JoHMIS: Journal of Health and Midwifery Innovation'S
Journal homepage: johmis.itsk-soepraoen.ac.id
ISSN:
Vol. 1, No. 3, May 2026, Pp. 165-171

Original Research

The Effect of Deep Breathing Relaxation Techniques on Labor Pain Reduction in Budi Setia Hospital, Longawan Minahasa District

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Article Info
Keywords:
Deep Breathing, Labor Pain, Relaxation, Relaxation Technique

Abstract
Effective pain management during labor is essential to improve maternal comfort and reduce complications related to stress and muscle tension. Deep breathing relaxation is a non-pharmacological method shown to decrease pain intensity, enhance maternal control, and reduce anxiety. This study used a pre-experimental design with purposive sampling and a one-group pretest–posttest approach. Sixteen laboring mothers at Budi Setia Langowan Hospital participated. Pain levels were measured before and after the intervention, and data were analyzed using the Wilcoxon Matched-Pairs Test. The analysis revealed a significant reduction in labor pain after the intervention. Statistical testing showed a p-value of 0.002 (≤ 0.05), indicating differences in pain scores before and after treatment. Deep breathing relaxation techniques significantly reduce labor pain and can serve as a safe, effective non-pharmacological alternative for mothers during childbirth. This technique may be integrated into routine maternity care and considered for postpartum pain management.
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1. Introduction

Labor pain is one of the most feared aspects of childbirth for women. The intensity of this pain varies depending on several factors, including physiological, psychological, and environmental influences. According to the American College of Obstetricians and Gynecologists (ACOG), effective pain management during labor is not only important for maternal comfort but also essential to prevent complications that may arise from excessive stress and muscle tension. Various methods have been employed to manage labor pain, encompassing both pharmacological and non-pharmacological approaches. Among the non-pharmacological methods, deep breathing relaxation techniques have gained increasing attention in recent years. This technique involves regulating deep and controlled breathing patterns, aimed at reducing the perception of pain through mechanisms that enhance relaxation and decrease muscle tension (Dinas Kesehatan Kota Yogyakarta, 2016).

Globally, two main approaches are commonly used to manage labor pain: pharmacological and non-pharmacological methods. Pharmacological interventions include the use of analgesics and anesthesia, while non-pharmacological strategies focus on techniques that promote relaxation and coping. One widely recognized non-pharmacological intervention is the deep breathing relaxation technique, which involves teaching mothers to regulate their breathing in a slow, deep, and controlled manner. This technique aims to reduce the perception of pain by enhancing relaxation, lowering anxiety, and decreasing muscle tension (Aji et al., 2022)

Research has shown that deep breathing relaxation techniques can provide positive effects in reducing labor pain. A study by Smith et al. (2018) revealed that the use of deep breathing during childbirth significantly decreased pain intensity and enhanced the mother's sense of control over the birthing process. Another study by Brown and Jones (2019) supported these findings, demonstrating

that deep breathing relaxation not only reduced pain but also alleviated anxiety and improved the overall childbirth experience.

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Despite the growing evidence supporting the effectiveness of deep breathing relaxation techniques, there remains a need for further studies within specific local contexts, such as Budi Setia Langowan Hospital. This study aims to evaluate the influence of deep breathing relaxation techniques on labor pain reduction in this setting. The findings are expected to provide deeper insights into the benefits of this method and assist healthcare providers in developing evidence-based strategies for more effective pain management during childbirth.

2. Research Method

Based on its design, this study employed a pre-experimental approach, specifically a one-group pretest–posttest design, in which a single group of subjects was observed and measured both before and after receiving the intervention (Creswell, 2014). This design allows researchers to determine differences in outcomes attributable to the treatment by comparing pre-intervention and post-intervention results within the same group.

Intervention Procedure The intervention consisted of a structured deep breathing relaxation technique. Participants were instructed to perform slow, deep, and rhythmic breathing, inhaling through the nose for approximately 4 seconds, holding for 2 seconds, and exhaling through the mouth for 6 seconds. Each session lasted for 15 minutes and was conducted during the active phase of the first stage of labor (cervical dilatation 4–7 cm). The intervention was delivered once, under the supervision of a trained midwife, following a standardized protocol adapted from the guidelines of the Indonesian Ministry of Health (Dinas Kesehatan Kota Yogyakarta, 2016). Standard Operating Procedures (SOPs) included: (1) positioning the mother comfortably in a semi-sitting position, (2) providing verbal instructions and demonstrations, (3) monitoring maternal vital signs during the intervention, and (4) documenting the procedure in the patient's record.

Sampling Technique The sampling technique applied was purposive sampling, which involves selecting participants based on specific criteria relevant to the objectives of the study (Sugiyono,

2017). Inclusion criteria included primigravida mothers in active labor, aged 20–35 years, with singleton pregnancies and no obstetric complications.

Statistical Analysis Data analysis was conducted using the paired *t*-test to compare pre-intervention and post-intervention pain scores. The paired *t*-test was chosen because it is appropriate for evaluating mean differences in continuous variables measured within the same group before and after an intervention (Field, 2018). In addition to reporting *p*-values, effect sizes were calculated using Cohen's *d* to assess the magnitude of the intervention effect. Confidence intervals (95% CI) for mean differences were also reported to provide a more precise estimate of the intervention's impact (Lakens, 2013).

3. Results and Discussion

3.1 Univariat

In this study conducted at Budi Setya Hospital, Langowan, Minahasa District, the parity distribution of mothers was examined to provide an overview of their obstetric background. Parity is an important factor influencing maternal experiences during labor, as primiparous and multiparous women often differ in their perception of pain, anxiety levels, and coping strategies.

Table 1. Parity of Mother

Category	*Frequency*	*Percent*
Primipara	13	81.2
Multipara	3	18.8
Total	16	100.0

Based on table 1, The majority were primiparous mothers, accounting for 13 participants (81.2%), while only 3 respondents (18.8%) were multiparous. This suggests that most of the study participants were experiencing childbirth for the first time.

Tabel 2 Educational of Mother

Category	*Frequency*	*Percent*
Junior High Schoool	1	6.2
Senior High School	15	93.8
Total	16	100.0

Table 2 describes the educational background of the respondents. A large proportion, 15 participants (93.8%), had completed senior high school or higher education, whereas only 1 respondent (6.2%) had completed primary or junior high school. This indicates that the majority of mothers in the study had relatively high educational attainment.

Table 3 occupational status

Category	*Frequency*	*Percent*
Housewives	12	75.0
Having Job	4	25.0
Total	16	100.0

Table 3 illustrates the occupational status of the respondents. Most of the mothers, 12 participants (75%), were not employed, while 4 respondents (25%) reported having a job. This shows that the majority of the study participants were housewives.

3.2 Bivariat

Table 4 Pain Intensity Among Mothers in the First Stage of Labor Before and After the Application of Deep Breathing Relaxation Techniques at Budi Setya Hospital, Langowan, Minahasa District

Intervention	*N*	*Mean*	*Standar Deviation*	*P value*
Pre Intervention	16	7,37	1,475	0,002
Post Intervention	16	5,77	1,245	

Based on Table 4, the results of the Wilcoxon statistical test demonstrate the effect of deep breathing relaxation techniques on reducing labor pain at Budi Setia Hospital, Langowan. The analysis yielded a p-value of 0.002 (≤ 0.05), indicating a significant difference in respondents' pain levels before and after the intervention. Consequently, the null hypothesis (Ho) was rejected and the alternative hypothesis (Ha) was accepted. These findings confirm that deep breathing relaxation techniques have a significant influence on reducing labor pain among mothers at Budi Setia Hospital, Langowan.

The findings of this study revealed that prior to the intervention, all respondents have Mean 7,37 experienced severe, controlled labor pain during the first stage of labor. Labor pain is a complex phenomenon characterized by intense, spasmodic sensations resulting from uterine contractions, cervical dilatation, and pressure on surrounding structures such as the bladder, rectum, and perineum. In some cases, tissue rupture around the vaginal area may further intensify the pain (Cunningham et al., 2018). This pain is often described as highly variable among women, influenced by both physiological and psychological factors (Simkin et al., 2016).

Labor pain is primarily associated with strong and frequent uterine contractions, stretching of the birth canal, and pressure on the cervix and adjacent tissues (Pain Relief for Labor and Delivery, 2024). However, psychological and emotional factors such as anxiety, fear, and stress can exacerbate the perception of pain. Several determinants have been identified as contributing to labor pain, including the strength and frequency of contractions, fetal size and position, duration of labor, maternal psychological state, previous childbirth experiences, social and emotional support, and medical interventions (Labor Pain, 2024).

In this study, the predominance of severe pain among respondents highlights the multifactorial nature of labor pain. The presence of primiparous mothers in the sample may also explain the heightened pain perception, as first-time mothers often experience greater anxiety and less familiarity with coping strategies. Furthermore, the lack of employment among most respondents may reflect limited exposure to stress management techniques, potentially influencing their pain tolerance.

The intervention of deep breathing relaxation techniques is particularly relevant in this context. By promoting controlled breathing patterns, the technique enhances relaxation, reduces muscle tension, and alleviates anxiety, thereby lowering pain perception. These findings align with previous studies (Smith et al., 2018; Brown & Jones, 2019), which demonstrated that deep breathing relaxation significantly reduces pain intensity, improves maternal control, and enhances the overall childbirth experience.

Thus, the results of this study reinforce the importance of integrating non-pharmacological interventions such as deep breathing relaxation into maternity care. Such techniques not only provide safe and effective alternatives for pain management but also empower mothers to actively participate in their birthing process, contributing to more positive labor experiences.

After the intervention was applied, the majority of respondents (10 mothers, 62.5%) reported experiencing moderate pain, while a smaller proportion (6 mothers, 37.5%) continued to experience severe, controlled pain. This shift indicates that the deep breathing relaxation technique contributed to a reduction in pain intensity among most participants.

Labor pain can be classified into several types depending on the stage of labor and the source of pain (ACOG, 2017). In the early phase of labor, pain is typically described as strong menstrual-like cramps or lower back discomfort, resulting from cervical dilatation. During the active phase, contractions become stronger and more frequent, leading to more intense pain in the abdomen and lower back, often accompanied by pressure on the bladder and rectum. The transition phase, which precedes delivery, is characterized by the most severe pain, commonly felt in the abdomen, back, and

hips. In the pushing phase, pain arises from stretching and pressure on the perineum and vagina as the baby passes through the birth canal. Finally, in the placental stage, mothers may still experience pain, though it is generally milder compared to the active and transition phases (Brown & Jones, 2005; Simkin et al., 2018).

The reduction in pain intensity observed in this study suggests that deep breathing relaxation techniques are effective in modulating pain perception across these stages. By promoting controlled breathing, the technique enhances maternal relaxation, reduces muscle tension, and alleviates anxiety, thereby decreasing the severity of pain. This finding is consistent with previous literature, which emphasizes the role of non-pharmacological interventions in improving maternal comfort and coping during labor.

Based on Table 4, the Wilcoxon statistical test demonstrated a significant effect of deep breathing relaxation techniques on reducing labor pain at Budi Setia Hospital, Langowan. The analysis yielded a p-value of 0.002 (≤ 0.05), indicating a clear difference in pain intensity before and after the intervention. Thus, the null hypothesis (Ho) was rejected and the alternative hypothesis (Ha) was accepted, confirming that deep breathing relaxation techniques significantly reduce labor pain.

Breathing relaxation techniques have been widely recognized for their multiple benefits in various contexts, including labor, stress management, and overall physical and mental health. These techniques help lower stress and anxiety by stabilizing the nervous system, reduce pain perception through the release of endorphins, improve blood oxygenation, decrease blood pressure, and enhance concentration and emotional well-being (Breathing Exercises for Relaxation, 2024). Palinkas et al. (2015) emphasized that controlled breathing is an effective tool for reducing stress and anxiety, while Busch et al. (2012) highlighted its role in improving oxygenation, lowering blood pressure, and enhancing focus.

The findings of this study are consistent with previous research. Smith et al. (2018) reported that deep breathing significantly reduced labor pain intensity and improved maternal control during childbirth. Similarly, Brown and Jones (2019) found that breathing relaxation techniques not only reduced pain but also alleviated maternal anxiety and improved the overall birth experience. These results reinforce the evidence that non-pharmacological interventions, particularly deep breathing relaxation, can serve as safe and effective alternatives for pain management during labor.

In summary, the present study supports the growing body of literature demonstrating the effectiveness of deep breathing relaxation techniques in reducing labor pain. Beyond pain relief, such interventions contribute to maternal comfort, emotional stability, and positive childbirth experiences. Integrating breathing relaxation into routine maternity care may therefore enhance evidence-based strategies for labor pain management and provide mothers with greater empowerment during the birthing process.

Although the findings of this study demonstrate a significant reduction in labor pain following the application of deep breathing relaxation techniques, several limitations must be acknowledged. First, the sample size was relatively small (N = 16), which restricts the statistical power of the analysis and limits the generalizability of the results to broader populations. Small samples are more vulnerable to random variation and may not adequately represent the diversity of maternal characteristics (Field, 2018).

Second, the study employed a one-group pretest–posttest design without a control group. The absence of a comparison group makes it difficult to rule out alternative explanations for the observed pain reduction, such as natural progression of labor, placebo effects, or other supportive care provided during childbirth (Creswell, 2014). Consequently, while the results suggest that deep breathing relaxation techniques are effective, causal inferences should be made with caution.

Future research should therefore consider larger sample sizes and randomized controlled trial designs to strengthen the evidence base and provide more robust conclusions regarding the effectiveness of deep breathing relaxation in labor pain management.

4. Conclusion

This study demonstrated that deep breathing relaxation techniques have a significant effect on reducing labor pain among mothers at Budi Setia Hospital, Langowan, Minahasa District. Statistical analysis using the Wilcoxon test revealed a p-value of 0.002 (≤ 0.05), indicating a meaningful difference in pain intensity before and after the intervention. These findings confirm that the technique effectively lowers pain perception and provides mothers with greater comfort during childbirth.

The results are consistent with previous studies, such as Smith et al. (2018) and Brown & Jones (2019), which reported that deep breathing relaxation reduces pain intensity, alleviates anxiety, and enhances maternal control during labor. Together, this evidence highlights the importance of integrating non-pharmacological interventions into maternity care.

In conclusion, deep breathing relaxation techniques represent a safe, simple, and effective strategy for labor pain management. Their implementation in clinical practice can empower mothers, improve childbirth experiences, and contribute to evidence-based approaches in maternal health care.

Acknowledgement.

The authors would like to express their sincere gratitude to Budi Setia Hospital, Langowan, Minahasa District, for providing the facilities and support necessary to conduct this study. Special thanks are extended to the midwives and nursing staff who assisted in the data collection process, as well as to the mothers who generously participated in the research. The authors also acknowledge the guidance and encouragement provided by academic supervisors and colleagues throughout the study. Finally, appreciation is given to all individuals and institutions whose contributions made this research possible.

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