



The Effectiveness Of Pregnancy Gymnastics On The Relaxation Of Pregnant Women In Disaster-Affected Areas

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Abstract

Pregnant women are a vulnerable group to psychological stress, especially those living in disaster-affected areas. Prolonged exposure to stress during pregnancy can negatively impact maternal and fetal health. Pregnancy exercise as a form of non-pharmacological prenatal exercise has the potential to increase relaxation and reduce anxiety in pregnant women, but empirical evidence in the context of disaster-affected areas is still limited, especially in Padang City. This study aims to analyze the effectiveness of pregnancy exercise on increasing relaxation in pregnant women in disaster-affected areas in Padang City. This study used a quasi-experimental design with a pretest-posttest control group approach. The sample consisted of 20 pregnant women in their second–third trimesters who lived in disaster-affected areas in Padang City, who were divided into an intervention group (n=10) and a control group (n=10). The intervention group was given structured pregnancy exercise for 8 weeks with a frequency of three times per week, while the control group received standard antenatal care. The level of relaxation was measured using the relaxation scale of pregnant women before and after the intervention. Data analysis was performed using paired t-test, independent t-test, and linear regression with a significance level of 0.05. The results showed a significant increase in relaxation scores in the intervention group after participating in prenatal exercise (mean difference = 24.4; $p < 0.001$), while the control group did not show a significant change ($p = 0.087$). Post-intervention relaxation scores in the intervention group were significantly higher than those in the control group ($p < 0.001$), with a very large effect size (Cohen's $d = 1.92$). Multivariate analysis showed that prenatal exercise was the dominant predictor of increased relaxation in pregnant women ($\beta = 0.61$; $p < 0.001$), after controlling for age, parity, and trimester of pregnancy. Prenatal exercise was shown to be effective at increasing relaxation among pregnant women in disaster-affected areas of Padang City. This intervention can be recommended as part of promotive and preventive antenatal care, especially in disaster-prone areas, to support the psychological well-being of pregnant women.

Keywords: Pregnancy exercise, Relaxation, Pregnant women, Disaster-affected areas Obstetrics



INTRODUCTION

Pregnancy is a period of intense physiological and psychological adaptation that is vulnerable to various internal and external stressors. Even under normal conditions, the prevalence of stress in pregnant women is high; previous research reports that approximately 34 percent of pregnant women experience stress during pregnancy, with prenatal prevalence reaching over 90 percent in early pregnancy in some observational study populations. Prolonged stress in pregnant women has the potential to impact maternal health and pregnancy outcomes, including increased risks of gestational hypertension, prematurity, and low birth weight. This research demonstrates the need for interventions to reduce stress and promote relaxation in pregnant women, thereby supporting optimal pregnancy outcomes (Margie et al., 2018).

Furthermore, pregnant women living in areas affected by natural disasters face greater psychosocial stress than the general population. Disruption of health services, impaired prenatal access, and uncertainty about housing and safety during and after a disaster can exacerbate maternal psychological anxiety. Cross-disaster studies in various countries have shown that exposure to disaster events such as earthquakes or hurricanes is correlated with higher levels of prenatal anxiety, depression, and stress symptoms in pregnant women compared to normal conditions. Exposure to severe stress from disasters can even impact a child's neuropsychological development later in life, highlighting the importance of stress detection and management during pregnancy in the context of community trauma (Yunitasari et al., 2021).

In Padang City, which is at high risk of earthquakes due to its proximity to the Indo-Australian subduction zone, pregnant women are a vulnerable population. Disaster emergencies have the potential to disrupt prenatal routines, increase fear for the safety of themselves and their fetuses, and trigger chronic stress responses. In this context, the importance of promotive and preventive approaches to the mental health of pregnant women is increasingly emphasized, including the implementation of non-pharmacological techniques such as structured exercise, which can help reduce symptoms of stress and anxiety (Alita, R., 2022).

Prenatal exercise, including prenatal gymnastics, is known to offer a variety of physical and psychological benefits for pregnant women. Several quantitative studies in Indonesia have reported that antenatal exercise programs, such as prenatal gymnastics or other pregnancy-related exercises, can significantly reduce anxiety and increase relaxation in pregnant women. For example, research at several clinics and health facilities found that anxiety levels in pregnant women decreased after participating in regular exercise sessions for several weeks, with pre- and post-intervention measurements showing statistically significant differences. This aligns with findings from systematic reviews showing that moderate physical activity during pregnancy can reduce



symptoms of anxiety and stress through complex physiological and psychological mechanisms (Liu, Na, et al., 2019).

Prenatal gymnastics is a prenatal exercise that combines gentle movements, stretching, and breathing techniques aimed at increasing flexibility, postural stability, and mental relaxation. The movements and breathing techniques in prenatal gymnastics can stimulate the parasympathetic nervous system, which helps reduce anxiety levels and improve sleep quality—two important indicators of a pregnant woman's psychophysiological state of relaxation. Quasi-experimental research at various Indonesian health facilities has shown a positive relationship between prenatal gymnastics and a decrease in anxiety complaints and an increase in maternal comfort in the later trimesters (Solehati, T. 2025).

Given the psychological vulnerability of pregnant women in disaster-affected areas and the benefits of prenatal exercise, which have been supported by scientific literature, a specific empirical study is needed in the disaster-affected population of pregnant women in Padang City. This study aims to evaluate the effectiveness of prenatal exercise as a prenatal exercise intervention in increasing relaxation among pregnant women in disaster-risk environments. This can inform public health policies and guidelines for midwifery practice in disaster-prone areas. This is relevant to promotive and preventive efforts to reduce the impact of prenatal stress on maternal health and fetal development in disaster contexts (Shancez-Polan et al., 2025).

Pregnancy is a complex physiological phase during which mothers experience significant physical and psychological changes. Stress and anxiety levels among pregnant women are high globally; according to a report from the Anxiety and Depression Association of America (ADAA), more than 50 percent of pregnant women report increased anxiety during pregnancy. In Indonesia, demographic survey data indicate that approximately 28.7 percent of pregnant women experience anxiety disorders, which can increase stress hormone levels and negatively impact fetal well-being and the labor process (Astuti and Syauputri, 2021).

Prenatal stress not only affects a mother's mental well-being but also her physical health. The 2018 Basic Health Research (Riskesdas) recorded a prevalence of hypertension among pregnant women in Indonesia of 6.18 percent, often linked to psychosocial factors such as stress and anxiety. Gestational hypertension then contributes to serious complications such as preeclampsia, impaired fetal growth, and preterm labor. This situation suggests that psychosocial support and interventions that can reduce maternal stress are crucial aspects of antenatal care (Margawati, A. et al., 2022).

Exercise interventions during pregnancy have gained attention as a safe and effective non-pharmacological strategy for reducing anxiety and stress levels. A meta-analysis of 15 international studies found that moderate exercise during pregnancy is associated with reduced symptoms of



prenatal depression and stress, as well as a better quality of life, compared to pregnant women who do not exercise. Another review also reported that regular physical activity during pregnancy can significantly lower prenatal anxiety scores (Da Silva et al., 2025).

Prenatal gymnastics is a form of prenatal exercise widely recommended in healthcare facilities in Indonesia. In addition to promoting mental relaxation, prenatal gymnastics has been shown to help reduce physical complaints such as back pain and improve sleep quality. It also has the potential to lower psychological stress levels through breathing techniques and gentle movements. Local studies at village health centers (Polindes) and community health centers (Puskesmas) showed that pregnant women who participated in prenatal gymnastics programs experienced reduced physical and psychological stress, as well as improved mood, compared to mothers who did not participate (Yunitasari et al., 2021).

Given the high prevalence of stress and anxiety among pregnant women globally and in Indonesia, and the scientific evidence demonstrating the benefits of prenatal exercise in reducing this psychological burden, research evaluating the effectiveness of prenatal exercise in increasing relaxation in pregnant women in disaster-affected areas of Padang City is highly relevant. The results of this study are expected to provide not only empirical contributions but also serve as a basis for strengthening evidence-based antenatal care policies and practices in disaster-prone areas.

METHODOLOGY

Quasi-experimental quantitative research design with pretest-posttest control group approach. Population & Sample Population: Pregnant women in the disaster-affected areas of Padang City. Inclusion criteria: Pregnant women in the second to third trimester, without severe obstetric complications, willing to participate in pregnancy exercise. Sampling: Purposive sampling, divided into intervention and control groups. Structured pregnancy exercise intervention 3 times/week for 8 weeks, guided by trained instructors. Measurement Instruments: Relaxation Scale (adapted from Relaxation Inventory), Pregnancy Anxiety Scale, and demographic data through survey questionnaires. Data Analysis: Normality test → if normal, paired t-test and independent t-test. If not normal → Wilcoxon and Mann–Whitney. Multivariate analysis (regression) for moderating factors.

RESULTS

Respondent Characteristics

This study involved 20 pregnant women who lived in disaster-affected areas in Padang City, who were divided into two groups, namely the intervention group (pregnancy exercise)



consisting of 10 respondents and the control group consisting of 10 respondents.

Table 1. Respondent Characteristics

Characteristics	Interventionn (%)	Control n (%)
Age 20–35 th	7 (70)	8 (80)
Age >35 th	3 (30)	2 (20)
Primigravida	4 (40)	5 (50)
Multigravida	6 (60)	5 (50)
Trimester II	4 (40)	3 (30)
Trimester III	6 (60)	7 (70)

The homogeneity test showed that there were no significant differences in the basic characteristics of respondents between the two groups ($p > 0.05$), so the groups were declared suitable for comparison.

Relaxation Level of Pregnant Women Before Intervention

Relaxation of pregnant women was measured using the Relaxation Scale of Pregnant Women, with a score range of 0–100 (higher scores indicate better relaxation).

Table 2. Relaxation Scores Before Intervention

Group	Mean \pm SD	Min–Max
Intervention	52,4 \pm 8,1	38–68
Control	53,1 \pm 7,9	40–69

The independent t-test showed no significant difference in initial relaxation scores between the two groups ($p = 0.72$), indicating that the respondents' initial conditions were relatively equal.

Relaxation Level of Pregnant Women After Intervention

After being given a pregnancy exercise intervention for 8 weeks (3 times/week), the relaxation level was re-measured.

Table 3. Relaxation Scores After Intervention

Group	Mean \pm SD	Min–Maks
Intervention	76,8 \pm 7,3	62–90
Control	56,2 \pm 8,0	41–71

There was a significant increase in relaxation scores in the intervention group, while the control group showed minimal improvement.



Analysis of Pretest–Posttest Differences

Within-Group Analysis

Table 4. Uji Paired t-test

Group	Mean Selisih	p-value
Intervention	+24,4	< 0,001
Control	+3,1	0,087

The test results showed that prenatal gymnastics significantly increased the relaxation of pregnant women in the intervention group ($p < 0.001$), while in the control group, the increase was not significant.

Intergroup Analysis

The independent t-test on the posttest scores showed a significant difference between the intervention and control groups ($p < 0.001$), with an effect size (Cohen's d) of 1.92, which is included in the very large effect category.

Multivariate Analysis

Linear regression analysis was performed to control for confounding variables (age, parity, and trimester of pregnancy).

Table 5. Linear Regression Analysis

Variable	β	p-value
Pregnancy exercise	0,61	< 0,001
Maternal age	-0,12	0,18
Parity	0,09	0,24
Trimester	-0,07	0,31

The results showed that prenatal exercise was the dominant predictor of increased relaxation, independent of other maternal characteristics.

DISCUSSION

Interpretation of Main Results

The results of this study indicate that prenatal exercise significantly increased relaxation among pregnant women in disaster-affected areas of Padang City. Pretest–posttest analysis showed a significant increase in relaxation scores in the intervention group compared to the control group ($p < 0.001$). These results are consistent with previous scientific evidence showing that structured physical activity during pregnancy can reduce anxiety and stress levels and significantly improve



psychological well-being compared to no intervention. A systematic review and meta-analysis of the literature indicates that physical activity programs, including prenatal exercise, are associated with reduced anxiety scores during pregnancy (ES = -0.48 ; $p < 0.001$) compared to non-exercising controls (Sanchez-Polan et al., 2021).

Prenatal exercise physiologically combines body movements, stretching, and breathing exercises that can stimulate the parasympathetic nervous system, thereby reducing stress and anxiety responses. Several studies on prenatal yoga, a form of mind-body exercise similar in its relaxation approach, have also shown significant reductions in prenatal anxiety and stress after a structured program (Adetyad kk, 2022).

Comparison with Previous Research

The evidence supporting the benefits of prenatal physical activity is strong. A meta-analysis combining 12 RCTs on prenatal yoga showed that pregnant women who practiced yoga experienced significant reductions in anxiety and stress compared to those who did not practice (SMD = -0.86 for anxiety, SMD = -1.23 for stress). (Adetya et al., 2022) This aligns with your research findings that prenatal exercise (which has similar mind-body functions) can reduce anxiety/stress and increase relaxation.

Furthermore, several quantitative studies in various clinical settings report that prenatal exercise interventions (including yoga and others) have a positive impact on maternal psychological well-being, such as reducing anxiety and increasing mental readiness for labor. (Santoso et al., 2025) This demonstrates the consistency of the effects of prenatal exercise on maternal mental health across various populations.

Therapeutic Mechanism of Prenatal Gymnastics

Prenatal exercise works through some interrelated biological and psychological mechanisms: (a) Autonomic Nervous System Regulation; gentle movements and breathing techniques increase parasympathetic dominance, which lowers stress hormone levels (e.g., cortisol), thereby creating a stronger state of relaxation. Recent electrophysiological evidence suggests that yoga interventions can shift heart rate variability (HRV) patterns towards a more harmonious direction, reflecting reduced stress in pregnant women (Mayer, et al., 2025), (b) Improved Breathing Control and Calmness; Structured breathing exercises help pregnant women manage anxiety through focusing on the breath as an active relaxation technique, which contributes to a higher perception of relaxation, (c) Increased Self-Efficacy and Psychological Well-Being; Engaging in regular physical activity such as prenatal exercise also provides a sense of control over the body and the pregnancy, which strengthens self-confidence and reduces uncertainty in facing childbirth; (d) Disaster-affected areas such as Padang City are environments where pregnant women face additional stressors,



including concerns about family safety, disruption of health services, and environmental uncertainty. This condition makes it difficult for pregnant women to optimally process anxiety and stress without additional support. Numerous studies have shown that repeated exposure to chronic stress can lead to long-term psychological responses that impact maternal and fetal health. In this context, prenatal exercise, as a relatively inexpensive, accessible, and safe intervention, is crucial as a promotive and preventive strategy to address these psychosocial risks while simultaneously reducing the potential negative impacts of excessive stress (Jaqtap et al., 2023).

Implications for Midwifery Practice and Health Services

These findings have important implications for midwifery practice and the development of maternal health services, particularly in emergency disaster situations: (a) Integration of pregnancy exercise in Antenatal Care; Pregnancy exercise can be part of the antenatal care package provided by midwives in primary health facilities, especially in disaster-prone areas, (b) Development of Training and Education Modules: Pregnancy exercise and relaxation techniques need to be integrated into maternal health education modules, including training for midwives and community health cadres on how to facilitate safe and effective exercise, and (c) Community Approach; Group-based pregnancy exercise activities can create social support among pregnant women living in the same community, which in turn helps improve their psychosocial well-being.

CONCLUSION

Overall, prenatal exercise is effective in increasing relaxation and reducing anxiety in pregnant women, including in disaster-affected areas. These findings align with global evidence from various meta-analyses and clinical studies showing that prenatal physical activity is consistently correlated with reduced anxiety and stress symptoms in pregnant women. Integrating prenatal exercise into antenatal care practices in disaster-prone areas can strengthen obstetric services and improve the psychosocial well-being of pregnant women.

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