

Combined Isometric Handgrip Exercise and Slow Deep Breathing for Blood Pressure Reduction: A Family Nursing Case Study

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ABSTRACT/ ABSTRAK

ABSTRACT. Hypertension requires continuous management, and family involvement may support self-care and sustained blood pressure control at home. This study aimed to describe the application of combined isometric handgrip exercise and slow deep breathing for blood pressure reduction within the context of family nursing care in a patient with hypertension. This single-case study involved a 59-year-old woman with a five-year history of hypertension. The combined intervention was implemented for 15–20 minutes daily over five consecutive days, with blood pressure measured before and after each session. The patient's blood pressure changed from 193/108 mmHg before the intervention on the first day to 164/92 mmHg after the intervention on the fifth day. The patient also reported reduced shortness of breath and tingling in the right leg, improved sleep quality, and an increased ability to perform the exercise independently. Family members participated by accompanying and encouraging the patient and supporting dietary changes. Combined isometric handgrip exercise and slow deep breathing may be considered an adjunctive non-pharmacological approach within family nursing care for patients with hypertension.

ABSTRAK. Hipertensi memerlukan pengelolaan berkelanjutan, dan keterlibatan keluarga dapat mendukung perawatan diri serta pengendalian tekanan darah di rumah. Penelitian ini bertujuan menggambarkan penerapan kombinasi *isometric handgrip exercise* dan *slow deep breathing* untuk menurunkan tekanan darah dalam konteks asuhan keperawatan keluarga pada pasien dengan hipertensi. Penelitian studi kasus tunggal ini melibatkan seorang perempuan berusia 59 tahun dengan riwayat hipertensi selama lima tahun. Intervensi kombinasi dilakukan selama 15–20 menit setiap hari selama lima hari berturut-turut, dengan pengukuran tekanan darah sebelum dan setelah setiap sesi. Tekanan darah pasien berubah dari 193/108 mmHg sebelum intervensi pada hari pertama menjadi 164/92 mmHg setelah intervensi pada hari kelima. Pasien juga melaporkan berkurangnya sesak napas dan kesemutan pada kaki kanan, perbaikan kualitas tidur, serta peningkatan kemampuan melakukan latihan secara mandiri. Keluarga berpartisipasi melalui pendampingan, pemberian motivasi, dan dukungan terhadap perubahan pola makan. Kombinasi *isometric handgrip exercise* dan *slow deep breathing* dapat dipertimbangkan sebagai pendekatan nonfarmakologis pendamping dalam asuhan keperawatan keluarga pada pasien dengan hipertensi.

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INTRODUCTION

Hypertension is a major noncommunicable disease and a global health challenge that contributes to an increased risk of cardiovascular disease, stroke, kidney failure, and premature death. Globally, approximately 1.28 billion adults aged 30–79 years live with hypertension, with most residing in low- and middle-income countries. Nearly half of adults with hypertension are unaware of their condition, and only a limited proportion achieve adequate blood pressure control (World Health Organization, 2023). In Indonesia, the prevalence of hypertension based on blood pressure measurements was 30.8% in 2023. Although this figure was lower than the previously reported prevalence of 34.1%, hypertension remains a major public health concern requiring sustained management.

Hypertension management requires the integration of pharmacological and non-pharmacological approaches. In addition to antihypertensive medication when indicated, lifestyle modifications, including dietary sodium restriction, healthy dietary patterns, weight management, physical activity, and relaxation techniques, play an important role in supporting blood pressure control and reducing cardiovascular risk (Putra et al., 2024). Within family nursing care, family involvement is particularly important because it can support medication adherence, health behavior modification, blood pressure monitoring, and patients' ability to perform self-care. Family support has been associated with improved self-efficacy and hypertension management behaviors, while family-based educational interventions may enhance self-management among patients with hypertension (Dwisetyo & Safina, 2024; Zahirah et al., 2023).

One non-pharmacological intervention applicable to patients with hypertension is isometric handgrip exercise, a simple form of isometric contraction performed through sustained handgrip that can be practiced independently. This exercise may support blood pressure reduction through vascular adaptation and decreased peripheral vascular resistance. Previous studies have reported reductions in blood pressure following isometric handgrip exercise. Adha et al. (2024) reported a decrease in mean systolic blood pressure from 146.25 to 140.31 mmHg and in mean diastolic blood pressure from 91.25 to 87.19 mmHg. Similarly, Rispawati and Riskawaty (2025) reported a reduction in mean blood pressure from 153/96.5 mmHg to 140.5/87.5 mmHg following the intervention.

Another non-pharmacological intervention is slow deep breathing, a controlled breathing technique involving slow and deep respiration that promotes relaxation and influences autonomic nervous system regulation. This technique may facilitate vasodilation, enhance parasympathetic activity, and support blood pressure regulation (Fauziah, 2022; Widia & Alfikrie, 2023). In addition to being easy to practice independently, slow deep breathing requires no specialized equipment and can be incorporated into home-based care (Faiz et al., 2024).

Although isometric handgrip exercise and slow deep breathing have been used as non-pharmacological interventions to support blood pressure management, evidence regarding their combined application within home-based family nursing care remains limited. The two interventions involve distinct but potentially complementary physiological mechanisms: isometric handgrip exercise is associated with vascular adaptation and reduced peripheral vascular resistance, whereas slow deep breathing supports autonomic regulation and relaxation through enhanced parasympathetic activity. However, given the limited comparative evidence, the combined intervention cannot be assumed to be superior to either intervention alone without further investigation.

Within family nursing care, simple interventions that can be independently practiced at home may support the continuity of hypertension management. Family involvement in health education, medication supervision, healthy lifestyle practices, and blood pressure monitoring may strengthen patients' capacity to manage chronic disease (Ibnu et al., 2024; Husnah et al., 2025; Zahirah et al., 2023). Therefore, this study aimed to describe the application of combined isometric handgrip exercise and slow deep breathing and the observed changes in blood pressure in a patient with hypertension within the context of family nursing care.

RESEARCH METHOD

This study employed a single-case study design within the context of family nursing care. The nursing care process comprised assessment, nursing diagnosis, planning, implementation, evaluation, and documentation. The study was conducted in Batik Village, Bakumpai District, Barito Kuala Regency, South Kalimantan Province, Indonesia. The overall study activities were conducted from April 14 to May 30, 2026, encompassing initial preparation, data collection, data processing, interpretation of findings, and completion of the final report.

The study participant was one patient with hypertension living with family members in Batik Village. The patient was selected based on willingness to participate and receive the combined isometric handgrip exercise and slow deep breathing intervention. The inclusion criteria comprised a patient with hypertension who agreed to receive the combined intervention and had a core family member living in the same household who was willing to accompany the patient throughout the intervention and provide written consent. The exclusion criteria included severe comorbidities or stroke with hemiparesis or hemiplegia that prevented the performance of motor exercises, as well as withdrawal or non-cooperation during the intervention period.

Data were collected through interviews, observation, physical examination, and documentation using a family nursing care assessment form. Interviews were conducted with the patient and the closest family member to obtain information regarding patient characteristics, health history, physical, psychological, and spiritual needs, and other relevant subjective data. Observation and physical examination were performed to assess the patient's general condition and health status and to support the nursing assessment and implementation of the intervention. The initial assessment served as the basis for identifying health problems and establishing family nursing diagnoses. Based on the assessment findings, the identified nursing diagnoses were ineffective health maintenance and readiness for enhanced family coping.

The intervention consisted of combined isometric handgrip exercise and slow deep breathing implemented according to standard operating procedures and evidence-based nursing practice. Before the intervention, the patient was placed in a comfortable seated position and allowed to rest for five minutes, followed by an initial blood pressure measurement. Isometric handgrip exercise was performed using a handgrip dynamometer. The patient performed an isometric contraction by squeezing the device with one hand for 45 seconds, followed by a 15-second rest period. The procedure was then performed with the other hand and repeated until each hand completed two contractions, resulting in four contractions with a total contraction time of 180 seconds, or three minutes.

Slow deep breathing was subsequently performed in a comfortable position with both hands placed over the abdomen. The patient was instructed to inhale and then exhale slowly through pursed lips at a respiratory rate of 6–10 breaths per minute for approximately 15 minutes. The combined isometric handgrip exercise and slow deep breathing intervention was administered for 15–20 minutes per session over five consecutive days. Blood pressure was measured before and after the intervention, and daily evaluations were conducted through the fifth day.

The primary outcome was the change in systolic and diastolic blood pressure over the five-day combined intervention period. Blood pressure was measured before and after the intervention according to the standard operating procedures. Data from nursing assessments, intervention implementation, and blood pressure measurements were analyzed descriptively and presented in narrative and tabular formats. No inferential statistical analysis was performed because the study employed a single-case design.

The study was conducted in accordance with the ethical principles of respect for persons, beneficence and non-maleficence, and justice. Before participation, the patient and family were informed about the study objectives, potential benefits, procedures, potential risks, and confidentiality of study information. Participation was voluntary, and written informed consent was obtained. The patient's identity was protected throughout the study and reporting process.

RESULTS

The study involved one family residing in Batik Village, Bakumpai District, Barito Kuala Regency, South Kalimantan Province, Indonesia. The family assessment was conducted on May 22, 2026, followed by the implementation and evaluation of family nursing care for five consecutive days until May 26, 2026.

The patient, Mrs. A, was a 59-year-old woman who had completed primary education and was a homemaker. She lived with her husband, Mr. I, a 62-year-old farmer, and their son, Mr. M. The patient had a five-year history of hypertension and a family history of hypertension in both parents. She rarely sought healthcare at the nearest healthcare facility and did not regularly take antihypertensive medication. She habitually consumed high-sodium foods, particularly salted fish, and drank coconut water daily to help relieve her symptoms.

At the initial assessment on May 22, 2026, the patient reported posterior neck pain, tingling in the right leg, and shortness of breath without a history of asthma. She also demonstrated low motivation to maintain her health. Physical examination revealed a symmetrical head, graying hair, a pale and wrinkled facial appearance, pink conjunctivae, non-icteric sclerae, and intact hearing and olfactory function. No thyroid enlargement was identified. The chest was symmetrical with vesicular breath sounds, although the patient occasionally reported mild shortness of breath. Heart sounds were normal. The abdomen was symmetrical, with no masses or tenderness. No peripheral edema was observed, and the patient remained physically active despite walking slowly. Initial blood pressure was 193/108 mmHg, pulse rate was 98 beats/min, respiratory rate was 22 breaths/min, body temperature was 36.4°C, and oxygen saturation was 99%.

The patient's husband was 62 years old, had completed primary education, worked as a farmer, continued to work daily, and had a history of smoking. His examination findings

showed a blood pressure of 138/88 mmHg, pulse rate of 83 beats/min, respiratory rate of 20 breaths/min, and body temperature of 36.3°C. Their son, who lived in the same household, was generally healthy without significant complaints and actively assisted with daily activities and the patient's care. His examination findings showed a blood pressure of 134/80 mmHg, pulse rate of 85 beats/min, respiratory rate of 20 breaths/min, and body temperature of 36.2°C.

The family was at the developmental stage of a family with older adults. The family's monthly income was less than IDR 1,000,000, and recreational activities were primarily undertaken at home by watching television. The family lived in a wooden house with adequate air circulation, comprising three bedrooms, a kitchen, and a family room, with water supplied from the river and the Community-Based Drinking Water and Sanitation Provision Program. The house was located relatively close to a village-level healthcare facility. The family maintained good and mutually supportive relationships with neighbors.

Within the family structure, Mr. I served as the head of the household and the primary decision-maker. Mrs. A was responsible for household activities, while Mr. M assisted with daily activities and followed parental guidance. Communication among family members was open, and important decisions were generally discussed collectively. In terms of affective functioning, the family demonstrated harmonious emotional relationships and mutual support.

Regarding the family's healthcare function, family members demonstrated concern for the patient's condition but had limitations in hypertension management. In recognizing health problems, the family was aware that the patient had longstanding hypertension and recognized her complaint of posterior neck pain. However, they had limited understanding of factors that could aggravate hypertension, particularly high sodium intake and the importance of regular blood pressure monitoring.

In making health-related decisions, Mr. I, as the head of the household, was the primary decision-maker. Decisions to seek healthcare were generally made when the patient's condition was perceived to have worsened. Although the family recognized the importance of healthcare professionals, routine health examinations had not become a priority, and the patient rarely underwent regular blood pressure monitoring.

In caring for an ill family member, the family, particularly Mr. M, assisted the patient with daily activities, including household tasks and other activities. However, the family did not routinely monitor and record blood pressure, remind the patient to take antihypertensive medication, or consistently modify dietary practices.

In modifying the environment to support health, the family home was adequately clean and provided sufficient space for family interaction. However, no specific adjustments had been made to support hypertension management, including implementing a low-sodium diet, reducing exposure to cigarette smoke within the home, or providing a device for independent blood pressure monitoring.

In utilizing healthcare services, the family was aware that the village-level healthcare facility could be used to support hypertension management. However, the facility had not been actively utilized for routine blood pressure monitoring or continuing health education. The patient demonstrated low motivation to undergo health examinations.

Regarding stress and coping, the family faced a short-term stressor related to the need to control the patient's blood pressure through health examinations. In the long term, the family hoped to maintain the health of all family members and prevent complications of

hypertension. The family's coping strategies included open discussion, mutual support among family members, and prayer. The family hoped that the patient would be able to manage her health condition and remain comfortable while performing daily activities.

Based on the subjective and objective assessment findings, two nursing diagnoses were established: ineffective health maintenance (D.0117) and readiness for enhanced family coping (D.0090). The supporting data for both nursing diagnoses are presented in Table 1.

Table 1. Family Nursing Assessment Findings and Nursing Diagnoses

Nursing Diagnosis	Subjective Data	Objective Data
Ineffective health maintenance (D.0117)	The patient frequently consumed salted fish; rarely sought healthcare because she was reluctant to wait in queues; reported tingling in the right leg and posterior neck pain; and drank coconut water daily to relieve her symptoms.	The patient appeared unable to make appropriate health-related decisions, demonstrated low motivation to change her habits, and had an initial blood pressure of 193/108 mmHg.
Readiness for enhanced family coping (D.0090)	The son frequently assisted with the patient's activities; the husband reported that family communication was effective when discussing problems.	The husband and son demonstrated concern for the patient's condition; the husband provided guidance regarding the patient's activities; family communication was effective; and the family residence was located near a healthcare facility.

Based on the priority scoring of nursing problems, ineffective health maintenance received a score of 4.3 and was established as the primary priority, whereas readiness for enhanced family coping received a score of 3.3 and was established as the second nursing diagnosis.

For ineffective health maintenance, nursing care was directed toward improving the family's ability to manage hypertension, including recognizing health problems, making health-related decisions, caring for an ill family member, modifying the environment, and utilizing healthcare services. The interventions included education on hypertension management, medication adherence, high-sodium food consumption, fruit and vegetable consumption, physical activity, and the implementation of combined isometric handgrip exercise and slow deep breathing.

For readiness for enhanced family coping, nursing care focused on family involvement in patient care, open communication, identification of the family's readiness to participate in care, provision of information regarding the patient's condition, and support for family involvement during the implementation of the intervention.

Family nursing care and the combined isometric handgrip exercise and slow deep breathing intervention were implemented for five consecutive days, from May 22 to May 26, 2026. On the first day, interventions for ineffective health maintenance included identifying health behaviors that could be improved; providing education on the benefits and physiological effects of isometric handgrip exercise; explaining the frequency, duration, and intensity of the combined intervention; teaching the slow deep breathing technique; and encouraging daily physical activity. For readiness for enhanced family coping, interventions included identifying the family's readiness to participate in care, explaining the patient's condition to family members, communicating the patient's expectations, and encouraging the family to be assertive in providing care.

On the second day, the patient and family received orientation regarding available healthcare services, recommendations for daily fruit and vegetable consumption, encouragement to engage in physical activity, and education on preventing injury during the combined intervention. Regarding family coping, the interventions included strengthening the therapeutic relationship between the patient and family, explaining the patient's condition, and increasing family involvement in care.

On the third day, implementation focused on creating a health-supportive environment, reinforcing fruit and vegetable consumption, and implementing the combined intervention. Regarding family coping, the family was encouraged to develop positive aspects of the care plan, provided with information regarding the patient's condition and level of dependency, and encouraged to remain involved in care.

On the fourth day, the interventions focused on maintaining a health-supportive environment and continuing physical activity through combined isometric handgrip exercise and slow deep breathing. The family was further involved through therapeutic communication, provision of information regarding the patient's condition and level of dependency, and support for continued participation in care.

On the fifth day, the health-supportive environment was maintained, and the patient was again encouraged to engage in physical activity through the combined intervention. The family received information regarding the patient's condition, level of dependency, and expectations as part of efforts to enhance family coping.

Blood pressure measurements before and after each intervention session over the five-day period are presented in Table 2.

Table 2. Blood Pressure Before and After the Combined Intervention Over Five Days

Day	Date	Pre-intervention Blood Pressure (mmHg)	Post-intervention Blood Pressure (mmHg)
1	May 22, 2026	193/108	185/101
2	May 23, 2026	187/107	180/107
3	May 24, 2026	184/102	173/97
4	May 25, 2026	173/112	170/99
5	May 26, 2026	172/107	164/92

On the first day, the patient was not yet accustomed to the newly introduced physical activity involving combined isometric handgrip exercise and slow deep breathing. She continued to report tingling in the right leg and difficulty taking deep breaths during the intervention. Blood pressure was 193/108 mmHg before the intervention and 185/101 mmHg afterward. Following the intervention, pulse rate was 85 beats/min, respiratory rate was 22 breaths/min, body temperature was 36.3°C, and oxygen saturation was 99%. The family followed the recommendations provided during the nursing care process.

On the second day, the patient reported becoming accustomed to the combined intervention, and her left hand had begun adapting to the use of the handgrip device. She was able to perform the intervention more smoothly than on the first day. Blood pressure was 187/107 mmHg before the intervention and 180/107 mmHg afterward. Pulse rate was 94 beats/min, respiratory rate was 21 breaths/min, body temperature was 36.4°C, and oxygen saturation was 98%. The patient's son encouraged her to become accustomed to the newly introduced physical activity.

On the third day, the patient reported that her shortness of breath had begun to decrease after practicing slow deep breathing. She had also begun independently performing isometric handgrip exercise outside the nursing care sessions, particularly in the morning. Blood pressure was 184/102 mmHg before the intervention and 173/97 mmHg afterward. Pulse rate was 97 beats/min, respiratory rate was 20 breaths/min, body temperature was 36.3°C, and oxygen saturation was 99%. The family reported that the patient's symptoms had begun to decrease and remained involved throughout the intervention.

On the fourth day, the patient reported that tingling in the right leg had begun to decrease after four consecutive days of the combined intervention. She also stated that she continued to drink coconut water to help relieve her symptoms. Blood pressure was 173/112 mmHg before the intervention and 170/99 mmHg afterward. Pulse rate was 91 beats/min, respiratory rate was 20 breaths/min, body temperature was 36.4°C, and oxygen saturation was 98%. The patient's husband provided encouragement, while the family stated that they would reduce the consumption of foods that could increase the patient's blood pressure.

On the fifth day, the patient reported that her symptoms had further decreased and that her sleep quality had begun to improve each night. She stated that she no longer experienced symptoms that interfered with physical activity after undergoing the combined intervention and expressed a commitment to reducing her consumption of salty foods. The patient also stated that she continued to drink coconut water daily. Blood pressure was 172/107 mmHg before the intervention and 164/92 mmHg afterward. Pulse rate was 86 beats/min, respiratory rate was 20 breaths/min, body temperature was 36.5°C, and oxygen saturation was 99%. The family stated that they would encourage the patient to undergo health examinations at the village-level healthcare facility and continue the intervention independently.

The patient's clinical course and family involvement throughout the five-day intervention are summarized in Table 3.

Table 3. Patient Clinical Course and Family Involvement During the Five-Day Intervention

Day	Patient Response and Clinical Progress	Family Involvement and Response
1	The patient was not yet accustomed to the intervention and continued to experience tingling in the right leg and difficulty taking deep breaths.	The family followed the recommendations and participated during the intervention.
2	The patient began adapting to the intervention and became more proficient in using the handgrip device.	The son encouraged the patient to adapt to the newly introduced physical activity.
3	Shortness of breath began to decrease, and the patient began independently performing isometric handgrip exercise in the morning.	The family reported that the patient's symptoms had begun to decrease and remained involved throughout the intervention.
4	Tingling in the right leg began to decrease; the patient continued drinking coconut water to help relieve her symptoms.	The husband provided encouragement, and the family stated that they would reduce foods that could increase the patient's blood pressure.
5	Symptoms further decreased, sleep quality improved, no symptoms interfered with physical activity, and the patient expressed a commitment to reducing salty food consumption.	The family planned to encourage the patient to undergo health examinations and continue the intervention independently.

Overall, the patient's blood pressure was 193/108 mmHg at the initial measurement on the first day and 164/92 mmHg after the intervention on the fifth day. During the five-day implementation period, post-intervention blood pressure was recorded as 185/101 mmHg on

the first day, 180/107 mmHg on the second day, 173/97 mmHg on the third day, 170/99 mmHg on the fourth day, and 164/92 mmHg on the fifth day.

At the end of the five-day nursing care period, the patient demonstrated progress in performing the combined intervention, began independently practicing isometric handgrip exercise, reported reductions in shortness of breath and tingling in the right leg, experienced improved sleep quality, and expressed a commitment to reducing salty food consumption. The family remained involved throughout the nursing care process by accompanying and encouraging the patient, expressing an intention to reduce foods that could increase blood pressure, planning to encourage the patient to undergo health examinations, and continuing the intervention independently.

DISCUSSION

This study describes the application of family nursing care to a 59-year-old woman with a five-year history of hypertension through combined isometric handgrip exercise and slow deep breathing for five consecutive days. The main finding showed that the patient's blood pressure changed from 193/108 mmHg before the intervention on the first day to 164/92 mmHg after the intervention on the fifth day. During the nursing care period, the patient also reported reduced shortness of breath and tingling in the right leg, improved sleep quality, an increased ability to perform the exercise independently, and a commitment to reducing salty food consumption. The family demonstrated involvement throughout the nursing care process by accompanying and encouraging the patient, supporting dietary changes, planning to encourage health examinations, and expressing willingness to continue the intervention independently.

The patient's initial condition revealed several factors associated with suboptimal hypertension management. In addition to a five-year history of hypertension and a family history of hypertension in both parents, the patient frequently consumed high-sodium foods, particularly salted fish, rarely underwent health examinations, and did not regularly take antihypertensive medication. The initial blood pressure of 193/108 mmHg highlights the importance of continuous monitoring and management of hypertension. Widayanti et al. (2024) explained that older adults are particularly vulnerable to hypertension because of age-related physiological changes, including reduced vascular wall elasticity and alterations in cardiovascular function that may complicate blood pressure control. Although the patient in this study was 59 years old, age remains a relevant factor to consider alongside other risk factors in hypertension management.

Frequent consumption of high-sodium foods was an important finding in the patient assessment. The patient reported frequently consuming salted fish, while the family had not optimally implemented dietary modifications to support blood pressure control. This finding is consistent with Suhartatik et al. (2023), who reported an association between salty food consumption and hypertension. Excessive sodium intake may lead to fluid retention and increased intravascular volume, which may ultimately contribute to elevated blood pressure (Serihati et al., 2025). In the context of family nursing care, this finding emphasizes the importance of family involvement in supporting dietary changes because food selection and preparation at home depend not only on the patient but are also influenced by family habits and decisions.

A history of hypertension in both of the patient's parents was another relevant finding. Yunara et al. (2025) reported that a family history of hypertension is associated with an increased risk of developing the condition through genetic predisposition and potentially shared lifestyle patterns within families. Therefore, hypertension management within the family context should not focus exclusively on the family member with hypertension but should also include increasing other family members' awareness of risk factors and the importance of blood pressure monitoring.

The patient also reported drinking coconut water daily in an attempt to relieve her symptoms. Prasani and Mekeama (2025) reported that young coconut water consumption was associated with reduced systolic blood pressure among older adults. The potassium content of coconut water may contribute to sodium balance and blood pressure regulation. However, in this study, daily coconut water consumption should be considered an additional factor occurring concurrently with the combined intervention. Therefore, the blood pressure changes observed over the five-day period cannot be attributed exclusively to isometric handgrip exercise and slow deep breathing.

Another important finding was the limited utilization of healthcare services and irregular blood pressure monitoring before the implementation of nursing care. Although the family lived relatively close to a village-level healthcare facility, the patient rarely underwent health examinations and did not routinely monitor her blood pressure. Widayanti et al. (2024) emphasized the importance of regular blood pressure measurements for the detection and control of hypertension, particularly among older populations. In this study, the availability of healthcare services did not necessarily result in optimal utilization, indicating that nursing interventions should also address patient and family motivation to engage in regular blood pressure monitoring and health examinations.

The assessment identified two nursing diagnoses: ineffective health maintenance as the priority problem and readiness for enhanced family coping as the second diagnosis. Ineffective health maintenance was supported by frequent consumption of high-sodium foods, infrequent health examinations, irregular use of antihypertensive medication, low motivation to modify health behaviors, and an initial blood pressure of 193/108 mmHg. These findings indicate that hypertension management in this patient was associated not only with physiological conditions but also with health behaviors and the family's ability to support daily care.

The findings of this study indicate that family involvement plays an important role in hypertension management. Family support may improve adherence to antihypertensive medication through encouragement, supervision, and regular medication reminders (Yeni et al., 2016; Nofita, 2024). Family members may also support the adoption of a healthy diet and regular physical activity, both of which are important components of blood pressure control (Kiki, 2020; Nugraha et al., 2025). In the present study, family involvement developed throughout the nursing care period, ranging from accompanying and encouraging the patient during the intervention to supporting dietary changes and expressing willingness to continue the intervention independently.

The combined isometric handgrip exercise and slow deep breathing intervention was implemented for five consecutive days. Blood pressure was measured before and after the intervention each day. On the first day, blood pressure changed from 193/108 mmHg to 185/101 mmHg. On the second day, it changed from 187/107 mmHg to 180/107 mmHg; on

the third day, from 184/102 mmHg to 173/97 mmHg; on the fourth day, from 173/112 mmHg to 170/99 mmHg; and on the fifth day, from 172/107 mmHg to 164/92 mmHg. This pattern showed that post-intervention systolic blood pressure was lower than pre-intervention systolic blood pressure on each day of implementation, whereas diastolic blood pressure remained unchanged on the second day and was lower after the intervention on the other days.

The findings of this study are consistent with Anggraini et al. (2025), who reported that combined isometric handgrip exercise and slow deep breathing contributed to blood pressure reduction in individuals with hypertension. Physiologically, isometric handgrip exercise may induce vascular adaptations and reduce peripheral resistance (Aisah & Rejeki, 2021), whereas slow deep breathing may increase parasympathetic activity and reduce sympathetic activity, thereby supporting blood pressure regulation and the relaxation response (Ubolsakka-Jones et al., 2019).

Kharva and Thakar (2023) also reported that isometric handgrip exercise may contribute to reduced systolic blood pressure in individuals with hypertension. Similarly, Nirnasari et al. (2023) and Halid et al. (2025) reported changes in systolic blood pressure following regular isometric exercise. Although the duration, frequency, participant characteristics, and intervention protocols in previous studies may differ from those in the present study, the similar direction of blood pressure changes provides support for the potential role of isometric handgrip exercise as an adjunctive non-pharmacological approach to hypertension management.

The observed blood pressure changes may also be related to the slow deep breathing component. Herawati et al. (2022) reported reduced blood pressure following the implementation of slow breathing exercises, while Martika et al. (2025) explained that slow deep breathing may influence autonomic nervous system balance by decreasing sympathetic activity and increasing parasympathetic dominance. These mechanisms may produce a relaxation response and support blood pressure regulation. Nurhanifah (2024) also reported the potential benefits of slow deep breathing in blood pressure management, particularly when practiced consistently.

Combining isometric handgrip exercise and slow deep breathing in this study provided two distinct but potentially complementary approaches. Isometric exercise focuses on muscle contraction and vascular adaptation, whereas slow breathing is associated with relaxation and autonomic nervous system regulation. Anggraini et al. (2025) suggested that combining these two techniques may be associated with changes in vascular tone, baroreceptor regulation, and reduced physiological stress in patients with hypertension. However, because this study employed a single-case design without a control group, the observed findings cannot establish a causal relationship or support general conclusions regarding intervention effectiveness.

In addition to blood pressure changes, the patient demonstrated clinical progress during the five-day nursing care period. On the first day, the patient was not yet accustomed to the intervention, continued to experience tingling in the right leg, and had difficulty taking deep breaths. On the second day, she began adapting to the exercise and was able to use the handgrip device more smoothly. On the third day, the patient reported reduced shortness of breath and began independently performing isometric handgrip exercise in the morning. On the fourth day, tingling in the right leg began to decrease. By the fifth day, the patient reported further symptom reduction, improved sleep quality, and no symptoms that interfered

with physical activity. These developments represent subjective changes that occurred concurrently with the intervention and family nursing care process.

The patient's ability to begin performing isometric handgrip exercise independently represents an important development in home-based health management. Khorip et al. (2024) suggested that education and training in non-pharmacological interventions may support patient adherence to hypertension management. In this study, independently performed exercise reflected increased patient involvement in self-care. However, exercise performed outside the scheduled nursing care sessions should also be considered when interpreting blood pressure changes because the patient's actual exercise frequency may have differed from the scheduled intervention sessions.

Family involvement was an important component of this study. During the five-day nursing care period, the family not only accompanied the patient but also gradually demonstrated broader involvement. The son encouraged the patient to adapt to the newly introduced physical activity, while the husband provided support throughout the care process. The family also expressed a commitment to reducing foods that could increase blood pressure, encouraging the patient to undergo health examinations, and continuing the intervention independently. These developments were consistent with the nursing diagnosis of readiness for enhanced family coping and demonstrate how family nursing care can integrate management of the patient's condition with strengthened family participation in care.

Although blood pressure changes and clinical progress were observed over the five-day period, the findings should be interpreted cautiously. The study employed a single-case design without a control group, preventing the establishment of a causal relationship between the combined intervention and changes in blood pressure. Furthermore, the patient independently performed isometric handgrip exercise outside the nursing care sessions and continued to drink coconut water daily, indicating the presence of concurrent factors during the intervention period. Day-to-day blood pressure variation, including the increase in pre-intervention diastolic blood pressure on the fourth day, further demonstrates that blood pressure is dynamic and may be influenced by multiple factors.

The findings have implications for family nursing practice. Combined isometric handgrip exercise and slow deep breathing may be considered as part of an adjunctive non-pharmacological approach to nursing care for patients with hypertension, particularly because these techniques can be performed at home with family involvement. However, this approach is not intended to replace antihypertensive medication, regular blood pressure monitoring, dietary modification, or examination by healthcare professionals. In the context of this study, integrating exercise, health education, family support, behavioral modification, and healthcare utilization represents an important component of sustained hypertension management.

Overall, this study showed that during five days of combined isometric handgrip exercise and slow deep breathing within the context of family nursing care, the patient's blood pressure changed from 193/108 mmHg at the initial measurement to 164/92 mmHg after the intervention on the fifth day, accompanied by improvements in patient-reported symptoms, the ability to perform exercise independently, and family involvement in care. These findings support the relevance of a family nursing approach that integrates non-pharmacological interventions, health education, behavioral modification, and family support.

However, interpretation of the findings should consider the limitations inherent in a single-case design and the presence of other concurrent factors during the intervention period.

CONCLUSION

This study describes the application of combined isometric handgrip exercise and slow deep breathing for five consecutive days within the context of family nursing care for a 59-year-old woman with a five-year history of hypertension. The patient's blood pressure changed from 193/108 mmHg before the intervention on the first day to 164/92 mmHg after the intervention on the fifth day. During the nursing care period, the patient also reported reduced shortness of breath and tingling in the right leg, improved sleep quality, an increased ability to perform the exercise independently, and a commitment to reducing salty food consumption. The family demonstrated involvement in care by accompanying and encouraging the patient, supporting dietary changes, planning to encourage health examinations, and expressing willingness to continue the intervention independently. These findings suggest that combined isometric handgrip exercise and slow deep breathing may be considered an adjunctive non-pharmacological approach within family nursing care for patients with hypertension. However, because this study employed a single-case design without a control group, the observed blood pressure changes cannot be attributed exclusively to the combined intervention or generalized to a broader population.

Patients and their families are encouraged to continue hypertension management through regular blood pressure monitoring, adherence to prescribed antihypertensive medication, reduced consumption of high-sodium foods, appropriate physical activity, and regular utilization of healthcare services. Combined isometric handgrip exercise and slow deep breathing may be used as an adjunctive intervention and should not replace antihypertensive medication or professional healthcare. In nursing practice, a family-based approach may support patient engagement in self-care, health behavior modification, and the sustainability of home-based hypertension management. Future studies should include larger sample sizes, comparison groups, longer intervention and follow-up periods, and better control of other factors that may influence blood pressure to provide stronger evidence regarding the effects of combined isometric handgrip exercise and slow deep breathing.

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