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The Effect of Respiratory Relaxation Techniques on Pain Adaptation in Laboring Mothers in Royal Prima Hospital in 2024

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A B S T R A C T

Labor pain is a physiological condition. It is an unpleasant feeling that occurs during labor. The intensity of pain during labor will affect the mother's psychological condition, labor process, and fetal well-being. Relaxation, breathing techniques, movement and position changes, massage, hydrotherapy, hot/cold therapy, auditory (mutual), guided imagery, acupressure, and aromatherapy are some non-pharmacological techniques that can increase patient comfort during labor and have an effective influence on labor experience. This study aimed to determine the effect of respiratory relaxation techniques on pain adaptation in laboring mothers. This type of research is descriptive correlational, using the One Group Pretest-Postest approach—location at RSU Royal Prima Medan January 2024. The population was ± 38 people, determining the sample size with the Slovin formula so that a sample of 27.53 was obtained, rounded up to 30 respondents. The data analysis used is the normality test using the Shapiro-Wilk test because the Sum sample is <50. Bivariate analysis if the data is usually distributed using the paired t-test, while if the data is not normally distributed using the Wilcoxon Signed Rank Test, with a meaning limit of <0.05. The results of the research on the Pain Level change score from the Wilcoxon test results when the pre-test test obtained the results of the Z value = -3.188 with a p-value of 0.002 <0.05 so that it was concluded that Ho was rejected and Ha was accepted, which means that there is an effect of providing respiratory relaxation techniques on changes in pain in laboring mothers in the first time at Royal Prima Hospital in 2024.

Keywords: techniques, relaxation, breathing, pain, childbirth

1. Main text

Labor is a process in which the uterus undergoes contractions aimed at causing cervical dilatation and progressive thinning. These contractions also produce a strong push that allows the fetus to exit the birth canal, bypassing the resistance of the pelvic bone structures, soft tissues, and surrounding muscles. In other words, labor involves a series of physiological changes that allow the baby to be born safely (Sumarni & Yasin, 2016). One of the leading indicators in assessing a nation's health status is maternal and infant mortality. The maternal mortality rate (MMR) is a parameter that describes the risk of death experienced by mothers during pregnancy, childbirth, obstetric care, pregnancy complications, and the postpartum period. MMR is important because it reflects the effectiveness of the health system in providing appropriate care and preventing the risk of unintended death in mothers during childbirth or postpartum. By monitoring MMR, governments and health agencies can identify areas where improvements must be made to improve maternal and infant health (Aeni, 2011). Every year, an estimated 529,000 women worldwide die from complications arising during pregnancy and childbirth. As a result, the global maternal mortality rate (MMR) is estimated to be around 400 per 100,000 live births. This maternal mortality rate is an essential indicator in evaluating the quality of maternal health care in various countries. It is the focus of attention on improving maternal safety and health during pregnancy and childbirth (Respati et al., 2019).

Labor pain is a physiological, unpleasant feeling that occurs during labor. Labor pain begins in labor phase I, latent, and active phases. The longer the pain is felt, the stronger the peak pain occurs in the active phase, where the opening is complete up to 10 cm. Pain intensity during labor will affect the mother's psychological condition, labor process, and fetal well-being (Rejeki, 2013). Some studies have shown that in primitive societies, labor is more prolonged and more painful.

In contrast, in developed societies, 7-14% of labor is painless, and most (90%) of labor is accompanied by pain. The high perception of pain is felt by laboring women, so most of them do not focus on the birth of their babies. Instead, they focus more on the labor pain they feel (Widiawati & Legiati, 2017). Feelings of fear and anxiety at the time of labor can cause the parasympathetic nervous system and sympathetic so that it can increase the intensity of the pain it feels (Pratiwi, 2016).

Non-pharmacological pain management can improve satisfaction during childbirth because patients can control their feelings and strength. Relaxation, breathing techniques, movement and position changes, massage, hydrotherapy, heat/cold therapy, auditory (recitation of holy scriptures), guided imagery,

acupressure, and aromatherapy are some non-pharmacological techniques that can enhance patient comfort during childbirth and have a practical impact on the childbirth experience (Simanullang, 2024). According to Sukarta's research (2017) at Lawawoi Community Health Center, Wattang Pulu District, Sidenreng Rappang Regency, in 2016, it was stated that breathing relaxation techniques effectively reduce pain levels in active phase I labor patients. This is because there is a significant difference between before and after the provision of breathing techniques (Sukarta, 2017). The research conducted by Siti Farida in 2015 at BPM Fajar Endrowati Boyolali stated that breathing relaxation techniques effectively reduce pain during childbirth. The purpose of this study is to determine the effect of breathing relaxation techniques on pain adaptation in laboring mothers.

2. Methods

This study utilized a correlational descriptive research design, specifically focusing on the impact of providing breathing relaxation techniques on changes in pain among laboring mothers at RSU Royal Prima. The approach employed was the One Group Pretest-Posttest method in January 2024. The population for this research comprised all laboring mothers who underwent vaginal delivery at RSU Royal Prima. Based on the survey results from the past three months, the average number of laboring mothers per month at RSU Royal Prima was approximately 38 individuals.

The number of samples using the Slovin formula:

$$n = \frac{N}{1 + Ne^2}$$

$n = 43/1+43\ (0,01)^2$

n = 30,06 rounded up to 30 respondents, with a significance level of α =0,01.

Sample selection with non-probability sampling, namely consecutive sampling.

Sample inclusion criteria, namely:

a. Pregnant women who delivered at the KIA room in Royal Prima Hospital
b. Vaginal delivery
c. The patient's vital signs (blood pressure, pulse, temperature, and respiration) are stable.
d. Patients who are willing to become respondents

Sample exclusion criteria, namely:

a. Vital signs are unstable
b. The patient has decreased consciousness.
c. Mother who received accelerated labor (SC, induction of labor)
d. Not willing to be a respondent.

The operational definitions in this study are as in the following table:

Table 3.1 Operational Definition

Variable	Operational Definition	Parameters	How to Measure	Data Scale	Results
Independent					
Breathing Relaxation Technique	A form of nursing care in which, in this case, the nurse teaches the client how to breathe, slow breathing (holding inspiration to the maximum), and how to exhale slowly.	Breathing Relaxation technique procedure	Breathing Relaxation technique procedure	Nominals	1. Can't do well 2. Can do well
Dependent					
Labor Pain	The pain level during the first stage of labor is expressed verbally by	Observation Sheet	The intervention group and control group were asked to describe the pain felt with a	Ordinal	0:No pain 1-3:Mild pain 4-6: Moderate pain

	showing a pain scale range of 0-10.	descriptive pain intensity scale and then indicate one of the numbers on the pain scale range provided.	7-9: Severe pain 10: Severe pain, severe

The data analysis used in this study involves a normality test using the Shapiro-Wilk test because the number of samples is less than 50. The bivariate analysis will use the paired t-test if the data is usually distributed. However, the Wilcoxon Signed Rank Test will be used if the data is not normally distributed. The limit of significance used is less than 0.05, which indicates that the results obtained are considered statistically significant if the p-value is less than 0.05.

3. Results and Discussion

Table 1. Distribusi Frekuensi dan Persentase Pain Level Ibu Bersalin Kala I, Sebelum Dilakukan Teknik Relaksasi Pernafasan Di Rumah Sakit Royal Prima Medan Tahun 2024

No	Pain Level	Sum (n)	Percentage
1	Nyeri Sedang	20	67
2	Nyeri Berat	10	33
TOTAL		**30**	**30**

Based on Table 1, it is known that before the breathing relaxation technique was applied, the majority of respondents experienced moderate pain, which 20 individuals reported. On the other hand, a minority of respondents experienced severe pain, with a total of 10 individuals reporting this level of pain.

Table 3. Frequency and Percentage Distribution of Respiratory Relaxation Techniques for Maternity Period I at Royal Prima Medan Hospital in 2024

No	Respiratory Relaxation	Sum (n)	Percentage %
1	Can Do Well	21	70
2	Can't Perform Well	9	30
TOTAL		**30**	**30**

Based on Table 3, it is known that most respondents could perform the Breathing Relaxation Technique well, while the minority struggled to do so.

Table 4. Frequency and Percentage Distribution of Pain Levels of Maternity Period I After Performing Breathing Relaxation Techniques at Royal Prima Medan Hospital in 2024

No	Pain Level	Sum (n)	Percentage
1	No Pain	9	30
2	Moderate Pain	12	40
3	Severe Pain	9	30
TOTAL		**30**	**100**

Table 4 presents the frequency and percentage distribution of pain levels during Maternity Period I after implementing Breathing Relaxation Techniques at Royal Prima Medan Hospital in 2024. Among the respondents, nine individuals (30%) reported no pain (Tidak Nyeri), 12 individuals (40%) experienced moderate pain (Nyeri Sedang), and nine individuals (30%) felt severe pain (Nyeri Berat). This distribution indicates that most respondents experienced moderate pain during Maternity Period I after utilizing Breathing Relaxation Techniques, with an equal number of respondents experiencing no pain and severe pain, each accounting for 30% of the total sample.

Table 5. Pain Level Before and After Performing Respiratory Relaxation Techniques in Laboring Mothers in Phase I at Royal Prima Hospital.

No	Pain Level	Sum (n)	Mean	SD	Min Max
1	Pre-Breathing Relaxation Technique	**30**	**6,44**	**1,920**	**3-9**
2	Post- Breathing Relaxation Technique	**30**	**5,18**	**1,412**	**2-8**

Table 5 presents the pain levels before and after the application of Breathing Relaxation Techniques on laboring mothers during stage I labor at Royal Prima Hospital. Before the techniques, the mean pain level was 6.44, with a standard deviation of 1.920, ranging from 3 to 9 on the pain scale. Following the implementation of the techniques, the mean pain level decreased to 5.18, although the standard deviation is not specified in the table. The pain levels ranged from 2 to 8 after the techniques were applied, indicating reduced pain levels among the participants.

The data normality test uses Shapiro-Wilk because the sum of the samples used is not more than 50, and the ordinal scale is not more than 50.

Table 6. Shapiro Wilk Normality Test

	Shapiro Wilk		
	Statistic	**df**	**Sig**
Pre-Relaxation	0.664	30	0,012
Post-Relaxation	0.598	30	0,006

Table 6 shows the results of the Shapiro-Wilk normality test conducted on the data. For the Pre-Relaxation group, the Shapiro-Wilk statistic is 0.664 with 30 degrees of freedom, resulting in a significant p-value of 0.012. Similarly, the Shapiro-Wilk statistic is 0.598 with 30 degrees of freedom for the Post-Relaxation group, leading to a significant p-value of 0.006. These results indicate that the Pre-Relaxation and Post-Relaxation data are not normally distributed, as the p-values are less than the standard alpha level of 0.05. Therefore, non-parametric tests, such as the Wilcoxon Signed Rank Test, should be used for further data analysis.

Table 7. Descriptive Test Results Wilcoxon Signed Ranks Test Changes in Pain Level Before and After Performing Respiratory Relaxation Techniques in Maternity Mothers in Period I at Royal Prima Medan Hospital in 2024.

No	**Pain Level**	**Sum (n)**	**Mean**	**Z**	***p-value***
1	Respiratory Pre-Relaxation	**30**	**3.589**	**-3.118**[b]	**0.002**
2	Post- Respiratory Relaxation	**30**	**3.045**		

Table 7 presents the findings from the Wilcoxon Signed Ranks Test conducted to assess the change in pain levels before and after implementing Breathing Relaxation Techniques on laboring mothers in stage I labor at Royal Prima Medan Hospital in 2024. Before using Respiratory Pre-Relaxation techniques, the mean pain level was 3.589. After applying Post-Respiratory Relaxation techniques, the mean pain level decreased to 3.045. The Wilcoxon Signed Ranks Test resulted in a Z score of -3.118 and a significant p-value of 0.002, indicating a statistically significant difference in pain levels before and after implementing the Breathing Relaxation Techniques.

Pain is integral to labor and delivery (Wildan et al., 2012). Labor is a process of removing the results of conception (fetus and uri), which can live from the uterus through the vagina to the outside world (Sayuti & Ulandari, 2015). Meanwhile, according to (Triwidiyantari, 2021), labor is a series of physiological processes that end with the release of conception by the mother. Pain is a source of frustration for clients and health workers (Berkanis et al., 2024). Pain is a highly individualized and subjective experience that can affect all people of all ages. Pain can occur in children and adults. The causes of pain are disease processes, injuries, procedures, and surgical interventions (Kyle, T. & Carman, 2015).

Labor pain is caused by stretching the lower segment of the uterus (Setianto, 2017). The intensity of pain is proportional to the strength of contractions and the pressure that occurs; the pain increases when the mouth of the uterus is fully dilated due to the baby's pressure on the pelvic structure, followed by stretching and tearing of the birth canal. Labor pain is unique and different in each individual because pain is not only associated with physical conditions but also related to the psychological condition of the mother during labor. Based on the results of research on 30 respondents about the effect of providing Respiratory Relaxation Techniques on Period I Delivery Mothers at Royal Prima Medan Hospital in 2024, before the respiratory relaxation technique was performed, the majority of respondents felt more moderate pain while the minority of respondents experienced severe pain. Labor is associated with two different types of pain. First, pain comes from the uterine muscles; when these muscles contract, the pain that arises is called visceral pain. This pain cannot be precisely located (Pain-Pointed). Visceral pain can also be felt in other people who are not the origin, called referred pain. In labor transfer, pain can be felt in people with lower back and sacrum. At the same time, the second pain arises when approaching birth. Unlike visceral pain, this pain is localized in the vagina, rectum, and perineum around the anus. This type of pain is called somatic pain and is caused by stretching of the lower birth canal structures due to the descent of the bottom of the fetus (Sulistiawati□, 2024).

Pain sensation is produced by a complex network of nerve fibers that generate the peripheral and central nervous systems. In labor pain, the autonomic nervous system, especially the sympathetic component, plays a role in sensation. Based on the results of research on 30 respondents about Pain Levels After Being Given Respiratory Relaxation Techniques in First-Time Laboring Mothers at Royal Prima Medan Hospital in 2024, the results obtained were no pain in as many as seven people, moderate pain in as many as 11 people, severe pain as many as 12 people. Pain during labor is a normal thing to happen. The causes include physiological and psychological factors (Girsang, 2017). During the first stage of labor, pain is caused by dilatation of the cervix and lower segment of the uterus and distension of the corpus uteri. Pain during this time results from the force of contractions and the pressure

they generate. It was found that onion fluid pressure was more than 15mmHg above the tone required to stretch the uterine lower segment and cervix and thus produce pain (Magfuroh, 2012).

The results of the Wilcoxon Rank Test showed ρ -value = 0.002 ⩽ 0.05, and this means that H0 is rejected and Ha is accepted; there is an effect of providing Respiratory Relaxation Techniques on changes in pain in laboring mothers at Stage I in patients in the KIA room of Royal Prima Hospital in 2024. Labor pain during stage 1 is caused by uterine contractions delivered by sympathetic surface fibers and thoracic nerve fibers 11 and 12—pain caused by stretching the mouth of the uterus. Pain is spread through nerves from the spinal cord, namely thoracic 11 and 12 and lumbar 1. The pain that arises is felt as 10% back pain, 20% lower back pain, and most pain in the lower abdomen 70% (Sukarta, 2017). Following the theory that pain in the opening period is caused by the opening of the mouth of the uterus, for example, stretching of smooth muscles is sufficient stimulus to cause pain, there is a close relationship between the magnitude of the opening of the uterus and the intensity of pain (the more open the more pain), there is a relationship between uterine contractions, pain is felt approximately 15-30 seconds after the start of uterine contractions (Sukarta, 2017). According to (Rejeki, 2014), severe and prolonged labor pain can affect ventilation, metabolic circulation, and uterine activity. Pain during labor can cause blood pressure to increase and the mother's concentration during labor to be disturbed; it is not uncommon for pregnancy to bring "stress" or worry/anxiety, which has an impact and influence on physical and psychological, both on the mother and on the fetus she is carrying. For example, causing physical disability, a decline in intelligence, mental and emotional pain, and excessive pain will cause anxiety. Excessive anxiety also increases pain. Non-pharmacological therapy is a therapy that is used without the use of drugs but by providing various techniques that can at least slightly reduce pain when labor arrives. Some things that can be done are distraction, self-hypnosis, cutaneous stimulation, massages, warm and cold therapy, and respiratory relaxation. Respiratory relaxation is a form of nursing care in which the nurse teaches the client how to do breathing, slow breathing (holding inspiration to the maximum), and exhale slowly. Besides reducing pain, breathing relaxation techniques can also increase lung ventilation and improve blood oxygenation (Rosmiati, 2021). According to its usefulness, the respiratory relaxation technique is considered to relieve pain, taking slow breaths through the nose (holding maximum inspiration) and exhaling through the mouth slowly.

The results of this study are supported by the results of research (Sukarta, 2017), which researched the effect of respiratory relaxation on the Pain Level of labor of mothers in parts kala active phase at Lawawoi Health Center; the results of the study were 18 respondents (78.3%), moderate pain as many as five respondents (21.7%) and severe pain as many as 0 respondents. From the results of the study, it was found that there was an effect from before treatment and after treatment had a significant change in pain in laboring women. With advice, it is hoped that in the future, midwives at the Puskesmas will be able to facilitate laboring women with this breath relaxation technique to reduce pain in labor, especially in parts kala I active phase. The results of this study are almost the same as the results of research conducted by (Lestari, 2015), with the title The Effect of Breath Relaxation Techniques on Pain Adaptation Responses in Mothers Inpartu Kala I Active Phase at BPM Midwife P Kota Yogjakarta the results that the intensity of pain before being given respiratory relaxation techniques on average experienced severe pain and after being given the average respiratory relaxation technique experienced mild pain. The results of this study are also supported by research (Farida, 2016), with the title Effectiveness of Deep Breath Relaxation on Period I Labor Pain at BPM Fajar Endrowati Boyolali with the results that the breath relaxation technique is effective for reducing pain during the labor process. The main advantage is that the breath relaxation technique gives a relaxed feeling when breathing is controlled so that it can reduce pain. It provides a comfortable feeling when breathing is controlled so that it can reduce pain.

4. Conclusion

Based on the findings and analysis of the study, the conclusion that can be drawn is that the provision of respiratory relaxation techniques has a significant effect on changes in pain levels in first-time laboring women at Royal Prima Hospital in 2024. This is indicated by a p-value of 0.002, which is less than the significance level of 0.05, indicating that the observed differences do not occur by chance, and there is indeed a significant relationship between the provision of respiratory relaxation techniques and changes in pain levels in laboring women.

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