e-ISSN: 3030-878X

The 5th International Conference on Nursing and Public Health **(ICONPH)**

Effectiveness of Slow Deep Breathing Therapy in First-Trimester Pregnant Women in Hypertension

Nazira Rifqi Amelia Putri[1], Tria Eni Rafika Dewi[2*], Febrika Devi Nanda[3]

[1,2] Diploma in Midwifery, Rustida College of Health Sciences, Banyuwangi, Indonesia
[3] Diploma in Nursing, Rustida College of Health Sciences, Banyuwangi, Indonesia
**Corresponding author: enitria944@gmail.com*

ABSTRACT

Background: Hypertension in pregnancy is defined as an increase in blood pressure of ≥140/90 mmHg occurring after 20 weeks of gestation, and it remains one of the leading causes of maternal morbidity and mortality. **Object:** This study aims to determine the effectiveness of slow deep breathing therapy in reducing blood pressure among first-trimester pregnant women with hypertension in the working area of Sepanjang Glenmore Community Health Center, Banyuwangi. **Methode:** This research employed a quantitative approach using a pre-experimental one-group pretest–posttest design. The sample consisted of 33 first-trimester pregnant women with hypertension, selected through consecutive sampling. The intervention slow deep breathing therapy was performed for 15 minutes per session, three times daily, over three consecutive days. Blood pressure was measured before and after the intervention and analyzed using the Wilcoxon Signed-Rank Test. **Results:** Pre-test data indicated that 100% of respondents were classified as having mild hypertension. After the intervention, post-test results showed that the majority of respondents were in the pre-hypertension category (81.82%), followed by normal (12.12%), and only 6.06% remained in mild hypertension. The Wilcoxon test demonstrated a significant reduction in both systolic and diastolic blood pressure, with an Asymp. Sig. (2-tailed) = 0.000 ($p < 0.05$). **Conclusion:** Slow deep breathing therapy proved effective in reducing blood pressure among first-trimester pregnant women with hypertension. This technique is expected to serve as a non-pharmacological intervention reference for midwives, particularly in the Sepanjang Glenmore Community Health Center area, to support hypertension control efforts during pregnancy.

Keywords: Slow Deep Breathing Therapy, Pregnant Women with Hypertension

BACKGROUND

Hypertension during pregnancy is one of the major contributors to maternal mortality worldwide. Alongside hemorrhage and infection, hypertension remains a leading cause of pregnancy-related complications. It is estimated that approximately 10% of pregnant women experience hypertension, which often presents without specific symptoms and therefore poses a serious risk if not promptly detected and managed. Hypertension occurring during pregnancy represents a potentially dangerous complication that may arise at various stages of gestation, including the postpartum period.

The onset or course of hypertension in pregnancy may begin as chronic hypertension, defined as high blood pressure that exists prior to pregnancy or is detected before 20 weeks of gestation. This type of hypertension generally persists for more than 12 weeks postpartum and is most commonly caused by primary or essential hypertension (Nurfatimah et al., 2020).

According to data from the World Health Organization (WHO, 2023), hypertension in pregnancy affects approximately 10% of all pregnancies globally and is one of the leading causes of maternal death. In Indonesia, pregnancy-induced hypertension is the second leading cause of maternal mortality after hemorrhage. The 2022 Indonesian Demographic and Health Survey (SDKI) reported that the prevalence of hypertension among pregnant women reached 12.8%, with nearly 30% of maternal deaths attributed to hypertensive complications. In East Java Province, this condition is also a serious concern, with the regional health profile reporting a prevalence of 17.8%, and Banyuwangi District recording 15.3%. These high rates underscore the urgent need for effective preventive and management strategies to minimize complications for both mothers and infants (Kontesah et al., 2023).

This finding is consistent with the theory proposed by Prawirohardjo (2013), which identifies several risk factors associated with hypertension in pregnancy, including primigravidity, primipaternity, maternal age, kidney disease, a history of pre-pregnancy hypertension, hyperplacentosis, and obesity. After 20 weeks of gestation, elevated blood pressure may progress to preeclampsia, a condition characterized by hypertension accompanied by proteinuria and clinical symptoms such as severe headaches, visual disturbances, and seizures. In some pregnant women, gestational hypertension may also occur defined as elevated blood pressure after 20 weeks of gestation without the presence of proteinuria, which typically returns to normal after childbirth.

Given that hypertension can occur in any group of pregnant women, it is essential that healthcare providers at all levels national and local understand appropriate management strategies. Maternal mortality remains a major public health issue in Indonesia, with hypertension as one of its primary causes. Hypertension is defined as blood pressure ≥140/90 mmHg, while normal blood pressure is below 120/80 mmHg. In the third trimester, elevated blood pressure is often related to anxiety about pregnancy and childbirth, as well as physical discomfort (Nurfatimah et al., 2020).

One of the non-pharmacological methods proven effective in lowering blood pressure is the slow deep breathing therapy technique. This method stimulates the parasympathetic nervous system while reducing sympathetic nervous system activity, thereby helping to lower blood pressure (Friskia et al., 2024).

RESEARCH METHODS

Materials and Method

This study employed a quantitative research design using a pre-experimental one-group pretest–posttest approach. The study was conducted from June to July 2025. The independent variable in this study was *slow deep breathing therapy*, while the dependent variable was *blood pressure in pregnant women with hypertension*.

Description of Materials or Research Subjects

The study population consisted of all first-trimester pregnant women diagnosed with hypertension who resided in the working area of Sepanjang Community Health Center, Banyuwangi, with a total population of 41 individuals. The sample was selected using a consecutive sampling technique, involving all first-trimester pregnant women with hypertension who met the inclusion criteria and agreed to participate. A total of 33 pregnant women were included as research respondents.

Research Design

This study used a one-group pretest–posttest design, in which blood pressure measurements were taken before

and after the intervention to determine the effect of the therapy.

Research Procedure

Data collection was carried out through an observational and interventional approach using the one-group pretest–posttest design. Primary data were obtained by measuring. respondents' blood pressure before and after performing slow deep breathing therapy. Blood pressure was measured using a digital sphygmomanometer to ensure measurement accuracy.

The research was conducted in several systematic stages.

1. Preparation stage: This included obtaining research permits, informing respondents about the study objectives and procedures, and obtaining informed consent from each participant.
2. Pretest: Baseline blood pressure measurements were taken from pregnant women who met the inclusion criteria.
3. Intervention: Respondents were instructed to perform slow deep breathing therapy for 15 minutes per session, conducted three times daily for three consecutive days.
4. Posttest: After the intervention period, blood pressure was measured again using the same instrument to evaluate the effect of the therapy.

Instruments and Equipment

The instruments used in this study included a slow deep breathing therapy implementation sheet, a blood pressure observation sheet, a respondent characteristics questionnaire, and a digital Omicron sphygmomanometer. All instruments and questionnaires underwent validity and reliability testing prior to use.

Data Collection Methods

Data collection was conducted through direct observation and intervention, following the one-group pretest–posttest design. Primary data were collected by measuring blood pressure before and after the intervention.

Data Analysis

To determine the effect of slow deep breathing therapy on blood pressure among pregnant women with hypertension, data were analyzed using the Wilcoxon Signed-Rank Test, as the results of the normality test indicated that the data were not normally distributed.

Ethical approval for this study was obtained from the Health Research Ethics Committee (KEPK) of STIKES Rustida.

RESULTS AND DISCUSSION

Univariate Analysis

Table 1.
Characteristics of Respondents by Age

Age (years)	Frequency (n)	Percentage (%)
<20	0	0%
20-35	19	57.58%
>35	14	42.42%
Total	**33**	**100%**

Based on Table 1, which presents the characteristics of respondents by age in the working area of Sepanjang Community Health Center**,** it was found that most respondents were aged 20–35 years**,** totaling 19 participants (57.58%)**.** A smaller proportion of respondents were aged over 35 years, accounting for 14 participants (42.42%)**,** in the Sepanjang Glenmore Banyuwangi area.

Table 2.
Characteristics of Respondents by Educational Level

Education Level	Frequency (n)	Percentage (%)
Junior/Senior High	29	87.88%

Education Level	Frequency (n)	Percentage (%)
School (Equivalent)		
Higher Education (College/University)	4	12.12%
Total	**33**	**100%**

As shown in Table 2, most respondents had completed junior or senior high school education (87.88%), while only 4 respondents (12.12%) had a college or university education. Thus, a total of 33 respondents (100%) were included in this study. This finding indicates that the majority of first-trimester pregnant women with hypertension in the working area of Sepanjang Glenmore Community Health Center, Banyuwangi, had an educational background at the secondary level.

Table 3.
Characteristics of Respondents by Occupation

Occupation	Frequency (n)	Percentage (%)
Housewife (IRT)	29	87.88%
Private/Government Employee	3	9.09%
Trader	1	3.03%
Total	**33**	**100%**

As presented in Table 3, the majority of respondents were housewives (87.88%), followed by private or government employees (9.09%), and only one respondent (3.03%) worked as a trader. This finding suggests that most first-trimester pregnant women with hypertension in the Sepanjang Glenmore Community Health Center area were housewives with relatively limited physical activity related to their daily work.

Table 4.
Characteristics of Respondents by Parity

Parity (Number of Children)	Frequency (n)	Percentage (%)
Primipara (First pregnancy)	14	42,42%
Multipara (≥2 pregnancies)	19	57.58%
Total	**33**	**100%**

As shown in Table 4, most respondents were multiparous mothers (57.58%), while primiparous mothers accounted for 42.42%. This indicates that a larger proportion of first-trimester pregnant women with hypertension in the Sepanjang Glenmore Community Health Center area had experienced previous pregnancies, which may influence physiological adaptation and the risk of hypertension during subsequent pregnancies.

Table 5.
Pre-Test Results of the Effectiveness of Slow Deep Breathing Therapy in First-Trimester Pregnant Women with Hypertension in the Working Area of Sepanjang Glenmore Community Health Center, Banyuwangi

Blood Pressure Category	Frequency (n)	Percentage (%)
Normal	0	0
Pre-Hypertension	31	93.9%

Blood Pressure Category	Frequency (n)	Percentage (%)
Mild Hypertension	2	6.1%
Moderate Hypertension	0	0
Severe Hypertension	0	0
Total	**33**	**100%**

As shown in Table 5, before the intervention (pre-test), the majority of respondents **(**93.94%**)** were classified as having pre-hypertension**,** while only a small proportion (6.06%) experienced mild hypertension**.** No respondents were found in the normal, moderate, or severe hypertension categories. These results indicate that most first-trimester pregnant women in the Sepanjang Glenmore Community Health Center area experienced elevated blood pressure levels prior to receiving the slow deep breathing therapy intervention.

Table 6.
Post-Test Results of the Effectiveness of Slow Deep Breathing Therapy in First-Trimester Pregnant Women with Hypertension in the Working Area of Sepanjang Glenmore Community Health Center, Banyuwangi

Blood Pressure Category	Frequency (n)	Presentase
Normal	31	93.9%
Pre-Hypertension	2	6.1%
Mild Hypertension	0	0
Moderate Hypertension	0	0
Severe Hypertension	0	0
Total	**33**	**100%**

As shown in Table 6, after the intervention (post-test), the majority of respondents (93.94%) were categorized as having normal blood pressure**,** while 6.06% were in the pre-hypertension category. None of the respondents remained in the mild, moderate, or severe hypertension categories. These findings demonstrate a notable improvement in blood pressure status following the implementation of among first-trimester pregnant slow deep breathing therapy women with hypertension in the Sepanjang Glenmore Community Health Center area.

Bivariate Analysis

Table 7.
Distribution of Wilcoxon Test Results on the Effectiveness of Slow Deep Breathing Therapy in First-Trimester Pregnant Women with Hypertension in the Working Area of Sepanjang Glenmore Community Health Center, Banyuwangi (June–July 2025).

	Post-Test Systolic Blood Pressure Pre-Test Systolic Blood Pressure	Post-Test Diastolic Blood Pressure Pre-Test Diastolic Blood Pressure
Z	-5.018[b]	-5.019[b]
Asymp. Sig. (2-tailed)	.000	.000

As shown in Table 7, the results of the Wilcoxon Signed-Rank Test indicated a significance value of Asymp. Sig. (2-tailed) = 0.000 for both systolic and diastolic blood pressure. Since the p-value was less than 0.05**,** it can be concluded that there was a significant difference between blood pressure measurements before and after the intervention. These results demonstrate that slow deep breathing therapy was effective in reducing blood pressure among first-trimester pregnant women with hypertension in the Sepanjang Glenmore Community Health Center area.

Discussion

Based on Table 1**,** the characteristics of first-trimester pregnant women with hypertension show that most respondents were aged 20–35 years (57.58%)**.** The majority of respondents were within the reproductive age range**,** considered the safest period for pregnancy and childbirth. According to (Dumilah, 2019), the optimal reproductive age for pregnancy and delivery is 20–35 years**.** Women aged below 20 years or above 35 years are at higher risk for complications during pregnancy and childbirth due to degenerative processes that may alter the structure and function of peripheral blood vessels, thereby increasing susceptibility to hypertension. Each individual may also have varying physiological and psychological responses to stress and blood pressure regulation.

This finding is consistent with research by (Kaimmudin et al., 2018) who reported that the majority of pregnant women with hypertension were aged comprising below 20 years and above 35 years, 53.1% of respondents. In the current study conducted in the Sepanjang Glenmore Community Health Center**,** it was found that most first-trimester pregnant women with hypertension were aged 20–35 years (57.58%)**,** while a smaller proportion were over 35 years (42.42%)**.** These findings suggest that hypertension during pregnancy does not occur exclusively among high-risk age groups (>35 years), but is also prevalent among women in the healthy reproductive age range. This highlights the importance of preventive efforts and health education regarding hypertension across all reproductive age groups, as risk factors are not solely age-related but may also involve lifestyle, genetic predisposition, obstetric history, and general health status.

Based on Table 2**,** the educational background of first-trimester pregnant women with hypertension indicates that the majority had completed junior or senior high school (87.88%)**.** Educational level plays a crucial role in shaping individual behavior, including health-related behaviors. Higher education levels generally provide broader opportunities for individuals to acquire knowledge through both formal education and informal learning experiences**.** Continuous learning processes enhance understanding,

enrich information, and foster positive attitudes toward maintaining and improving health (Notoatmodjo, 2021).

In the context of hypertension, a higher level of education is typically associated with greater awareness of the condition, including knowledge of risk factors, symptoms, prevention strategies, and treatment adherence. Individuals with better knowledge are more likely to adopt healthy lifestyles and comply with medical advice, enabling more effective blood pressure control. Therefore, education not only reflects one's exposure to learning opportunities but also directly contributes to the development of awareness and proactive behavior in managing hypertension.

Other studies have also shown that patients with higher health literacy are significantly more likely to achieve optimal blood pressure control compared to those with lower literacy. The mean health literacy score among participants with controlled blood pressure was significantly higher than that of those with uncontrolled hypertension (Sohrabi et al., 2022). These results align with the current study, suggesting that health literacy acts as a key mediator between education and knowledge in hypertension management.

In conclusion, the findings indicate that the majority of first-trimester pregnant women with hypertension in the Sepanjang Community Health Center area had secondary-level education (87.88%), while only 12.12% had higher education. This suggests that most respondents came from middle educational backgrounds, which may influence their understanding of hypertension risks and prevention efforts. Consequently, it is essential to provide intensive health education, particularly to pregnant women with secondary education, to improve awareness and promote healthy behaviors in managing blood pressure during pregnancy.

According to Table 3, most respondents were housewives (87.88%). Housewives often engage in light domestic tasks, which may not be sufficient to enhance cardiorespiratory fitness. A sedentary lifestyle can reduce vascular elasticity, increase arterial stiffness, and consequently elevate blood pressure. In contrast, private or government employees typically perform sedentary work that involves long hours of sitting, which also contributes to reduced physical activity and increased blood pressure (Musrifah, 2019; Henry et al., 2022).

Traders or small business owners often work extended hours, sometimes from early morning until late afternoon, with irregular eating and rest patterns. Financial instability and occupational stress can further exacerbate hypertension by stimulating sympathetic nervous system activity and stress hormone release. A previous study examining the association between domestic physical activity and new-onset hypertension among adults found a significant correlation between the intensity of household activities and hypertension risk.

Individuals performing high-intensity domestic work (e.g., cleaning, washing, cooking, or childcare for extended periods without rest) had a higher risk of developing hypertension compared to those with moderate activity. Conversely, regular and balanced physical activity, whether through light housework or recreational exercise, was associated with a lower risk of hypertension (Li et al., 2022).

Therefore, the findings of this study suggest that the majority of first-trimester pregnant women with hypertension in the Sepanjang Glenmore Community Health Center area were housewives with limited physical activity. This condition may contribute to increased blood pressure during pregnancy. Thus, it is recommended to promote light, regular physical activities and provide ongoing education and support to housewives to help control blood pressure levels.

Based on Table 4, most respondents were multiparous mothers (57.58%), while primiparous mothers accounted for 42.42%. Primiparous women those experiencing their first pregnancy are at a higher risk of developing hypertension compared to multiparous women. Pregnancy can trigger a maturity crisis, which may induce psychological stress. Maternal stress is closely linked to complications during pregnancy, delivery, and the postpartum period (Belayhun et al., 2023).

Other studies have shown a relationship between parity and the incidence of preeclampsia, although parity alone cannot be considered a direct cause of hypertension, as multiple factors contribute to the condition (Laila, 2019). Moreover, both short interpregnancy intervals (<18 months) and long intervals (>60 months) have been shown to significantly increase the risk of hypertensive disorders of pregnancy, including preeclampsia. The lowest risk was observed among mothers with interpregnancy intervals of 24–59 months (Gebremedhin et al., 2021). Furthermore, cohort studies have demonstrated that adopting a healthy lifestyle including a balanced diet (low salt and saturated fats), regular physical activity, non-smoking habits, and maintaining an ideal body weight—can substantially reduce the risk of gestational hypertension and preeclampsia. Pregnant women with four or more healthy lifestyle factors had up to a 60% lower risk of developing hypertension compared to those with fewer than two (Lane et al., 2023).

In the present study, most first-trimester pregnant women with hypertension in the Sepanjang Glenmore Community Health Center area were multiparous (57.58%), whereas 42.42% were primiparous. This finding indicates that most participants had previous childbirth experiences. Multiparity may increase the risk of hypertension during pregnancy due to repeated hemodynamic adaptations and structural vascular changes that occur over successive pregnancies. Therefore, multiparous women require more intensive blood pressure monitoring to prevent complications.

This study involved 33 respondents, all of whom were first-trimester pregnant women with hypertension who met the inclusion criteria. Most respondents were aged 20–35 years (57.58%), had secondary education (87.88%), worked as housewives (87.88%), and were multiparous (57.58%). These characteristics provide an overview of the demographic and obstetric distribution of the study population.

The results showed that after receiving slow deep breathing therapy for 15 minutes, pregnant women with hypertension experienced a reduction in both systolic and diastolic blood pressure. This finding demonstrates that a simple non-pharmacological intervention can effectively help reduce blood pressure during pregnancy.

Before the intervention, all 33 respondents exhibited mild hypertension, with systolic pressure ≥120 mmHg and diastolic pressure ≥90 mmHg, consistent with the classification standards of the European Society of Cardiology (ESC) and the World Health Organization (WHO). This finding aligns with literature stating that early pregnancy hemodynamic and cardiovascular adaptations, if suboptimal, can lead to increased blood pressure from the first trimester onward.

Following the intervention slow deep breathing therapy administered for three consecutive days (15 minutes per session, three times daily) there was a significant improvement in blood pressure. Post-test results revealed that 93.9% of respondents had normal blood pressure, while 6.1% were classified as pre-hypertensive, and none remained hypertensive.

Statistical analysis using the Wilcoxon Signed-Rank Test yielded an Asymp. Sig. (2-tailed) value of 0.000 for both systolic and diastolic pressure, indicating a significant difference ($p < 0.05$) between pre-test and post-test results. These findings confirm that slow deep breathing therapy is effective in reducing blood pressure among first-trimester pregnant women with hypertension.

Furthermore, the consistent reduction in systolic and diastolic blood pressure across nearly all respondents reinforces the potential of slow deep breathing therapy as a safe, non-pharmacological intervention that midwives and healthcare providers can incorporate into antenatal care programs to manage pregnancy-induced hypertension and prevent related complications.

CONCLUSION

The normality test results indicated that the data were not normally distributed; therefore, analysis was continued using the Wilcoxon Signed-Rank Test. Based on the Wilcoxon test results, the Asymp. Sig. (2-tailed) value was 0.000 ($p < 0.05$) for both systolic and diastolic blood pressure. This value indicates a significant difference between blood pressure measurements before and after the implementation of slow deep breathing therapy. Thus, it can be concluded that slow deep breathing therapy is effective in reducing blood pressure among first-trimester pregnant women with hypertension.

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