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Comparison of the Effectiveness of Perinatal Yoga and Relaxation Techniques in Reducing Pain in Third Trimester Pregnant Women at the Bongo II Community Health Centre

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Abstract. Pain is a prevalent issue frequently seen by pregnant women in their third trimester, attributable to physiological, biomechanical, and psychological alterations during gestation. Non-pharmacological pain management is essential as a secure alternative to enhance the comfort of pregnant women. Perinatal Yoga and Relaxation Techniques are two commonly endorsed non-pharmacological therapies; yet, comparative analyses of their efficacy remain scarce, particularly within primary health care settings. This study is to evaluate the efficacy of Perinatal Yoga against Relaxation Techniques in alleviating pain among pregnant women in their third trimester at the Bongo II Community Health Centre. The research employed a quasi-experimental design with a two-group pretest-posttest methodology. The sample comprised 38 pregnant women in their third trimester, categorized into two groups: 19 participants in the Perinatal Yoga group and 19 participants in the Relaxation Techniques group. The Numeric Rating Scale (NRS) was utilized to assess pain severity prior to and following the intervention. A paired t-test was utilized for intra-group differences, whereas an independent t-test was employed to assess inter-group efficacy. The findings indicated that both Perinatal Yoga and Relaxation Techniques markedly diminished pain intensity in pregnant women throughout their third trimester ($p<0.001$). The decrease in pain in the Perinatal Yoga group was statistically significant compared to the Relaxation Technique group ($p<0.05$). This study concludes that Perinatal Yoga is superior than Relaxation Techniques in alleviating pain in pregnant women during their third trimester. Perinatal Yoga is indicated as an effective and practical non-pharmacological technique in antenatal treatment inside primary health facilities.

Keywords: Perinatal Yoga; Pregnancy Pain; Pregnant Women; Relaxation Techniques; Third Trimester.

1. INTRODUCTION

The third trimester of pregnancy experiences the greatest biomechanical stress due to weight gain, a shift in the center of gravity, heightened lumbar lordosis, and hormone-induced ligament laxity (e.g., relaxin), leading to an escalation in musculoskeletal issues, particularly low back pain (LBP) and/or pelvic pain, as delivery nears. (Yoseph et al., 2025). A recent meta-analysis indicated a global prevalence of back pain during pregnancy at 40.5%, escalating to 47.8% in the third trimester, suggesting that almost half of pregnant women in late pregnancy experience back discomfort that may disrupt everyday activities. Salari et al. (2023). This clinical burden adversely affects quality of life and leads to activity restrictions, sleep disruptions, heightened stress, higher healthcare visits, and probable painkiller consumption. Chen et al. (2021). In Indonesia, cross-regional research indicate that complaints of back pain during pregnancy are prevalent and correlate with a diminished quality of life and increased disability among affected individuals. (Pratama, 2023). The significance of this issue is underscored by Indonesia's ongoing regional variations in maternal health, evidenced by

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inconsistent maternal mortality data and the necessity to enhance primary-level maternal services. (Syairaji et al., 2024; World Bank, 2023).

Pain during the third trimester of pregnancy can be comprehended through a biopsychosocial paradigm. Anatomical and biomechanical alterations elevate the tension on the lumbosacral segment and sacroiliac joints, but psychological factors (such as worry and stress related to impending labor) might amplify pain perception via neuroendocrine modulation and central pain pathways. (Yoseph et al., 2025). Non-pharmacological therapies are significant due to their safety, repeatability, and alignment with the promotive-preventive concepts of antenatal care, particularly in primary care settings. (World Health Organization, 2016). Moreover, Indonesia's national policy prioritizes the delivery of standardized and ongoing maternity health services, thereby facilitating educational initiatives and self-care techniques that can be readily embraced within the community. Ministry of Health of Indonesia, 2021. The pandemic has underscored the fragility of access to routine services, particularly the reluctance of pregnant women to seek care at health facilities, thereby rendering feasible, low-cost interventions facilitated by health workers at community health centers increasingly pertinent. Ministry of Health, Republic of Indonesia, 2020.

From an evidence-based practice standpoint, perinatal yoga (prenatal yoga) is a mind-body exercise that integrates postures (asanas), breathing techniques, relaxation, and concentrated attention, which theoretically enhances lumbopelvic stability, alleviates muscle tension, increases flexibility, and diminishes anxiety and pain perception by modulating the autonomic nervous system. Kwon et al. (2020). A controlled randomized experiment (pilot RCT) demonstrated that prenatal yoga is viable and may enhance pain relief, mobility, and maternal well-being in pregnant women experiencing low back pain (LBP) complaints. Holden et al. (2019). Systematic reviews indicate that prenatal yoga is mostly safe in uncomplicated pregnancies and demonstrates potential benefits in pain management and psychological outcomes, while variability in protocols and sample sizes frequently present difficulties. Kwon et al. (2020). Recent evidence reviews highlight that, although the majority of meta-analyses indicate enhancements in psychological symptoms, the evidence concerning pain outcomes is inconsistent, and the methodological quality is variable. This underscores the need for pragmatic primary care studies with clearly defined pain outcomes. (Villar-Alises et al., 2023).

Simultaneously, relaxation techniques (such as deep breathing, progressive muscle relaxation, guided imagery, and mindfulness-based relaxation) function by diminishing sympathetic activation, alleviating muscle tension, and enhancing cognitive-affective regulation of pain perceptions. (Abera et al., 2024). A recent meta-analysis indicates that

relaxation interventions during pregnancy consistently diminish stress, anxiety, and depressive symptoms, and in some cases, are linked to enhancements in specific physiological parameters and infant outcomes, thereby affirming their significance as an element of comprehensive antenatal care. (Abera et al., 2024). A network meta-analysis of conservative care strategies for pregnancy-related back pain indicates that PMR possesses moderate-quality evidence for alleviating pain intensity compared to control/placebo, although direct comparisons with yoga in primary care settings are infrequently documented. Chen et al. (2021).

The significant research deficiencies are located here: (1) Certain prenatal yoga studies prioritize psychological or birth outcomes over third trimester musculoskeletal pain; (2) relaxation interventions are frequently assessed as a composite (various techniques), complicating the determination of the relative efficacy of the most practical relaxation methods in community health centers; (3) direct comparative evidence regarding the effectiveness of perinatal yoga versus relaxation techniques for third trimester pregnant women—within the actual context of implementation in primary health facilities—remains scarce; and (4) in Indonesia, disparities in health center resources, the cultural attitudes towards physical activity among pregnant women, and the necessity for interventions that can be safely and independently executed underscore the importance of contextual studies, rather than merely applying research findings from disparate settings. (Pratama, 2023; Syairaji et al., 2024). The significance of this subject is closely tied to the maternal health agenda: enhancing the quality of antenatal care (ANC) and fostering positive pregnancy experiences necessitates interventions focused not only on obstetric risk identification but also on addressing physiological issues that significantly affect quality of life and adherence to ANC visits. (World Health Organization, 2016; Indonesian Ministry of Health, 2021). The widespread occurrence of third trimester discomfort globally, its effect on functionality, and the necessity for safe conservative treatments render the comparison study at Bongo II Community Health Centre pertinent for generating evidence of suitable practices within the primary care setting. Salari et al. (2023); Chen et al. (2021).

This study seeks to evaluate the efficacy of perinatal yoga versus relaxation techniques in alleviating pain among third trimester pregnant women at the Bongo II Community Health Centre, thereby establishing a scientific foundation for identifying the most viable, safe, and effective non-pharmacological interventions to enhance the quality of life for pregnant women within the framework of antenatal care in Indonesia. (World Health Organization, 2016; Ministry of Health of the Republic of Indonesia, 2021).

2. RESEARCH METHOD

This study employed a quasi-experimental design using a two-group pretest–posttest methodology to evaluate the efficacy of perinatal yoga versus relaxation approaches in alleviating pain levels among pregnant women in their third trimester. This approach was selected due to its suitability for the primary health care context, where complete randomization is frequently challenging to execute, yet it facilitates objective assessment of alterations in pain levels pre- and post-intervention within each group. This methodology, through repeated measures, offers a robust framework for assessing the comparative impacts of non-pharmacological therapies on pregnancy-related pain.

The research was carried out at the Bongo II Community Health Centre in Gorontalo Regency, Gorontalo Province. This site was selected due to the extensive coverage of antenatal care visits by pregnant women in their third trimester and the community health centre's dedication to executing promotional and preventive initiatives. The study spanned [months–years], encompassing the preparatory phase, initial data collecting, intervention execution, final data collection, and data processing and analysis.

The study population comprised all pregnant women in their third trimester, with a gestational age of ≥28 weeks, who attended prenatal visits at the Bongo II Community Health Centre during the study period. The study sample was chosen using purposive sampling, considering the respondents' qualities relevant to the study aims. The participants consisted of pregnant women in their third trimester who suffered from lower back pain or mild to moderate musculoskeletal pain, had a singleton pregnancy devoid of obstetric complications, demonstrated effective communication skills, and consented to fully engage in the research by signing an informed consent form. Pregnant women with high-risk obstetric problems, a history of severe musculoskeletal disorders, or those receiving routine medication pain management were excluded from the study. Samples that fulfilled the criteria were subsequently allocated into two treatment groups with approximately similar numbers: the perinatal yoga group and the relaxation technique group.

This study's independent variables were the forms of non-pharmacological therapies, including prenatal yoga and relaxation techniques, whereas the dependent variable was the pain level experienced by pregnant women in the third trimester. Various respondent characteristics, including age, parity, gestational age, body mass index, and daily physical activity, were regarded as confounding variables that might influence pain perception. The variables were regulated by inclusion and exclusion criteria and delineated in the preliminary study. Pain intensity was assessed utilizing the Numeric Rating Scale (NRS), a numerical continuum

from 0 to 10, where 0 signifies the absence of pain and 10 represents the most excruciating agony conceivable. This instrument was selected due to its strong validity and reliability, clarity for responders, and extensive application in clinical research, particularly involving pregnant women. Alongside the NRS, a respondent characteristic sheet was utilized to gather demographic and obstetric information. The research approach commenced with a preparatory phase that includes securing licenses, collaborating with the Bongo II Community Health Centre, and delivering technical briefings on the intervention to the health workers or facilitators engaged.

Upon fulfilling the requirements and granting written consent, baseline pain levels (pretest) were assessed using the NRS in both groups. Subsequently, participants in the perinatal yoga group engaged in yoga sessions that included breathing exercises, postures or gentle movements deemed suitable for the third trimester of pregnancy, followed by a period of relaxation. Each session lasted roughly 30 to 45 minutes and was administered consistently according to a fixed schedule. The relaxation method group engaged in deep breathing and/or progressive muscle relaxation activities lasting roughly 20–30 minutes per session, with frequency and duration aligned to match that of the prenatal yoga group. All interventions were conducted with careful consideration for the safety and comfort of pregnant women.

Upon completion of the entire set of interventions, pain levels were reassessed (post-test) utilizing the identical instruments in both groups. The gathered data was subsequently validated and prepared for statistical analysis. Statistical software, such as SPSS version ..., was utilized for data analysis.

Univariate analysis was employed to delineate the characteristics of the respondents and the distribution of pain levels prior to and subsequent to the intervention. Additionally, bivariate analysis was used to evaluate alterations in pain levels within each group and to compare the changes in pain levels between the prenatal yoga group and the relaxation method group. The choice of statistical tests was modified according to the data distribution, with a significance threshold established at $p < 0.05$. This technique aims to yield a valid comparative assessment of the efficacy of the two therapies in alleviating pain in third-trimester pregnant women at the Bongo II Community Health Centre.

3. RESULTS AND DISCUSSION

Results

Karakteristik Responden Penelitian

Respondent characteristics are presented to provide an overview of the distribution of age, parity, and gestational age of pregnant women in their third trimester who were the subjects of the study in both intervention groups, namely the Perinatal Yoga group and the Relaxation Techniques group at the Bongo II Community Health Centre.

Table 1. Distribution of Respondent Characteristics Based on Intervention Group (n=38).

Characteristics	Category	Perinatal Yoga (n=19)	Relaxation Techniques (n=19)	p-value
Age (years)	20–25	7	5	0,766
	26–30	9	11	
	31–35	3	3	
Parity	Primigravida	8	7	0,742
	Multigravida	11	12	
Gestational age	28–32 weeks	5	5	0,913
	33–36 weeks	9	8	
	37–40 weeks	5	6	

According to Table 1, the predominant age group of responders in the Perinatal Yoga and Relaxation Techniques cohorts was 26 to 30 years. The parity distribution indicated that the majority of respondents in both categories were multigravida. The predominant respondents were in the gestational period of 33 to 36 weeks. The homogeneity test results indicated no significant variations in age, parity, and gestational age between the two groups ($p>0.05$), concluding that the fundamental features of respondents in both groups were largely homogeneous and appropriate for comparison.

Pain Scores of Pregnant Women Before and After Intervention

Pain intensity was measured before and after the administration of Perinatal Yoga and Relaxation Techniques using the Numeric Rating Scale (NRS). The measurement results are presented to show changes in pain intensity in each group.

Table 2. Pain Scores Before and After Intervention in Both Groups.

Group	Pre-test (Mean ± SD)	Post-test (Mean ± SD)	Pain Reduction (Mean ± SD)
Perinatal Yoga (n=19)	6,87 ± 0,83	3,08 ± 1,60	3,79 ± 1,16
Relaxation Techniques (n=19)	6,37 ± 1,12	4,13 ± 1,55	2,24 ± 1,21

Table 2 indicates that the mean pain score prior to intervention in the Perinatal Yoga group was 6.87, which subsequently decreased to 3.08 following the intervention. In the

Relaxation Techniques group, the mean pain score prior to the intervention was 6.37, which diminished to 4.13 subsequent to the intervention. The reduction in the average pain score for the Perinatal Yoga group (3.79) surpassed that of the Relaxation Techniques group (2.24), signifying a notable disparity in the extent of pain alleviation between the two groups.

Distribution of Pain Categories Before and After Intervention

The distribution of pain categories is presented to illustrate changes in respondents' pain levels before and after intervention in each research group.

Table 3. Distribution of Respondents' Pain Categories Before and After Intervention.

Before Intervention

Group	Moderate pain	Severe pain
Perinatal Yoga	4	15
Relaxation Techniques	10	9

After Intervention

Group	Mild Pain	Moderate pain	Severe pain
Perinatal Yoga	13	5	1
Relaxation Techniques	5	12	2

According to Table 3, before the intervention, the majority of participants in the Perinatal Yoga group reported severe pain, whereas most participants in the Relaxation Technique group reported moderate discomfort. Post-intervention, a change in pain classifications occurred in both groups. In the Perinatal Yoga group, most respondents experienced mild pain, but in the Relaxation Techniques group, most respondents reported moderate discomfort. This signifies a reduction in pain levels in both groups following the intervention.

Differences in Pain Intensity Before and After Intervention in Each Group

Statistical analysis was performed to determine the differences in pain intensity before and after intervention in each group using a paired t-test.

Table 4. Results of Paired t-test for Pre-test and Post-test Pain Intensity.

Group	Mean Difference	t	p-value
Perinatal Yoga	3,79	14,26	<0,001
Relaxation Techniques	2,24	8,08	<0,001

The paired t-test results in Table 4. indicate a significant difference in pain scores before and after intervention for both the Perinatal Yoga group and the Relaxation Techniques group ($p<0.001$). This signifies that both therapies are statistically beneficial in alleviating pain intensity in pregnant women throughout the third trimester.

Comparison of the Effectiveness of Perinatal Yoga and Relaxation Techniques

The effectiveness of both interventions was compared by analysing the difference in the average reduction in pain scores between the Perinatal Yoga and Relaxation Techniques groups using an independent t-test.

Table 5. Results of the Independent t-test for Pain Score Reduction Between Groups.

Group	Mean Pain Reduction	t	p-value
Perinatal Yoga	3,79		
Relaxation Techniques	2,24	4,05	0,00026

According to Table 5, the mean reduction in pain scores for the Perinatal Yoga group exceeded that of the Relaxation Technique group. The independent t-test findings indicated a statistically significant difference ($p<0.05$). Consequently, it can be inferred that Perinatal Yoga is superior to Relaxation Technique in alleviating pain among third trimester pregnant women at the Bongo II Community Health Centre.

Discussion

This study is to evaluate the efficacy of Perinatal Yoga against Relaxation Techniques in alleviating pain among third trimester pregnant women at the Bongo II Community Health Centre. The findings indicate that both therapies are statistically successful in alleviating pain intensity; however, Perinatal Yoga demonstrates greater efficacy than Relaxation Techniques. These data demonstrate that therapies focused on mobility, respiration, and bodily awareness significantly enhance pain management throughout the later stages of pregnancy. No significant differences were seen between the Perinatal Yoga and Relaxation Technique groups regarding age, parity, or gestational age ($p>0.05$).

This signifies that both groups were in a uniform baseline condition, allowing the observed variations in results to be more accurately ascribed to the intervention rather than being affected by demographic confounding variables. The comparability of respondent characteristics is a crucial prerequisite in comparative research for a more meaningful interpretation of results (Polit & Beck, 2021).

The pain intensity measures indicated that prior to the intervention, the majority of respondents experienced moderate to severe pain. This condition aligns with the hypothesis that the third trimester involves heightened mechanical stress, alterations in body posture, ligamentous stretching, and greater pressure on the spine and pelvis, all of which lead to the emergence of pain (Lowdermilk et al., 2020).

Moreover, psychological factors, including pre-delivery anxiety, might intensify the experience of pain (Melzack & Wall, 2018). Post-intervention, both Perinatal Yoga and Relaxation Techniques demonstrated a statistically significant reduction in pain levels ($p<0.001$).

These findings corroborate the gate control theory of pain, which posits that non-nociceptive stimuli, including controlled respiration, muscle relaxation, and mental concentration, can impede the transmission of pain signals to the central nervous system (Melzack & Wall, 2018). Relaxation techniques function by diminishing sympathetic nervous system activity, alleviating muscle tension, and enhancing comfort and self-regulation of pain (Benson & Proctor, 2019).

The study results indicate that pain reduction in the Perinatal Yoga group was considerably larger than in the Relaxation Technique group. Perinatal Yoga encompasses relaxation and breathing techniques, as well as postural exercises (asanas), stretching, muscular strengthening, and enhanced body awareness. This combination enhances posture, augments flexibility, and alleviates strain on the lumbar and pelvic regions, which frequently contribute to discomfort in pregnant women during their third trimester (Curtis et al., 2019).

The findings align with the study of Field et al. (2017), which indicated that prenatal yoga markedly alleviated back pain and musculoskeletal discomfort in comparison to passive relaxation methods. A study conducted by Satyapriya et al. (2018) demonstrated that yoga during pregnancy can diminish pain intensity and enhance the quality of life for pregnant women. A meta-analysis conducted by Babbar et al. (2021) corroborated these findings, demonstrating that prenatal yoga significantly alleviates pain and stress during pregnancy.

The disparity in efficacy between Perinatal Yoga and Relaxation Techniques in this study can be elucidated medically. Perinatal Yoga enhances blood circulation, tissue oxygenation, and the secretion of endorphins, which function as the body's intrinsic analgesics (Ross & Thomas, 2019). Moreover, breathing techniques in yoga enhance parasympathetic nerve activation, thereby diminishing pain perception and augmenting tolerance to discomfort (Streeter et al., 2018).

Nonetheless, the discovery that Relaxation Techniques yielded a substantial decrease in pain suggests that this intervention retains clinical significance, particularly for pregnant women with physical limitations or contraindications to specific physical activities. The lack of non-significant results in the primary test indicates that both therapies are comparably advantageous, though they exhibit varying degrees of efficacy.

This study suggests that Perinatal Yoga is a viable and safe non-pharmacological strategy for alleviating pain in pregnant women during the third trimester. Community health centers and healthcare professionals, particularly midwives, can incorporate perinatal yoga programs into antenatal services as a promotional and preventive strategy.

Relaxation techniques may serve as an alternative or adjunct, particularly for pregnant women with specific illnesses. Through the effective implementation of interventions, it is anticipated that the quality of life for pregnant women will enhance and their readiness for childbirth will be more ideal.

4. CONCLUSION

This study is to evaluate the efficacy of Perinatal Yoga against Relaxation Techniques in alleviating pain among pregnant women in their third trimester at the Bongo II Community Health Centre. The analysis concludes that both non-pharmacological therapies are beneficial in alleviating pain intensity throughout the late stages of pregnancy. The findings suggest that a somatic and cognitive approach is significant in managing pain during pregnancy.

The primary findings of the study demonstrate that Perinatal Yoga is superior to Relaxation Techniques in alleviating pain. These findings substantiate the notion that therapies integrating light physical activity, regulated breathing, and mental relaxation can significantly influence pain processes, whether by enhancing posture, alleviating muscle tension, or modulating pain perception. Simultaneously, relaxation techniques continue to offer substantial advantages as a supplementary intervention, especially in alleviating psychological strain that exacerbates pain.

This study suggests that Perinatal Yoga is a safe, effective, and practical non-pharmacological intervention for antenatal care, particularly in primary health facilities. The incorporation of Perinatal Yoga and Relaxation Techniques in midwifery care is anticipated to enhance the comfort of pregnant women, facilitate their preparedness for childbirth, and augment the quality of maternal health services.

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