LAMAZE BREATHING RELAXATION AND PAIN DURING ACTIVE FIRST-STAGE LABOR

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ABSTRAK

Latar Belakang: Nyeri persalinan kala I fase aktif dapat meningkatkan kecemasan dan ketegangan serta mengganggu kemampuan ibu beradaptasi terhadap kontraksi. Teknik pernapasan Lamaze merupakan intervensi nonfarmakologis yang sederhana, aman, dan mudah diterapkan. Di Puskesmas Pakuan Aji, teknik ini belum digunakan secara rutin untuk manajemen nyeri persalinan.

Tujuan: Menganalisis perubahan intensitas nyeri persalinan kala I fase aktif sebelum dan sesudah pemberian teknik relaksasi pernapasan Lamaze.

Metode: Penelitian menggunakan desain pre-eksperimental one-group pretest-posttest pada 27 ibu bersalin kala I fase aktif yang dipilih dengan purposive sampling dari populasi 63 ibu. Tahap persiapan penelitian dilakukan sejak Desember 2025 sampai persetujuan etik diterbitkan pada Mei 2026. Rekrutmen responden dan pengambilan data dimulai hanya setelah persetujuan etik diterbitkan dan berlangsung sampai Juni 2026. Intensitas nyeri diukur menggunakan Numeric Rating Scale (NRS) sebelum dan sesudah intervensi Lamaze. Analisis dilakukan secara univariat dan bivariat menggunakan uji Wilcoxon signed-rank karena data tidak berdistribusi normal.

Hasil: Rata-rata skala nyeri menurun dari 6,59 ± 0,501 sebelum intervensi menjadi 4,78 ± 0,847 sesudah intervensi, dengan penurunan rata-rata 1,81 poin. Uji Wilcoxon menunjukkan perbedaan yang signifikan antara skor nyeri sebelum dan sesudah intervensi ($p < 0.001$).

Kesimpulan: Teknik relaksasi pernapasan Lamaze berhubungan dengan penurunan intensitas nyeri pada ibu bersalin kala I fase aktif dalam penelitian one-group pretest-posttest ini.

Saran: Puskesmas dapat mempertimbangkan edukasi dan penerapan teknik pernapasan Lamaze sebagai intervensi pendamping nonfarmakologis, disertai SOP dan pelatihan bagi tenaga kesehatan.

Kata kunci: Lamaze, nyeri persalinan, kala I fase aktif, relaksasi pernapasan

ABSTRACT

Background: Labor pain during the active phase of the first stage can increase anxiety and tension and may reduce maternal coping during contractions. Lamaze breathing is a simple, safe, and low-cost non-pharmacological approach that had not been routinely implemented at Pakuan Aji Community Health Center.

Objective: To analyze the change in labor pain intensity before and after Lamaze breathing relaxation during the active phase of the first stage of labor.

Methods: This pre-experimental one-group pretest-posttest study included 27 women in the active phase of the first stage of labor selected purposively from a population of 63. Research preparation was conducted from December 2025 until ethical approval was issued in May 2026. Participant recruitment and data collection began only after ethical approval and continued through June 2026. Pain intensity was measured using the Numeric Rating Scale (NRS) before and after the Lamaze intervention. Univariate analysis and the Wilcoxon signed-rank test were used because the pain scores were not normally distributed.

Results: Mean pain intensity decreased from 6.59 ± 0.501 before the intervention to 4.78 ± 0.847 after the intervention, a mean reduction of 1.81 points. The Wilcoxon test showed a statistically significant pre-post difference ($p < 0.001$).

Conclusion: Lamaze breathing relaxation was associated with lower pain intensity during the active phase of the first stage of labor in this one-group pretest-posttest study.

Suggestions: Primary care services may consider Lamaze breathing as a complementary non-pharmacological option, supported by clear procedures, educational materials, and staff training.

Keywords: Lamaze, labor pain, active first stage, breathing relaxation

INTRODUCTION

Labor is a clinical diagnosis characterized by regular uterine contractions and pain that cause progressive changes in the cervix, including effacement and dilation, ultimately allowing for the birth of the fetus. The first stage of labor (Stage I) begins with the onset of effective contractions that trigger cervical changes and continues until full dilation; it is classically divided into the latent phase (during which dilation progresses more slowly) and the active phase (during which cervical changes progress more rapidly) (Amelia & Cholifah, 2019). In the process of normal labor, pain is a very common symptom with multifactorial causes influenced by physiological, psychological, and sociocultural factors, as well as the mother's experience and readiness. Within the health–illness framework, labor pain can be understood as part of an individual's response to changes in health status during the labor process, the meaning of which may vary among mothers (e.g., perceived as a threat, discomfort, or a normal process leading to birth) (Maisyarah et al., 2021).

The primary sources of pain stem from myometrial contractions, cervical dilation, stretching of the lower uterine segment, and pressure on pelvic structures and surrounding tissues (Ahmar et al., 2021). Labor pain primarily results from increasingly strong and regular uterine contractions, which cause stretching and pressure on the cervix, soft tissues, and surrounding structures. This pain is also associated with ligament stretching, uterine muscle ischemia, and pressure from the fetal head on the birth canal (Lilis et al., 2023). During the active phase of the first stage of labor, labor pain generally peaks because the cervix dilates more rapidly and the intensity of contractions increases significantly (Astuti et al., 2022).

According to data from the United Nations Population Division, the number of births worldwide in 2025 is projected to reach approximately 132 million babies. The rate of deliveries at health care facilities in Indonesia in 2024 was 79.72%. When compared to the 2024 Strategic Plan target of 95%, the rate of deliveries at health care facilities in 2024 had not yet reached the 2024 Strategic Plan target (Indonesian Ministry of Health, 2025). In Lampung Province, the coverage of births at health facilities reached 85.1%, and in East Lampung Regency, it was 63.7%. The regency with the lowest coverage of births at health facilities is East Lampung Regency; this is likely due to difficult geographical conditions that make it hard to reach health facilities, and traditional birth attendants still play a significant role in the community (Lampung Provincial Health Office, 2024). Regarding delivery coverage at the Pakuan Aji Community Health Center, there were 451 mothers who gave birth at the health facility (Pakuan Aji Community Health Center, 2025), and at the Sukadana Community Health Center, there were 430 deliveries (Sukadana Community Health Center, 2025).

The high intensity of pain experienced by mothers during this phase can negatively impact their physical and emotional well-being, which may ultimately hinder the smooth progression of labor. This aligns with research findings indicating that mothers who are unaware of what is happening and what is to come may feel fear and anxiety, and their fear may intensify as the pain becomes more severe (Matondang & R, 2021). If not properly managed, unbearable pain can increase stress, muscle tension, and excessive anxiety. In some cases, this condition can trigger an increase in stress hormone levels such as adrenaline and cortisol which can actually inhibit the production of oxytocin, the hormone responsible for uterine contractions and the smooth progression of labor. As a result, the labor process may take longer and increase the risk of medical interventions such as labor induction or surgical procedures. This is supported by research findings indicating that labor pain must be managed through both pharmacological and non-pharmacological methods (Puspitasari, 2020). Therefore, pain management efforts during labor are crucial for enhancing the mother's comfort and supporting a smoother, safer labor process. Research findings indicate that labor pain relief techniques include birth balls, effleurage massage, aromatherapy, warm compresses, and breathing relaxation (Ningdiah et al., 2022).

This study focuses on the first stage of labor because it is during this phase that labor pain begins to be felt and increases progressively as uterine contractions become stronger and more regular and the cervix dilates

and thins; this phase also lasts for a relatively longer duration compared to the other stages. These conditions make mothers more susceptible to physical and psychological fatigue, necessitating special attention to pain management during this phase (Maryunani, 2015).

Various methods have been developed to help reduce the intensity of pain during labor. In general, these methods can be categorized into two groups: pharmacological and nonpharmacological. Pharmacological methods, such as the administration of opioid analgesics or epidural anesthesia, have indeed been proven effective in reducing pain, but are often associated with various side effects for both the mother and the baby. This aligns with research findings indicating that nonpharmacological methods are increasingly preferred for managing labor pain (Easton et al., 2023). Consequently, nonpharmacological methods are being increasingly developed as safer, more natural, and lower-risk alternatives. Nonpharmacological methods commonly used in midwifery practice include breathing techniques, hypnotherapy, hydrotherapy, aromatherapy, massage, acupressure stimulation, and others. Research findings indicate that the nonpharmacological therapies most frequently used by respondents were breathing and relaxation techniques (38.7%) (Prabandari et al., 2023).

Various non-pharmacological methods can be used to help reduce labor pain, including Lamaze breathing and relaxation techniques, massage or effleurage, counterpressure, warm compresses, the use of birth balls, aromatherapy, hypnobirthing, music therapy, positional changes and mobilization, and acupressure. Each method has its own mechanisms and advantages in promoting maternal comfort during labor. In this study, the Lamaze breathing relaxation technique was selected because it is simple, safe, affordable, does not require specialized equipment, is easy to teach, and can be performed independently by mothers during contractions. This technique not only focuses on reducing the perception of pain but also helps mothers regulate their breathing patterns, promote relaxation, reduce tension and anxiety, and improve their ability to cope with contractions (Indrayani, 2016).

One nonpharmacological intervention that is practical and easy to teach is controlled breathing relaxation. Breathing-based techniques are relatively safe, require no specialized equipment, and may improve maternal coping during contractions. These characteristics make Lamaze breathing suitable for use as a complementary intervention in primary maternity care.

Lamaze breathing is a patterned breathing approach synchronized with contractions to help mothers maintain control, promote relaxation, and reduce pain perception (Athiyyah et al., 2025). Madona and Ulaa (2025) reported a decrease in pain score from 6 to 4 after Lamaze breathing, while Rangkuti and Damanik (2023) reported a decrease in mean pain score from 3.83 to 2.87. These findings support further evaluation of Lamaze breathing in different maternity-care settings.

The research problem is the high intensity of labor pain experienced by women during the active phase of the first stage of labor, while the Lamaze breathing relaxation technique has not been routinely implemented as a non-pharmacological pain management method at Pakuan Aji Community Health Center. Although previous studies have reported the effectiveness of Lamaze breathing in reducing labor pain, its application and effectiveness in the local context of Pakuan Aji Community Health Center, East Lampung Regency, have not yet been evaluated. The novelty of this study lies in the application and evaluation of the Lamaze breathing relaxation technique for reducing pain intensity among women in the active phase of the first stage of labor in the Pakuan Aji Community Health Center service area, East Lampung Regency. Unlike previous studies conducted in different healthcare settings and populations, this study provides evidence regarding the applicability of Lamaze breathing as a simple, safe, and low-cost non-pharmacological intervention within a primary healthcare setting.

A preliminary survey conducted in January 2025 among 10 women in labor found that all reported physiological labor pain, particularly cramping in the abdomen, pelvis, and back during uterine contractions. Lamaze breathing had not been used for labor-pain management at Pakuan Aji Community Health Center, although it had been implemented at Sukadana Community Health Center. Accordingly, this study aimed to analyze the change in pain intensity before and after Lamaze breathing relaxation among women in the active phase of the first stage of labor at Pakuan Aji Community Health Center.

RESEARCH METHODS

This quantitative study used a pre-experimental one-group pretest-posttest design and was conducted in the service area of Pakuan Aji Community Health Center, East Lampung Regency. The preparatory phase was conducted from December 2025 until ethical approval was issued in May 2026 and included protocol finalization, administrative arrangements, preparation of the Lamaze intervention SOP, coordination with study sites, and enumerator preparation. No participant recruitment, informed-consent process, intervention, or research data collection was conducted before ethical approval. Participant recruitment and data collection began only after

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ethical approval had been granted and continued through June 2026. The population consisted of 63 women expected to give birth during the study period, and 27 respondents were selected using purposive sampling. The sample was proportionally distributed across village midwives and independent midwifery practices according to the number of eligible women at each location. Inclusion criteria were women in the active phase of the first stage of labor with cervical dilation of 4–10 cm, undergoing normal labor, without fetal distress, and willing to participate by signing informed consent. Exclusion criteria included premature rupture of membranes, severe pain (NRS score 8), and preterm labor.

Pain intensity was measured when the mother entered the active phase of the first stage of labor, specifically when cervical dilation reached 4–6 cm, before the administration of the Lamaze breathing relaxation technique as the pre-test. The Lamaze technique was then administered during contractions. The post-test was conducted after the intervention was completed, at the end of the intervention period, with pain intensity measured under contraction conditions similar to those during the initial assessment. Thus, pain intensity was measured twice, before and after the intervention.

The intervention consisted of deep breathing relaxation techniques using the Lamaze method for 3–5 minutes, repeated five times. The study began with a measurement of pain intensity (pretest) using the Numeric Rating Scale (NRS) with a score range of 0–10, followed by the Lamaze deep breathing relaxation technique intervention, and then a re-measurement of pain intensity (posttest) using the same instrument. The study was conducted with the assistance of 12 enumerators who were midwives and had been trained to ensure a consistent understanding of the intervention procedures in accordance with standard operating procedures (SOP).

The collected data were processed through editing, coding, entry, and cleaning and were analyzed using statistical software. Univariate analysis described respondent characteristics and pain scores. The Shapiro-Wilk test showed that both pretest and posttest pain scores were not normally distributed (both $p < 0.001$). Therefore, the Wilcoxon signed-rank test was used to assess the difference in pain intensity before and after the intervention, with statistical significance set at $p < 0.05$.

Ethics and Participant Protection

Ethical approval for this study was obtained from the Health Research Ethics Committee of Universitas Malahayati, Bandar Lampung, Indonesia, with approval number 5412/EC/KEP-UNMAL/V/2026, issued in May 2026. Activities undertaken from December 2025 until ethical approval were limited to research preparation and did not involve participant recruitment or research data collection. Participant recruitment, informed consent, the Lamaze intervention, and all research data collection began only after ethical approval had been issued and continued through June 2026. Written informed consent was obtained from all participants before participation.

RESEARCH RESULTS

Table 1. Shapiro-Wilk Normality Test

Measurement	Shapiro-Wilk p-value
Pain Scale (Pretest)	< 0.001
Pain Scale (Posttest)	< 0.001

The Shapiro-Wilk test indicated that both pretest and posttest pain scores were not normally distributed (both $p < 0.001$); therefore, the Wilcoxon signed-rank test was used for the paired comparison.

Univariate Analysis

Table 2. Respondent Characteristics (n = 27)

Variable	Mean	SD	f	%
Age	28.78	4.807		
At-Risk Age Group (<20 and >35 years)			3	11.1
Non-At-Risk Age Group (20–35 years)			24	88.9
Parity				
Primipara			10	37
Multipara			17	63

Based on Table 2, the mean age of the respondents was 28.78 years with a standard deviation of 4.807 out of 27 respondents. Based on parity, the majority were multiparous, totaling 17 out of 27 respondents, representing 63%.

Table 3. Pain Scores Before and After Lamaze Breathing Relaxation

Measurement	Mean	SD
Pretest	6.59	0.501
Posttest	4.78	0.847

Based on Table 3, the mean pain scale score before the Lamaze deep breathing relaxation technique (pre-test) was 6.59 with a standard deviation of 0.501. The mean pain score after the Lamaze deep breathing relaxation technique (post-test) was 4.78 with a standard deviation of 0.847.

Bivariate Analysis

The Wilcoxon signed-rank test was used to compare labor-pain scores before and after the Lamaze breathing relaxation intervention during the active phase of the first stage of labor.

Table 4. Wilcoxon Signed-Rank Test for Pain Scores Before and After Lamaze Breathing

Variable	Pretest Mean	Posttest Mean	Pretest SD	Posttest SD	Mean Rank	Sum of Ranks	p-value
Pain Scale	6.59	4.78	0.501	0.847	14.00	378.00	< 0.001

As shown in Table 4, mean pain intensity decreased from 6.59 ± 0.501 before the intervention to 4.78 ± 0.847 after the intervention, corresponding to a mean reduction of 1.81 points. All 27 respondents had negative ranks, with a mean rank of 14.00 and a sum of ranks of 378.00; no positive ranks or ties were observed. The Wilcoxon signed-rank test showed a statistically significant pre-post difference ($p < 0.001$).

DISCUSSION

The results showed that the mean pain intensity score during the active phase of the first stage of labor decreased from 6.59 ± 0.501 before the intervention to 4.78 ± 0.847 after the Lamaze deep breathing relaxation technique was administered. This finding indicates a mean reduction of 1.81 points in pain intensity following the intervention. The researchers consider this reduction clinically meaningful because the active phase is generally accompanied by increasingly strong uterine contractions and progressive cervical dilation, which may intensify pain perception (Ahmar et al., 2021; Astuti et al., 2022).

According to the researchers, the reduction in pain intensity occurred because Lamaze breathing encouraged mothers to focus their attention on their breathing pattern during contractions rather than concentrating entirely on the painful stimuli. Controlled inhalation through the nose followed by slow exhalation through the mouth may create a more relaxed state, reduce muscle tension, and help mothers regulate their responses to contractions. This process may make the pain more manageable and improve the mother's ability to cope with labor. Irianti et al. (2022) explained that deep breathing relaxation can support relaxation, improve ventilation and oxygenation, and reduce tension and panic during labor.

The researchers also believe that the effectiveness of Lamaze is related to its ability to provide mothers with an active coping strategy during contractions. Rather than passively experiencing pain, mothers are encouraged to participate actively by controlling their breathing. This may increase their sense of control and confidence during labor. The Lamaze technique is therefore not merely a breathing exercise but also a method of helping mothers develop a more adaptive response to contractions. This interpretation is consistent with Athiyyah et al. (2025), who reported that Lamaze breathing can help mothers maintain control, promote relaxation, and reduce pain perception during labor.

The findings of this study are consistent with previous research. Athiyyah (2025) reported a reduction in pain intensity from 8 to 6 on the Numeric Rating Scale following the Lamaze intervention. Similarly, Madona and Ulaa (2025) found that the pain score decreased from 6 before the intervention to 4 after Lamaze breathing exercises. Rangkuti and Damanik (2023) also reported a significant reduction in pain intensity, with the mean

score decreasing from 3.83 to 2.87 after the application of Lamaze breathing techniques. These findings support the present study, in which the mean pain score decreased from 6.59 to 4.78.

The Wilcoxon signed-rank test showed a statistically significant difference in pain intensity before and after Lamaze breathing ($p < 0.001$). This statistical result supports the observed reduction in pain scores; however, because the study used a one-group pretest-posttest design without a comparison group, the finding should be interpreted as a significant pre-post change rather than definitive evidence that Lamaze alone caused the entire reduction.

The researchers argue that the mechanism of pain reduction may also be associated with the mother's psychological response during labor. Severe pain can contribute to fear, anxiety, and muscle tension, which may subsequently increase the perception of pain. By directing the mother's attention toward controlled breathing, Lamaze may interrupt this cycle and promote a calmer response to contractions. Irianti et al. (2022) stated that deep breathing relaxation can reduce anxiety and fear and help mothers adapt to pain during labor. Thus, the reduction in pain observed in this study may reflect both physical and psychological effects of the intervention.

The findings are also supported by Kaple (2023), who reported that both Lamaze breathing and the Jacobson relaxation technique reduced labor pain and anxiety, with statistically significant results. The Lamaze group demonstrated favorable outcomes in reducing pain and anxiety. Similarly, Kuruvilla (2019) found that the Lamaze method reduced pain, anxiety, and fatigue during labor and was associated with better labor outcomes. These previous findings strengthen the evidence that breathing-based relaxation can be an effective complementary approach to labor pain management.

Based on respondent characteristics, most participants were aged 20–35 years, with 24 respondents (88.9%), while 3 respondents (11.1%) were in the at-risk age groups of less than 20 years or more than 35 years. Descriptively, the mean pain score decreased from 6.33 to 4.00 in the at-risk age group, representing a reduction of 2.33 points, whereas the non-at-risk group experienced a reduction from 6.63 to 4.88, representing a reduction of 1.75 points. Although the reduction appeared greater in the at-risk group, these differences should be interpreted descriptively because this study did not specifically analyze the effect of age on pain reduction.

Regarding parity, 63.0% of respondents were multiparous and 37.0% were primiparous. The mean pain score decreased from 6.47 to 4.29 among multiparous women, representing a reduction of 2.18 points, while among primiparous women it decreased from 6.80 to 5.60, representing a reduction of 1.20 points. According to the researchers, the greater reduction among multiparous women may be related to previous childbirth experience. Mothers who have previously experienced labor may have greater familiarity with contractions and may be better prepared to follow breathing instructions and manage anxiety. However, these differences are descriptive and cannot be interpreted as evidence that parity significantly influences the effectiveness of Lamaze because multivariate or subgroup statistical analysis was not performed.

Overall, the findings demonstrate that the Lamaze deep breathing relaxation technique was associated with a reduction in labor pain across the respondent groups observed in this study. The researchers consider Lamaze to be a practical intervention for midwifery care because it is simple, inexpensive, does not require specialized equipment, and can be taught and applied during contractions. Its application may help mothers develop greater control over their breathing, reduce tension and anxiety, and cope more effectively with labor pain. Therefore, Lamaze breathing relaxation can be considered a complementary non-pharmacological intervention for managing pain during the active phase of the first stage of labor at Pakuan Aji Community Health Center.

Strengths and Limitations

A strength of this study is the use of a standardized pain instrument (Numeric Rating Scale) and a structured Lamaze breathing procedure supported by trained midwife enumerators, which helped improve consistency in the intervention and measurement process. However, the study used a one-group pretest-posttest design without a comparison group, so the observed reduction in pain cannot be attributed exclusively to Lamaze breathing. The sample was relatively small and selected purposively from a single primary-care service area, which limits generalizability. Labor pain may also be influenced by parity, anxiety, cervical dilation, contraction intensity, maternal support, previous childbirth experience, and other clinical factors that were not controlled in the analysis. These limitations should be considered when interpreting the findings and designing future controlled studies.

CONCLUSION

Lamaze breathing relaxation was associated with a reduction in labor pain during the active phase of the first stage. Mean pain intensity decreased from 6.59 ± 0.501 before the intervention to 4.78 ± 0.847 after the intervention, a mean reduction of 1.81 points, and the pre-post difference was statistically significant ($p < 0.001$). Because the study used a one-group pretest-posttest design, the findings should be interpreted as evidence of improvement after the intervention rather than definitive proof of causality.

SUGGESTION

Pakuan Aji Community Health Center is encouraged to provide educational materials, develop a standard operating procedure for Lamaze breathing relaxation, and conduct periodic training for midwives so the technique can be applied consistently as a complementary non-pharmacological approach to labor-pain management. Future studies should include a comparison group, larger samples, and control of factors such as parity, anxiety, and labor progression.

DECLARATIONS

Ethics Approval and Informed Consent

Ethical approval for this study was obtained from the Health Research Ethics Committee of Universitas Malahayati, Bandar Lampung, Indonesia, with approval number 5412/EC/KEP-UNMAL/V/2026, issued in May 2026. The period from December 2025 until ethical approval was used solely for research preparation; no participant recruitment, intervention, or research data collection occurred before approval. Participant recruitment and data collection began only after ethical approval and continued through June 2026. Written informed consent was obtained from all participants before participation.

Author Contributions

This study involved four authors. Lili Noviyanti contributed to the conceptualization, methodology, data collection, data analysis, interpretation of findings, and manuscript preparation. Nurliyani contributed to supervision, academic guidance, methodology review, data analysis and interpretation, and critical revision of the manuscript. Lolita Sary contributed to supervision, methodology review, interpretation of findings, and critical revision of the manuscript. Anggraini contributed to critical evaluation of the methodology, results, discussion, and conclusions, as well as manuscript revision. All four authors reviewed and approved the final manuscript and agreed to be accountable for all aspects of the work.

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Conflict of Interest

The authors declare no conflict of interest.

Artificial Intelligence Declaration

Generative artificial intelligence (OpenAI ChatGPT) was used solely to support language editing, consistency checking, and manuscript formatting during the revision process. All AI-assisted outputs were reviewed and verified by the authors, who remain fully responsible for the accuracy, originality, integrity, and final content of the manuscript.

Data Availability Statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request, subject to applicable ethics, privacy, and confidentiality requirements.

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