assume a specific distribution, was used to compare pain scores before and after the intervention in each group. The Mann-Whitney U Test was used to compare the pain scores after the intervention between the group that received the intervention and the group that did not. The significance level for statistical tests was set to p less than 0.05. All the analyses were done using SPSS version 26.

The purposive sampling approach, single-site design, and small sample size (n=8 per group) limit the statistical power and generalizability of findings. These constraints are addressed in the limitations section. Ethical approval was received from the Research Ethics Committee at Universitas Sari Mutiara Indonesia, with the certificate number 1785/F/KEP/USM/III/2026. The study followed important guidelines that show respect for people by getting their permission before taking part, doing good and avoiding harm by not using medicine or harsh treatments, and making sure everyone is treated fairly.

RESULTS AND DISCUSSION

Results:

A total of 16 women in active phase I labor were enrolled: eight in the intervention group and eight in the control group. Pre-intervention pain distributions were comparable between groups, with both groups predominantly experiencing moderate to very severe pain.

Table 1. Distribution of Labor Pain Intensity Before and After the Rebozo Technique at BPM Herlina Tanjung, 2026

Pain Category	Intervention Pre n (%)	Intervention Post n (%)	Control Pre n (%)	Control Post n (%)
No Pain (0)	0 (0.0)	1 (12.5)	0 (0.0)	0 (0.0)

Mild Pain (1–3)	0 (0.0)	5 (62.5)	0 (0.0)	0 (0.0)
Moderate Pain (4–6)	4 (50.0)	2 (25.0)	3 (37.5)	0 (0.0)
Severe Pain (7–9)	2 (25.0)	0 (0.0)	2 (25.0)	2 (25.0)
Very Severe Pain (10)	2 (25.0)	0 (0.0)	3 (37.5)	6 (75.0)
Total	8 (100)	8 (100)	8 (100)	8 (100)

Before intervention, the majority of the intervention group experienced moderate pain (50.0%), with 25.0% each reporting severe and very severe pain. Following the rebozo technique, the dominant category shifted markedly to mild pain (62.5%), with 12.5% reporting no pain and 25.0% reporting moderate pain; no participant remained in the severe or very severe categories. In the control group, baseline pain was distributed across moderate (37.5%), severe (25.0%), and very severe (37.5%) categories. After the equivalent observation period without additional intervention, pain escalated to severe in 25.0% and very severe in 75.0% of control participants, consistent with the natural physiological progression of active labor.

Table 2. Wilcoxon Signed Ranks Test: Labor Pain Intensity Before and After Rebozo Technique in the Intervention Group

	Mean	SD	Min	Max	p-value
Pre-intervention	0,17708333	0,06111111	03.00	05.00	0.000
Post-intervention	02.12	0,04444444	01.00	03.00	

The Wilcoxon Signed Ranks Test revealed a statistically significant reduction in pain intensity within the intervention group (mean decrease: 1.63 points; $p=0.000$), indicating that the rebozo technique produced a meaningful and consistent analgesic effect.

Table 3. Wilcoxon Signed Ranks Test: Labor Pain Intensity Before and After the Observation Period in the Control Group

	Mean	SD	Min	Max	p-value
Pre-period	04.00	0,06388889	03.00	05.00	0.000
Post-period	0,21875	00.46	04.00	05.00	

The control group experienced a significant increase in pain intensity over the equivalent period (mean increase: 0.75 points; $p=0.000$), reflecting the expected natural escalation of labor pain in the absence of additional pain management strategies.

Table 4. Mann-Whitney U Test: Comparison of Post-Intervention Pain Intensity Between Intervention and Control Groups

Group	Mean	Median	SD	Min	Max	Mean Rank	p-value
Intervention	02.12	02.00	0,04444444	01.00	03.00	00.00	0.000
Control	0,21875	05.00	00.46	04.00	05.00	03.00	

The Mann-Whitney U Test demonstrated a highly significant difference in post-intervention pain scores between groups ($p=0.000$). The complete non-overlap in score ranges (intervention: 1–3; control: 4–5) and the mean rank disparity (intervention 0.0 vs. control 3.0) confirm the analgesic superiority of the rebozo technique over standard care alone in this sample.

Discussion:

The main result of this study shows that the rebozo technique helps lower the level of pain during the active first stage of labor, which matches the expected theories and previous research findings. The group that received the intervention showed a significant decrease of 1.63 points on average in their pain scores ($p=0.000$), and most people moved from experiencing moderate to severe pain to mainly mild pain. On the other hand, the control group felt their pain getting worse over time, which matches what is normally expected as labor pain increases with more cervical dilation and stronger contractions ([Sharma et al., 2023](#)).

The neurophysiological basis for the rebozo's analgesic effect is well-grounded in the gate control theory ([Shi & Wu, 2023](#)). The gentle touching from the rebozo cloth causes a soothing feeling in the skin and deeper tissues. This feeling activates special nerve endings called A-beta receptors. These receptors work against and reduce the pain signals sent by smaller nerve fibers called A-delta and C fibers, which are involved in sending pain messages to the spinal cord. This happens in a part of the spinal cord called the substantia gelatinosa. By stopping the pain signal from moving up to the brain, the rebozo helps block the pain message that would normally reach the thalamus and the part of the brain that senses touch and pain, which is where we actually feel pain ([Makvandi et al., 2021](#)). This mechanism parallels that of other effective non-pharmacological techniques, including massage, hydrotherapy, and transcutaneous electrical nerve stimulation ([Dowell et al., 2022](#)).

Beyond the neurophysiological mechanism, the rebozo technique likely activates additional analgesic pathways. The envelopment and physical support provided by the cloth may disrupt the fear-tension-pain cycle described by Dick-Read, reducing anxiety-mediated catecholamine (epinephrine and norepinephrine) surges that intensify uterine pain and impair uteroplacental blood flow ([Pérez-Escamilla et al., 2023](#)). The parasympathetic activation associated with relaxation and skilled midwifery touch further promotes endogenous endorphin release, providing additional opioid-mediated analgesia ([Fernández et al., 2020](#)). These different methods together explain why the rebozo technique seems to provide a comprehensive pain relief effect, covering all aspects of labor pain including how it feels, the emotional response, and the mental understanding of the pain.

These findings align with the qualitative study by ([Chang et al., 2021](#)) conducted among Danish women, who reported that the rebozo technique created sensations of comfort, reduced their pain experience, and fostered a sense of mutual engagement between themselves and their midwife during labor. This relational dimension is significant, as evidence from large-scale Cochrane reviews confirms that continuous, skilled midwifery support independently reduces pain perception, shortens labor duration, and decreases the likelihood of pharmacological analgesia and operative delivery ([Han et al., 2022](#)). The administration of the rebozo technique necessarily involves sustained midwife presence and physical attentiveness, thereby inherently delivering these benefits of continuous support.

The big difference between the groups, shown by the Mann-Whitney U Test ($p=0.000$), is the strongest finding of this study. This is because there was no overlap in the pain scores after the intervention. The intervention group had scores from 1 to 3, while the control group had scores from 4 to 5. This result is consistent with a systematic review by ([Thomson et al., 2019](#)), which confirmed that non-pharmacological interventions including massage, positioning, and supportive techniques significantly reduce subjective labor pain compared to standard care. Similarly, ([Tandoğan & Öskay, 2024](#)) demonstrated in a randomized controlled trial that an integrative bundle of non-pharmacological techniques significantly reduced pain intensity and epidural use during labor. The rebozo technique, which tackles both the physical feeling of labor pain through touch and the emotional and mental aspects like support and relaxation, could be a very thorough non-drug approach to managing pain during labor.

Local Indonesian evidence also supports these findings. Documented that the rebozo technique accelerated cervical dilation and fetal descent in active phase I labor, suggesting that its pelvic-optimizing effects extend beyond analgesia ([Simbolon & Siburian, 2021](#)). Reported significant pain reduction with rebozo ($p=0.000$), consistent with the current results. The convergence of these findings strengthens confidence in the rebozo technique's effectiveness within Indonesian primary midwifery care contexts ([Supranoto et al., 2025](#)).

The progressive pain escalation observed in the control group (mean increase: 0.75 points) reflects the well-established physiological reality that, without active intervention, labor pain intensifies as cervical dilation progresses through the active phase ([Vogel et al., 2024](#)). This natural progression underscores the urgent need for midwives to proactively apply evidence-based pain management strategies, consistent with WHO intrapartum care recommendations and Indonesian midwifery competency standards under PERMENKES No. 28 of 2017.

Implications:

This study's results suggest that the rebozo method should be included in usual care practices during childbirth at BPMs, Puskesmas, and midwifery-led birth centers throughout Indonesia. The technique's non-invasive nature, low cost, absence of pharmacological side effects, and compatibility with a wide range of labor positions make it particularly appropriate for primary care settings where epidural analgesia and other pharmacological options may be unavailable or undesired. Indonesian midwifery education programs should incorporate rebozo training within non-pharmacological pain management competencies, ensuring midwives are equipped to offer evidence-based comfort care as a routine component of normal birth support.

Research Contribution:

This study provides early numerical proof that the rebozo method can help lower pain during the first stage of active labor in an Indonesian BPM context. The results contribute to the increasing worldwide evidence that shows non-drug methods for managing pain during labor are effective. They also highlight how Indonesian midwives play an important role in helping women have positive and empowering birth experiences.

Limitations:

This study has a few key limitations that should be noted. The sample size, which was 8 in each group, was small. This makes it harder to find reliable results and limits the ability to make strong conclusions from the data within each group. So, the results should be taken with care. Second, using purposive sampling without random selection might lead to selection bias, and there was no formal check to make sure the groups were similar at the start on factors that could affect the results, like parity, anxiety levels, cultural influences, and labor support. Third, the design that focuses on a single site in Labuhanbatu Selatan makes it hard to apply the results to other locations and different medical situations. Fourth, not having assessors blinded could lead to biased measurements when scoring pain behavior. Fifth, the study didn't take into account other factors that might have influenced the results, such as how many times the mother has given birth before, her level of anxiety, whether she had someone with her during labor, and how long the labor lasted.

Suggestions:

Future research should employ randomized controlled trial designs with larger sample sizes (ideally ≥ 30 per group, with formal sample size calculation) and multisite recruitment to enhance generalizability. Assessor blinding and standardized confounding variable control are strongly recommended. Additionally, studies examining rebozo's secondary effects on labor duration, oxytocin levels, mode of delivery, neonatal Apgar scores, and maternal satisfaction would further characterize its clinical value. Multicenter trials across Indonesian primary care settings would provide robust evidence for national policy integration.

CONCLUSION

The rebozo method was found to be very helpful in lowering the level of pain during the active part of the first stage of labor. Women who got the rebozo technique saw a real and important decrease in their pain levels, and their pain moved from being moderate to severe to just mild. On the other hand, women who only got standard care had their pain get worse over time, which is what usually happens during normal labor. The big difference in pain levels between the groups after the treatment showed that the rebozo method is better at reducing pain compared to regular midwifery care alone. These results show that using the rebozo method regularly can be a good way to manage pain without medicine in everyday midwifery care, helping women in Indonesia have safer, more comfortable, and more empowering births.

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AUTHOR CONTRIBUTION STATEMENT

The authors jointly contributed to the conceptualization and design of the study, data collection, statistical analysis, interpretation of the findings, and manuscript preparation. One author was primarily responsible for conducting the research and drafting the original manuscript, while the other provided methodological guidance, supervised the research process, critically reviewed and revised the manuscript for important intellectual content. Both authors read and approved the final version of the manuscript and agreed to be accountable for all aspects of the work.

AI DISCLOSURE STATEMENT

The authors declare that no generative artificial intelligence (AI) tools were used to generate, analyze, interpret, or write the scientific content of this manuscript. All stages of the research, including the study design, data collection, data analysis, interpretation of the results, and manuscript preparation, were completed by the authors, who take full responsibility for the accuracy, originality, and integrity of the work.

CONFLICTS OF INTEREST

The authors declare that there are no financial, institutional, professional, or personal conflicts of interest that could have influenced the design of the study, data collection, analysis, interpretation of the findings, or the decision to publish this manuscript. The authors confirm that the research was conducted independently and objectively.

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