



Education on Slow Deep Breathing Therapy for Hypertensive Elderly Anxiety Management in Baitussalam

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ABSTRACT

Hypertension is one of the most prevalent chronic diseases among older adults and is frequently associated with anxiety, which may negatively affect blood pressure control, treatment adherence, and overall quality of life. Anxiety that is not properly managed can also increase the risk of cardiovascular complications and reduce the effectiveness of hypertension management. Therefore, providing education on non-pharmacological interventions is essential to enhance older adults' knowledge and self-management capabilities. This study aimed to analyze the effect of slow deep breathing education on improving knowledge regarding anxiety management among older adults with hypertension. A quantitative study employing a quasi-experimental one-group pretest-posttest design was conducted involving 70 older adults with hypertension selected through total sampling from the working area of the Baitussalam Community Health Center, Aceh Besar. Participants received structured educational sessions on slow deep breathing techniques as a complementary strategy for anxiety management. Knowledge was assessed using a validated structured questionnaire administered before and after the intervention. The collected data were analyzed using the Wilcoxon Signed-Rank Test to determine differences in knowledge scores between the pretest and posttest. The results demonstrated a statistically significant improvement in participants' knowledge following the educational intervention ($p < 0.001$), indicating that the program effectively increased their understanding of anxiety management through slow deep breathing. These findings suggest that slow deep breathing education represents an effective, practical, and community-based health education strategy for enhancing knowledge and promoting anxiety self-management among older adults with hypertension, thereby supporting comprehensive and holistic hypertension care.

INTRODUCTION

Knowledge is one of the most important determinants of health behavior because it influences an individual's ability to understand health information, make appropriate decisions, and perform self-care activities. Among older adults, adequate knowledge plays a crucial role in maintaining health and preventing complications associated with chronic diseases. As aging is accompanied by physiological, psychological, and cognitive changes, older adults often experience difficulties in understanding health information and adopting appropriate disease management strategies. Therefore, improving health knowledge through educational interventions is essential to enhance older adults' independence and encourage positive health behaviors, particularly in managing chronic conditions such as hypertension (Fitrianti et al., 2024).

Hypertension remains one of the leading non-communicable diseases worldwide and continues to pose a major public health challenge, particularly among older adults. According to the World Health Organization, approximately 1.28 billion adults aged 30–79 years are living with hypertension globally, with nearly two-thirds residing in low- and middle-income countries. In addition, approximately 46% of individuals with hypertension are unaware of their condition, while only 21% have adequately controlled blood pressure (Organization, 2023). These findings indicate that hypertension remains one of the leading causes of cardiovascular morbidity and premature mortality worldwide. In Indonesia, hypertension also continues to be one of the most prevalent chronic diseases among older adults and is associated with various complications, including stroke, coronary heart disease, heart failure, and chronic kidney disease (Kemenkes, 2023).

Older adults are particularly vulnerable to hypertension because aging causes progressive structural and functional changes in the cardiovascular system. In addition to physical deterioration, older adults frequently experience psychological problems related to chronic illness, including fear of disease progression, dependence on lifelong medication, decreased physical function, and concerns regarding future complications. These conditions often reduce quality of life and contribute to psychological disorders, especially anxiety. Anxiety is one of the most common





emotional responses experienced by older adults with chronic diseases and may negatively affect their daily functioning and overall well-being (Putri & Nurhidayati, 2022).

Anxiety among older adults with hypertension is also an important concern because psychological stress can affect cardiovascular regulation. Feelings of worry related to chronic disease conditions, medication dependence, and possible complications may activate the sympathetic nervous system, resulting in increased heart rate, vasoconstriction, and elevated blood pressure. Explained that uncontrolled hypertension often causes dizziness, discomfort, difficulty concentrating, and reluctance to engage in social interaction, all of which contribute to increased anxiety among older adults. If anxiety is not managed appropriately, it may decrease treatment adherence, reduce self-care behavior, and increase the risk of cardiovascular complications. (Wulandari et al., 2023).

Health education is one of the most effective strategies for improving knowledge among older adults because adequate knowledge enables individuals to understand disease management and adopt appropriate health behaviors. In community nursing, educational interventions aim not only to increase knowledge but also to empower older adults to participate actively in maintaining their health and preventing disease complications. According to the Health Promotion Model developed by Nola J. Pender, health education enhances knowledge, strengthens self-efficacy, increases perceived benefits, reduces perceived barriers, and encourages commitment to healthy behaviors. Therefore, educational interventions are expected to improve older adults' understanding and support sustainable behavioral change. (Fitrianti et al., 2024).

One non-pharmacological intervention that can be introduced through health education is slow deep breathing. Slow deep breathing is a breathing relaxation technique performed by inhaling slowly through the nose, holding the breath briefly, and exhaling gradually through the mouth. This technique stimulates parasympathetic nervous system activity, suppresses sympathetic responses, improves oxygenation, promotes vasodilation, reduces heart rate, and induces a relaxation response. Consequently, slow deep breathing may help reduce anxiety while supporting blood pressure control among older adults with hypertension. Because the technique is simple, safe, inexpensive, and can be performed independently, it has considerable potential to be integrated into community-based health promotion programs. (Aryani, 2022).

Previous studies have consistently demonstrated the benefits of slow deep breathing for individuals with hypertension. Reported that education regarding deep breathing relaxation significantly improved participants' understanding and contributed to anxiety reduction among older adults with hypertension. Similarly, (Zulkarnaini et al., 2025) found that regular slow deep breathing exercises effectively reduced sympathetic nervous system activity, promoted relaxation, and supported blood pressure stabilization. However, most previous studies primarily evaluated physiological outcomes, including anxiety reduction and blood pressure control. Comparatively, relatively few studies have specifically examined whether structured educational interventions can improve older adults' knowledge regarding anxiety management through slow deep breathing.

Furthermore, evidence concerning structured slow deep breathing education among hypertensive older adults in the working area of the Baitussalam Community Health Center, particularly in Lam Ujong, Lam Asan, and Lampineung Villages, remains limited. Preliminary observations conducted by the researcher showed that many older adults with hypertension had never received education regarding slow deep breathing therapy and were unfamiliar with its benefits and appropriate implementation. This condition indicates that inadequate knowledge remains one of the barriers preventing older adults from independently applying non-pharmacological strategies for anxiety management.

Therefore, this study aimed to analyze the effect of slow deep breathing education on improving knowledge regarding anxiety management among older adults with hypertension in Lam Ujong, Lam Asan, and Lampineung Villages within the working area of the Baitussalam Community Health Center, Aceh Besar. The novelty of this study lies in evaluating knowledge improvement as the primary outcome of a structured educational intervention based on Nola J. Pender's Health Promotion Model. Unlike previous studies that mainly focused on anxiety reduction and blood pressure control, this study emphasizes strengthening older adults' knowledge through poster-based education and practical demonstrations to support independent anxiety management using slow deep breathing.

The findings of this study are expected to contribute both theoretically and practically. Theoretically, this study provides additional evidence regarding the application of the Health Promotion Model in improving knowledge through structured health education. Practically, the findings are expected to support nurses, community health centers, and policymakers in integrating slow deep breathing education into community health promotion programs, thereby improving older adults' self-management abilities and promoting healthier behaviors in hypertension management.

LITERATURE REVIEW

Knowledge is one of the fundamental components influencing an individual's ability to understand health information and adopt appropriate health behaviors. Among older adults with chronic diseases, adequate knowledge is essential for improving self-care practices and preventing disease complications. Older adults who possess sufficient knowledge are more capable of recognizing health problems, understanding treatment recommendations, and independently performing interventions that support disease management. Therefore, improving knowledge through





health education is considered an important strategy in community nursing to promote healthy behavioral changes.(Ria Rachmasari et al., 2025).

Hypertension is a chronic disease that frequently affects older adults and is often accompanied by psychological disturbances, particularly anxiety. Anxiety may worsen cardiovascular function through increased sympathetic nervous system activity, resulting in elevated blood pressure and reduced treatment adherence. Consequently, comprehensive hypertension management should address not only physical conditions but also psychological well-being through appropriate educational and non-pharmacological interventions.(Pathan et al., 2023).

One of the recommended non-pharmacological interventions is slow deep breathing, which is performed by inhaling deeply through the nose, briefly holding the breath, and exhaling slowly through the mouth. This technique promotes relaxation by stimulating parasympathetic nervous system activity, reducing sympathetic responses, improving oxygenation, and stabilizing cardiovascular function. Because it is simple, safe, and does not require special equipment, slow deep breathing can be practiced independently by older adults after receiving appropriate education.(Hasina et al., 2024).

The primary objective of slow deep breathing is to produce a relaxation response that decreases sympathetic nervous system activity, lowers blood pressure, reduces heart rate, and alleviates psychological tension. Regular practice also improves adherence to non-pharmacological hypertension management, particularly when supported by family involvement and structured educational programs. Therefore, education plays an important role in ensuring that older adults understand the purpose and proper implementation of this technique.(Arfina et al., 2024; Susanto et al., 2024) .

Previous studies have demonstrated positive outcomes of educational interventions involving slow deep breathing among older adults with hypertension.(Damanik et al., 2024) reported that health education significantly improved older adults' knowledge regarding anxiety management through deep breathing exercises. Similarly, (Wahyuningsih et al., 2020)found that regular deep breathing relaxation effectively reduced anxiety among older adults with hypertension while increasing participants' confidence in performing the technique independently. These findings support the importance of structured educational interventions as an integral component of community nursing services aimed at improving knowledge and promoting independent anxiety management among older adults with hypertension.

METHOD

This study employed a quantitative research approach using a quasi-experimental one-group pretest–posttest design to evaluate the effect of slow deep breathing education on improving knowledge regarding anxiety management among older adults with hypertension. The study was conducted from 24 to 30 June 2026 in Lam Ujong, Lam Asan, and Lampineung Villages, located within the working area of the Baitussalam Community Health Center, Aceh Besar, Indonesia.

The study population consisted of 73 older adults diagnosed with hypertension in the study area. A total sampling technique was applied to recruit all eligible participants. Of the 73 older adults, 70 participants completed both the pretest and posttest assessments and were included in the final analysis, while three participants were excluded because they did not complete the research procedures. Eligible participants were older adults aged 60 years or above, diagnosed with hypertension, able to communicate effectively, willing to participate voluntarily, and able to provide written informed consent. Older adults with severe cognitive impairment, communication barriers, or serious medical conditions that could interfere with participation in the educational intervention were excluded from the study.

Data were collected using a structured knowledge questionnaire consisting of 20 true-or-false items that assessed participants' knowledge regarding anxiety management through slow deep breathing. The questionnaire covered the concept of anxiety in older adults with hypertension, the definition and objectives of slow deep breathing, its benefits, indications, implementation procedures, and its role as a non-pharmacological intervention for anxiety management. Knowledge was measured twice using the same questionnaire: before the educational intervention (pretest) and immediately after the intervention (posttest). The primary outcome of this study was the change in participants' knowledge scores following the educational intervention.

The intervention consisted of a structured health education program developed according to the researchers' Standard Operating Procedure (SOP). Educational activities included poster-based health education, interactive explanations, question-and-answer sessions, demonstrations, and supervised practice of the slow deep breathing technique. During the demonstration, participants were guided to perform the breathing technique correctly under the direct supervision of the researcher to ensure proper understanding of the procedure and its application in anxiety management. At the end of the educational session, participants completed the posttest questionnaire to evaluate the effectiveness of the intervention in improving their knowledge.

Data processing was performed through editing, coding, data entry, tabulating, and data cleaning before statistical analysis. Descriptive (univariate) analysis was used to summarize respondents' demographic characteristics and knowledge scores before and after the intervention. The normality of the data was examined using the Kolmogorov–Smirnov test, which demonstrated that both pretest and posttest knowledge scores were not normally





distributed ($p < 0.05$). Therefore, differences between pretest and posttest knowledge scores were analyzed using the Wilcoxon Signed-Rank Test, with a significance level of $p < 0.05$.

Ethical principles were maintained throughout the study, including respect for autonomy, beneficence, non-maleficence, confidentiality, and justice. Prior to data collection, participants received a comprehensive explanation regarding the study objectives, procedures, potential benefits, and their rights as research participants. Written informed consent was obtained from all participants before enrollment. Participant confidentiality and anonymity were protected throughout the study, and all participants were informed that their participation was voluntary and that they could withdraw from the study at any stage without affecting the health services they received.

RESULT

A total of 70 older adults with hypertension completed both the pretest and posttest assessments and were included in the final analysis. The results are presented according to participants' demographic characteristics, knowledge scores before and after the educational intervention, and the effectiveness of slow deep breathing education based on the Wilcoxon Signed-Rank Test.

Table 1. Characteristics of Participants (n = 70)

Characteristics	n	%
Age (years)		
60–64	21	30.0
65–69	23	32.9
70–74	15	21.4
75–79	5	7.1
≥80	6	8.6
Gender		
Male	23	32.9
Female	47	67.1

Table 1 presents the demographic characteristics of the participants. The largest age group was 65–69 years (32.9%), followed by 60–64 years (30.0%) and 70–74 years (21.4%). Participants aged 75–79 years accounted for 7.1%, while those aged 80 years or older represented 8.6% of the sample. Regarding gender, the majority of participants were female (67.1%), whereas 32.9% were male.

Table 2. Knowledge Scores Before and After the Educational Intervention (n = 70 n)

Variable	Mean ± SD	Minimum	Maximum
Pretest	4.86 ± 1.72	2	10
Posttest	19.69 ± 0.50	19	20

Table 2 demonstrates a substantial improvement in participants' knowledge following the educational intervention. The mean pretest knowledge score was 4.86 ± 1.72 , which increased to 19.69 ± 0.50 after participants received *slow deep breathing* education. These findings indicate that participants achieved markedly higher knowledge scores after the intervention.

The normality of the data was assessed using the **Kolmogorov–Smirnov test**. Both pretest and posttest knowledge scores were not normally distributed ($p < 0.05$); therefore, the **Wilcoxon Signed-Rank Test** was used to evaluate the effect of the educational intervention.

Table 3. Wilcoxon Signed-Rank Test Results (n = 70)

Comparison	Positive Ranks	Negative Ranks	Z	p-value
Pretest vs. Posttest Knowledge	70	0	-7.306	<0.001

Table 3 demonstrates a statistically significant difference between participants' pretest and posttest knowledge scores following the slow deep breathing educational intervention ($Z = -7.306$; $p < 0.001$). All 70 participants (100%) showed higher knowledge scores after the intervention, as indicated by 70 positive ranks and no negative ranks. These findings confirm that slow deep breathing education significantly improved older adults' knowledge regarding anxiety management among individuals with hypertension.

DISCUSSION

The findings of this study demonstrated that slow deep breathing education significantly improved older adults' knowledge regarding anxiety management. The Wilcoxon Signed-Rank Test showed a statistically significant difference between pretest and posttest knowledge scores ($Z = -7.306$; $p < 0.001$), indicating that the educational intervention effectively increased participants' understanding of anxiety management through slow deep breathing. The substantial increase in the mean knowledge score from 4.86 ± 1.72 before the intervention to 19.69 ± 0.50 after the intervention





suggests that structured health education successfully enhanced participants' knowledge. This improvement may be attributed to the educational strategy, which combined poster-based education, interactive explanations, demonstrations, and guided practice, enabling participants to understand both the theoretical concepts and practical application of slow deep breathing.

Knowledge is an important factor influencing an individual's ability to adopt healthy behaviors, particularly among older adults with chronic diseases. Adequate knowledge enables older adults to recognize health problems, understand disease management, and independently implement appropriate non-pharmacological interventions. The educational approach applied in this study provided participants with information regarding the definition, benefits, objectives, and correct procedures of slow deep breathing, thereby increasing their confidence in applying the technique as part of anxiety management. These findings are in line with (Andrianto, 2022), who emphasized that comprehensive hypertension management should include non-pharmacological interventions and patient education to improve self-management and prevent disease complications.

The present findings also demonstrate that educational interventions play an essential role in preparing older adults to perform slow deep breathing correctly and independently. Through demonstrations and guided practice, participants were able to understand and apply the breathing technique appropriately. The combination of visual media, interactive education, and practical sessions facilitated better comprehension and retention of information, resulting in a significant improvement in knowledge after the intervention.

The statistical analysis further confirmed the effectiveness of the intervention. The Wilcoxon Signed-Rank Test demonstrated a significant difference between pretest and posttest knowledge scores ($p < 0.001$), indicating that the educational program produced meaningful improvements in participants' knowledge. According to (Pramesti et al., 2024), the Wilcoxon Signed-Rank Test is an appropriate non-parametric statistical method for evaluating differences between paired observations when the data are not normally distributed. Therefore, the statistical findings obtained in this study provide strong evidence that slow deep breathing education effectively improved older adults' knowledge regarding anxiety management.

From a practical perspective, the findings support the implementation of slow deep breathing education as part of routine health promotion programs at community health centers. Because the technique is simple, safe, inexpensive, and easy to perform independently, it can be incorporated into community nursing services for older adults with hypertension. Improving knowledge through structured educational interventions is expected to strengthen self-management abilities, encourage healthy behavioral changes, and contribute to comprehensive hypertension management and better quality of life among older adults.

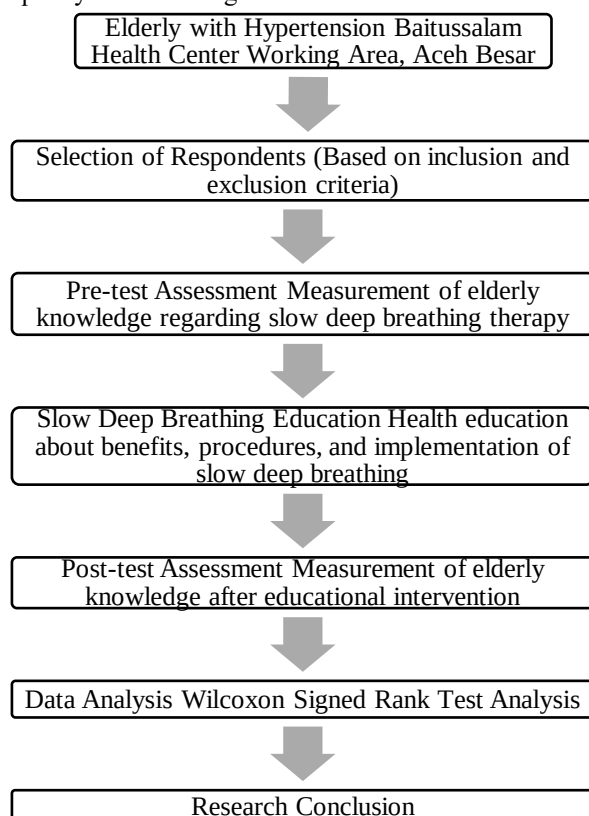


Figure 1. Research flow of slow deep breathing therapy education intervention to improve knowledge among elderly with hypertension in Baitussalam Health Center working area, Aceh Besar, 2026.





Tabel 4. Characteristics of Respondents among Elderly with Hypertension in Baitussalam Health Center Working Area, Aceh Besar, 2026

Characteristics	n	%
Age (years)		
60–64	21	30.0
65–69	23	32.9
70–74	15	21.4
75–79	5	7.1
≥80	6	8.6
Gender		
Male	23	32.9
Female	47	67.1

Tabel 5. Distribution of Elderly Knowledge Level Before and After Slow Deep Breathing Therapy Education

Knowledge Level	Pre-test n (%)	Post-test n (%)
Good	0 (0.0)	67 (95.9)
Poor	70 (100.0)	3 (4.1)
Total	70 (100)	70 (100)

Tabel 6 Effect of Slow Deep Breathing Therapy Education on Elderly Knowledge Regarding Anxiety Management

Variable	Mean	Standard Deviation	Z Value	P Value*
Pre-test knowledge	4.86	1.722		
Post-test knowledge	19.69	0.498	-7.306	0.000

Tabel 7 Analysis of Knowledge Changes Before and After Slow Deep Breathing Therapy Education

Knowledge Difference	n	Mean Rank	Sum of Ranks	Z	P Value*
Positive Ranks	70	35.50	2485.00		
Negative Ranks	0	0.00	0.00		
Ties	0			-7.306	0.000

Statistical Analysis

Data analysis was conducted using univariate and bivariate analysis. Univariate analysis was used to describe the characteristics of respondents, including age, gender, and the level of knowledge regarding slow deep breathing therapy before and after the intervention. The results of the univariate analysis were presented as frequency distributions and percentages.

Bivariate analysis was conducted to determine the effect of slow deep breathing therapy education on improving elderly knowledge regarding anxiety management among elderly with hypertension. The normality test was performed using the Kolmogorov–Smirnov test, and the results indicated that the data were not normally distributed (p -value < 0.05). Therefore, the Wilcoxon Signed Rank Test was applied to analyze differences in knowledge scores between the pre-test and post-test measurements. A significance level of 95% was used, with p -value < 0.05 considered statistically significant.

CONCLUSION

This study demonstrated that slow deep breathing education significantly improved older adults' knowledge regarding anxiety management, as confirmed by the Wilcoxon Signed-Rank Test (p < 0.001). The educational intervention effectively enhanced participants' understanding of the concept, benefits, and correct application of slow deep breathing as a non-pharmacological strategy for managing anxiety among older adults with hypertension.

These findings indicate that structured health education can serve as an effective community nursing intervention to strengthen older adults' knowledge and promote independent self-management of hypertension. Because slow deep breathing is simple, safe, inexpensive, and easy to perform, its education can be integrated into routine health promotion activities at primary healthcare facilities to support comprehensive hypertension management.

This study was limited by the use of a one-group pretest–posttest design without a control group and by the immediate evaluation of knowledge following the educational intervention. Future studies are recommended to employ controlled experimental designs, larger sample sizes, and longer follow-up periods to evaluate the sustainability of knowledge improvement and its effects on self-management behaviors, anxiety reduction, and hypertension control among older adults.





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