

ORIGINAL ARTICLE**OPTIMIZATION OF NOSTRIL BREATHING EXERCISES AS A COMPLEMENTARY THERAPY IN HYPERTENSION MANAGEMENT****Dian Istiana, Dewi Nur Sukma Purqoti*, Supriyadi**

Nursing Study Program, 3Faculty of Nursing, INKES Yarsi Mataram, Mataram, West Nusa Tenggara

*Corresponding author: purqotidewi87@gmail.com**ARTICLE INFO***Article history:**Received: 10 January 2026**Revised: 6 February 2026**Accepted: 29 April 2026**Keywords:**Complementary;**Elderly;**Hypertension;**Nostril.***ABSTRACT**

Background: Hypertension or high blood pressure is a medical condition characterized by consistently high arterial blood pressure. If left untreated, hypertension can increase the risk of heart disease, stroke, kidney failure, and other health problems. Hypertension management can include complementary practices such as Alternate Nostril Breathing exercises. **Aims:** To determine the effect of alternate nostril breathing on reducing blood pressure in the elderly with hypertension in the Karang Buyuk area, South Ampenan Subdistrict. **Method:** A pre-experimental method was conducted. The research design used a one-group pretest-posttest design. The population consists of all elderly women in the Karang Buyuk area. The sample size in this study was 16 respondents, and the sampling technique used was purposive sampling. Data analysis was conducted using a paired t-test, and the instruments used were observation sheets: standard operating procedure for alternate nostril breathing exercises, and a sphygmomanometer. The intervention was administered for 2 weeks. **Result:** Based on the data, the majority of respondents were aged 60-74 years (12 respondents (75%)); most respondents were unemployed 10 (62.5%); most respondents had an elementary school education (7 respondents (43.75%)); mean systolic pretest 152.13 and mean systolic posttest 144.25. The data analysis showed a significance value of 0.000 (< 0.05), indicating a reduction in blood pressure after performing alternate nostril breathing exercises. **Conclusion:** There is an effect of alternate nostril breathing on reducing blood pressure in the elderly with hypertension.

BACKGROUND

Hypertension is a leading global public health problem and a major contributor to cardiovascular disease, stroke, and chronic kidney failure (World Health Organization, 2025). The prevalence of hypertension continues to rise, particularly in low- and middle-income countries, where lifestyle changes, psychosocial stress, and limited access to preventive healthcare exacerbate disease burden (Mills et al., 2020). Although antihypertensive medications are widely prescribed and clinically effective, a substantial proportion of patients fail to achieve optimal blood pressure control due to medication side effects, long-term dependence, and poor adherence (Burnier & Egan, 2019).

According to data from the Mataram City Health Office, the estimated number of people with hypertension was 9,738. Based on the distribution of hypertension cases in the Mataram City area in 2023, the three highest numbers were at Cakranegara Health Center (1,409 cases), followed by Mataram Health Center (1,170 cases) and Tanjung Karang Health Center (1,184 cases) (Mataram City Health Office, 2024). Hypertension can be managed through a pharmacological approach by taking blood pressure-lowering medications, as well as through a non-pharmacological approach such as breathing relaxation techniques that have therapeutic benefits for people with hypertension.

Consequently, current hypertension management strategies include non-pharmacological and complementary therapies to improve long-term outcomes. Among complementary approaches, controlled breathing exercises, specifically nostril-breathing exercises such as alternate nostril breathing (ANB) or nadi shodhana pranayama, have gained growing scientific attention. These techniques involve deliberate regulation of inhalation and exhalation through one or both nostrils, aiming to influence respiratory rhythm and autonomic nervous system activity (Jerath et al., 2015). Nostril-breathing exercises are believed to enhance parasympathetic activation while suppressing sympathetic overactivity, mechanisms that play a central role in blood pressure regulation (Shaffer & Ginsberg, 2017).

Empirical studies have reported that regular practice of nostril-breathing exercises is associated with significant reductions in systolic and diastolic blood pressure and improvements in heart rate variability (HRV), an indicator of autonomic balance (Nam et al., 2024; S. Kalaivani et al., 2018). Systematic reviews and meta-analyses further suggest that breathing-based interventions yield modest but clinically meaningful improvements in cardiovascular parameters when used as adjuncts to standard medical therapy (Garg et al., 2024). In addition, nostril breathing exercises have demonstrated beneficial effects on psychological stress and anxiety, which are recognized contributors to hypertension pathophysiology (Pascoe et al., 2017).

However, despite these promising findings, existing studies show considerable heterogeneity in intervention protocols, including differences in breathing patterns, session duration, frequency, and intervention length. Unfortunately, most studies have treated nostril-breathing exercises as a uniform intervention without systematically examining how variations in these parameters influence therapeutic effectiveness (Nam et al., 2024). Therefore, there is limited consensus on the optimal dosage, structure, and strategy of nostril-breathing exercises for hypertensive populations. This lack of

optimization constitutes a significant research gap, limiting the translation of evidence into standardized clinical or community-based practice.

On the other hand, hypertension management in many settings, particularly in developing countries, remains heavily reliant on pharmacological treatment, with limited incorporation of evidence-based complementary therapies into routine care (Mills et al., 2020). Therefore, optimizing nostril breathing exercises as a structured, evidence-based complementary therapy is important both practically and theoretically. Practically, it offers a low-cost, accessible self-management strategy to support blood pressure control. Theoretically, it advances understanding of autonomic regulation mechanisms and their role in integrative cardiovascular health.

In elderly individuals, hypertension is predominantly characterized by isolated systolic hypertension, driven by arterial stiffening, reduced vascular compliance, and endothelial dysfunction. These age-related changes increase systolic blood pressure while diastolic pressure may remain normal or even decrease. Such hemodynamic patterns elevate pulse pressure and significantly heighten the risk of stroke, coronary artery disease, heart failure, and chronic kidney disease. Importantly, hypertension in later life often coexists with multimorbidity, frailty, and polypharmacy, complicating both diagnosis and management.

OBJECTIVE

The purpose of this study is to determine the effect of alternate nostril breathing on reducing blood pressure in elderly individuals with hypertension in the Karang Buyuk area, South Ampenan District.

METHOD

Design, Population and Sample

The method used in this study is the pre-experimental method. The research design used in this study is a one-group pretest-posttest design. In this design, before the treatment, the sample is first given a pretest and at the end of the treatment, the sample is given a posttest. This design is used in accordance with the intended goal, which is to assess the effect of alternate nostril breathing on reducing hypertension in the elderly before and after the treatment. The inclusion criteria in this study are being over 60 years old, having grade 1 and 2 hypertension, and having no severe complications. The research location is in the Karang Buyuk neighborhood, South Ampenan District. It was conducted in January 2024. The population in this study consists of 66 people, with a sample size of 16 respondents. In this study, the sampling technique used was purposive sampling.

Intervention, Instrument and Data Analysis

The intervention in this study was alternate nostril breathing, administered for a duration of 15 minutes per session, twice daily for two weeks. The instruments used were observation sheets, Standard Operating Procedures (SOP) for Alternate Nostril

Breathing, and a sphygmomanometer to measure the respondents' blood pressure. Data analysis was performed using the Paired Sample T-Test. With the results of the normality test using the Shapiro-Wilk test, the systolic blood pressure before and after the intervention showed a significance value of Sig = 0.522.

RESULTS

Based on the data collection results, the number of respondents by age can be seen in the following table:

Table 1. Respondent Characteristic in Karang Buyuk Area, South Ampenan District (n=16)

Respondent Characteristic	Frequency (F)	Percent (%)
Age (years)		
60-74	12	75
75-90	4	25
Employment Status		
Non Employment	10	62,5
Employment	6	37,5
Level of Education		
None	5	31,25
Elementary School	7	43,75
Junior High School	2	12,5
Senior High School/ Vocational High School	1	6,25
Diploma	1	6,25
Total	16	100

Based on Table 1, respondents aged 60-74 years were 12 (75%), and respondents aged 75-90 years were 4 (25%). A total of 10 (62.5%) respondents are unemployed, and 6 (37.5%) respondents are employed. Respondents with an elementary school education were 7 (43.75%), and those with a bachelor's degree were 1 (6.25%).

Table 2. The Effect of Alternate Nostril Breathing on Blood Pressure Reduction in Elderly People with Hypertension in Karang Buyuk area, South Ampenan Subdistrict (n=16)

Variable		Mean	P	T
Sistolik	Pretest	152,13	0,000	18,445
	Posttest	144,25		
Diastolik	Pretest	87,56	0,000	15,045
	Posttest	81,13		

Based on the results shown in Table 2, systolic blood pressure shows a significance value of 0.000 < the standard value of 0.05, and diastolic blood pressure shows a

significance value of $0.000 < \text{the standard value of } 0.05$. Therefore, it can be concluded that H_0 is rejected and H_1 is accepted, which means there is an effect of Alternate Nostril Breathing on reducing blood pressure in elderly people with hypertension in Karang Buyuk area, South Ampenan Subdistrict.

DISCUSSION

The majority of respondents in this study were aged 60–74 years, with a mean age of 66.88 years. Advanced age is a well-established non-modifiable risk factor for hypertension, largely due to age-related arterial stiffness, endothelial dysfunction, and reduced baroreceptor sensitivity (Mills et al., 2020). The predominance of older adults in this sample aligns with epidemiological data showing a sharp increase in hypertension prevalence among individuals over 60 years of age. Reductions of blood pressure following ANB intervention are particularly meaningful, as blood pressure control in older adults is often more challenging due to physiological degeneration and comorbidities. In terms of employment status, most respondents were unemployed, which may reflect retirement status common in elderly populations. Reduced occupational activity contributes to a lower stage of physical movement and increased sedentary behavior, both of which are associated with higher blood pressure and cardiovascular risk (Booth et al., 2012). The respondents' educational background was predominantly low, with most having an elementary school education or no formal education. Lower educational attainment has been consistently associated with limited health literacy, poorer self-care behaviors, and suboptimal control of hypertension (Mourouti et al., 2022). In this context, the simplicity and low cognitive demand of nostril breathing exercises make them particularly suitable as an intervention for populations with limited educational backgrounds.

The significant reduction in systolic and diastolic blood pressure observed in this study is consistent with previous experimental and clinical studies examining the cardiovascular effects of ANB. Study reported that regular practice of alternate nostril breathing led to significant reductions in both systolic and diastolic blood pressure among patients with hypertension (S. Kalaivani et al., 2018). ANB intervention led to significant reductions in blood pressure. ANB is effectively used as complementary therapy alongside standard medical treatment (Nam et al., 2024). From a physiological perspective, the effectiveness of ANB is reflected in the modulation of the autonomic nervous system. Controlled nasal breathing is known to enhance parasympathetic activity while suppressing sympathetic dominance, leading to vasodilation, reduced heart rate, and decreased peripheral vascular resistance (Shaffer & Ginsberg, 2017). The observed improvement in blood pressure in this study supports the autonomic regulation theory, which posits that restoring sympathovagal balance is a key mechanism in non-pharmacological blood pressure control (Thayer et al., 2012).

The magnitude of blood pressure reduction observed in this study is clinically relevant, particularly in elderly populations. Even modest reductions in systolic blood pressure (5–10 mmHg) have been associated with substantial decreases in the risk of stroke, coronary heart disease, and cardiovascular mortality (Whelton et al., 2018).

Observations of the study sample following the ANB intervention showed a reduction in systolic blood pressure of approximately 8 mmHg. This indicates that ANB holds potential long-term cardiovascular benefits if the practice is maintained. Moreover, ANB exercises offer additional advantages in elderly care settings, including low cost, minimal physical strain, and ease of implementation without specialized equipment. These characteristics are particularly important in community-based and low-resource settings, such as the Karang Buyuk area, where access to continuous medical supervision may be limited. Breathing-based interventions also contribute to stress reduction and psychological well-being, which indirectly support blood pressure regulation through neuroendocrine pathways (Pascoe et al., 2017).

Previous research reported that practicing nostril breathing can stimulate the parasympathetic nervous system and the vagus nerve (Setiawan, 2021). It contributes to lowering heart rate, decreasing blood pressure, and providing a sensation of calmness for both body and mind. Based on the observations and data analysis conducted, practicing Alternate Nostril Breathing once a day in each session produced a positive response, as it can affect blood pressure. Most respondents appeared calmer, felt more comfortable, and experienced a decrease in blood pressure. When this intervention is practiced more frequently, it will bring many positive health impacts.

CONCLUSION

Based on the results of data analysis using the Paired Sample T-Test, it was concluded that systolic blood pressure showed a significance value of $0.000 < \text{the standard value of } 0.05$ and diastolic blood pressure showed a significance value of $0.000 < \text{standard value } 0.05$, indicating that there is an effect of Alternate Nostril Breathing on reducing blood pressure in elderly individuals with hypertension in Karang Buyuk area, South Ampenan District. The findings of this study contribute to the growing body of evidence supporting the integration of breathing exercises into comprehensive hypertension management strategies. Unlike many previous studies that focus primarily on younger or mixed-age populations, this research provides empirical evidence specific to elderly individuals with hypertension, addressing an important demographic gap. Furthermore, the statistically robust results strengthen the argument for incorporating ANB as a structured complementary therapy in community health programs targeting older adults. This study is not without limitations. The relatively small sample size and short intervention duration limit the generalizability of the findings. Recommendations for future research might consider a randomized controlled trial design, a larger sample size, a longer intervention period, and the inclusion of autonomic markers such as heart rate variability.

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