

Effectiveness of Self-Care Management-Based Interventions for Blood Pressure Control in Older Adults with Hypertension: A Systematic Review

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Received February 3, 2026

Revised May 19, 2026

Accepted July 3, 2026

Available online August 17, 2026

Abstract

Aims: Hypertension is a prevalent chronic condition among older adults, yet blood pressure control remains suboptimal due to clinical complexity, limited health literacy, and treatment adherence challenges. Self-care management-based interventions have been promoted to improve patient engagement and blood pressure control. This systematic review evaluated the effectiveness of self-care management-based interventions in improving blood pressure control among older adults with hypertension.

Methods: A systematic literature search was conducted in PubMed, Scopus, ScienceDirect, and Wiley Online Library following PRISMA 2020 guidelines. Randomized controlled trials and quasi-experimental studies evaluating self-care management-based interventions among older adults with hypertension were included. Risk of bias was assessed using the Cochrane Risk of Bias 2 tool and ROBINS-I tool, while methodological quality was appraised using the Joanna Briggs Institute (JBI) tools. Data were synthesized narratively.

Results: Twelve studies met the inclusion criteria: seven randomized controlled trials and five quasi-experimental studies, mostly conducted in Asia. Interventions were predominantly multicomponent, incorporating structured education, home blood pressure monitoring, nurse-led support, family involvement, physical activity, and digital health technologies. Ten studies reported significant reductions in systolic blood pressure compared with usual care, whereas findings for diastolic blood pressure were less consistent. Several studies also demonstrated improvements in medication adherence, self-care behaviors, self-efficacy, and quality of life.

Conclusion: Self-care management-based interventions effectively improve blood pressure control, particularly systolic blood pressure, among older adults with hypertension. Multicomponent interventions integrating home blood pressure monitoring, nurse-led support, and family involvement appear to be the most effective strategies for community and primary care settings.

Keywords: blood pressure control, hypertension, older adults, self-care management

Introduction

Hypertension is one of the most prevalent chronic health conditions and remains a major modifiable risk factor for cardiovascular morbidity and mortality (The Global Cardiovascular Risk Consortium 2023). According to the World Health Organization (WHO), more than 1.3 billion adults aged 30–79 years worldwide live with hypertension, and its prevalence continues to rise annually (Richardson et al., 2025). Hypertension is also a leading contributor to the global burden of disease and consistently ranks among the top causes of death and disability associated with cardiovascular disease, stroke, and chronic kidney failure (Murray et al., 2020). Despite the availability of effective pharmacological therapies, population-level blood pressure control remains suboptimal. This gap is largely attributable to the asymptomatic nature of hypertension, the requirement for long-term management, and the strong dependence of treatment success on patients' daily self-management behaviors, in addition to routine clinical care (Elendu et al., 2024). The persistent discrepancy between treatment availability and effective blood pressure control highlights the urgent need for more comprehensive, patient-centered management approaches that extend beyond medication alone (Hickey et al., 2021).

Older adults represent a particularly important population in the context of hypertension management, as the prevalence of elevated blood pressure increases substantially with advancing age, and the consequences of uncontrolled hypertension tend to be more severe in this group (Rivasi et al., 2023). Evidence indicates that hypertension in older adults is strongly associated with an increased risk of adverse cardiovascular events, including stroke, coronary heart disease, and heart failure, which collectively contribute to a substantial health-care burden (Gadó et al., 2022). Managing hypertension in older populations is often more complex due to the presence of multimorbidity, frailty, and challenges related to medication adherence, all of which may compromise the effectiveness of blood pressure control strategies (Benetos et al., 2019). In addition, psychosocial factors, polypharmacy, and functional limitations commonly experienced by older adults may reduce the effectiveness of standard clinic-based or pharmacotherapy-focused interventions (Dale & Kashid, 2025). Consequently, approaches that strengthen older patients' capacity for self-management, including the ability to recognize symptoms, monitor blood pressure independently, and respond appropriately to changes in health status, are increasingly recognized as essential complements to conventional treatment (Dale & Kashid, 2025).

Self-care management interventions are designed to support individuals in managing chronic conditions through a combination of education, behavioral skill development, self-monitoring, and lifestyle modification strategies. These interventions typically include components such as hypertension education, out-of-clinic blood pressure monitoring, dietary regulation, physical activity promotion, stress management, and social support aimed at enhancing motivation and long-term treatment adherence (Banharak et al., 2025; Rostami et al., 2024). Growing evidence supports the role of home blood pressure monitoring as a key strategy to improve measurement accuracy, enhance patient engagement, and provide clinically meaningful data to inform decision-making when it is integrated with effective healthcare system support (Shimbo et al., 2020). Moreover, health policy documents and clinical guidelines emphasize patient empowerment through self-care strategies as a fundamental element of comprehensive blood pressure control, particularly when such interventions are integrated with healthcare teams and social support mechanisms (Rostami et al., 2024).

The literature increasingly supports the potential effectiveness of self-management interventions in improving blood pressure and hypertension-related outcomes among older adults; nevertheless, wide variations in intervention components and delivery approaches have been reported. (Ongkulna et al., 2022; Sukpattanasrikul et al., 2021). For example, several systematic reviews have reported that self-care interventions combining education, motivational support, and home blood pressure monitoring result in significant reductions in both systolic and diastolic blood pressure compared with usual care (Ngamvitroj et al., 2025; Widyastuti et al., 2025). However, heterogeneity in intervention design, implementation strategies, study settings, and outcome measures complicates the interpretation of overall effectiveness (Sheppard et al., 2020). This challenge is further intensified by the increasing diversity of intervention delivery modes, including digital health tools, telemonitoring systems, and group-based approaches, which present both opportunities and unresolved questions regarding best practices and sustained effectiveness in hypertension management (Shimbo et al., 2020).

Despite the growing evidence on self-care interventions, existing studies show considerable heterogeneity in intervention components, delivery methods, and outcome measures, as well as limited evidence synthesis specifically focused on older adults with hypertension. This gap highlights the need for a comprehensive systematic review to clarify the effectiveness and key characteristics of self-care management interventions in this population group. Therefore, synthesizing existing evidence systematically, particularly within the older adult population, is essential to clarify how and to what extent self-care management interventions contribute to the control of blood pressure. Such evidence is especially important given that nurses play a critical role in facilitating self-care management through education, behavioral support, and continuity of care, particularly in community settings. A better understanding of effective self-care management strategies may therefore support nursing practice and contribute to improved blood pressure control among older adults with hypertension.

Based on this background, this systematic review aimed to evaluate the effectiveness of self-care management-based interventions in improving blood pressure control among older adults with hypertension compared with standard care or other control conditions. This review also comprehensively describes the characteristics of the interventions employed, including their core components, duration, delivery methods, and reported clinical outcomes. By focusing specifically on older adults and interventions explicitly designed to enhance self-management capacity, this review is expected to provide evidence that can inform clinical policy recommendations and the development of healthcare strategies that are more responsive to the unique needs of hypertension management in older populations.

Methods

This systematic review aimed to synthesize scientific evidence on the effectiveness of self-care management-based interventions in improving blood pressure control in older adults with hypertension. The conduct and reporting of this review adhered to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 guidelines (Page et al., 2021). The protocol for this systematic review was prospectively registered in the PROSPERO database (Registration No. CRD420261283008).

A systematic literature search was conducted in five electronic databases: PubMed, Scopus, ScienceDirect, and Wiley Online Library, covering studies published between January 2020 and December 2025. The search strategy was developed using the

Population, Intervention, and Outcome (PIO) framework and combined relevant keywords and Medical Subject Headings (MeSH), including older adults, elderly, hypertension, high blood pressure, self-care management, and blood pressure control, along with their related synonyms. Boolean operators (AND, OR) were used to optimize the search strategy. A detailed search strategy was adapted for each database using appropriate keywords and MeSH terms. An example of the search strategy used in PubMed was as follows: (“hypertension” OR “high blood pressure”) AND (“older adults” OR elderly) AND (“self-care management” OR “self-management”) AND (“blood pressure control”). Similar search strategies were applied to Scopus, ScienceDirect, and Wiley Online Library with the necessary modifications. The full search strategy for each database is provided in the Supplementary Material.

Eligible studies included adults aged ≥ 60 years with hypertension that evaluated self-care management-based interventions using randomized controlled trial (RCT) or quasi-experimental designs and compared the interventions with usual care or another control group. The interventions included single- or multicomponent strategies to support independent hypertension management, such as health education, home blood pressure monitoring, lifestyle modification, medication adherence support, and family or community support. Only studies published in English and available in full text were included.

Study selection was conducted in three stages, including duplicate removal, title and abstract screening, and full-text reviews. The study selection process, including title/abstract screening and full-text reviews, was conducted manually by the authors. Reference manager software was used to organize the records and remove duplicates. Disagreements were resolved through discussion until a consensus was reached. The study selection process is illustrated in a PRISMA 2020 flow diagram.

Data extraction was systematically performed. The methodological quality and risk of bias were assessed to evaluate the strength of the evidence. The risk of bias for RCTs was assessed using the Cochrane Risk of Bias Tool version 2 (RoB 2), whereas quasi-experimental studies were evaluated using the Risk of Bias in Non-randomized Studies of Interventions (ROBINS-I). In addition, a critical appraisal of both study designs was conducted using the Joanna Briggs Institute (JBI) critical appraisal tools (Joanna Briggs Institute, 2020). A standardized data extraction form was used to collect key information, including the study design, population characteristics, intervention components, duration, and outcomes. The results are summarized descriptively in tables and supported by narrative synthesis.

Due to heterogeneity in the intervention characteristics, delivery methods, and outcome measures, the data were synthesized narratively. Studies were grouped according to the type and components of self-care management interventions and compared based on changes in systolic and diastolic blood pressure and reported secondary outcomes. This review provides a comprehensive overview of the effectiveness and key characteristics of self-care management interventions for hypertension among older adults.

Results

The literature search identified 500 records from four electronic databases: Scopus (n=140), PubMed (n=101), ScienceDirect (n=197), and Wiley Online Library (n=62). After the removal of 43 duplicate records, 457 articles remained for title and abstract screening. At this stage, 403 articles were excluded because they did not meet the

predefined inclusion criteria. A total of 54 articles were subsequently retrieved for full-text assessment; however, seven full-text articles could not be accessed. Consequently, 47 articles were assessed for eligibility through a full-text review. Of these, 35 articles were excluded for the following reasons: inappropriate study design (n=10), lack of relevance to the research focus (n=18), outcomes not aligned with the objectives of this review (n=4), and absence of a comparison or control group (n=3).

Ultimately, 12 studies met the inclusion criteria and were included in the final systematic review. The detailed study selection process is illustrated in the PRISMA 2020 flowchart (Figure 1).

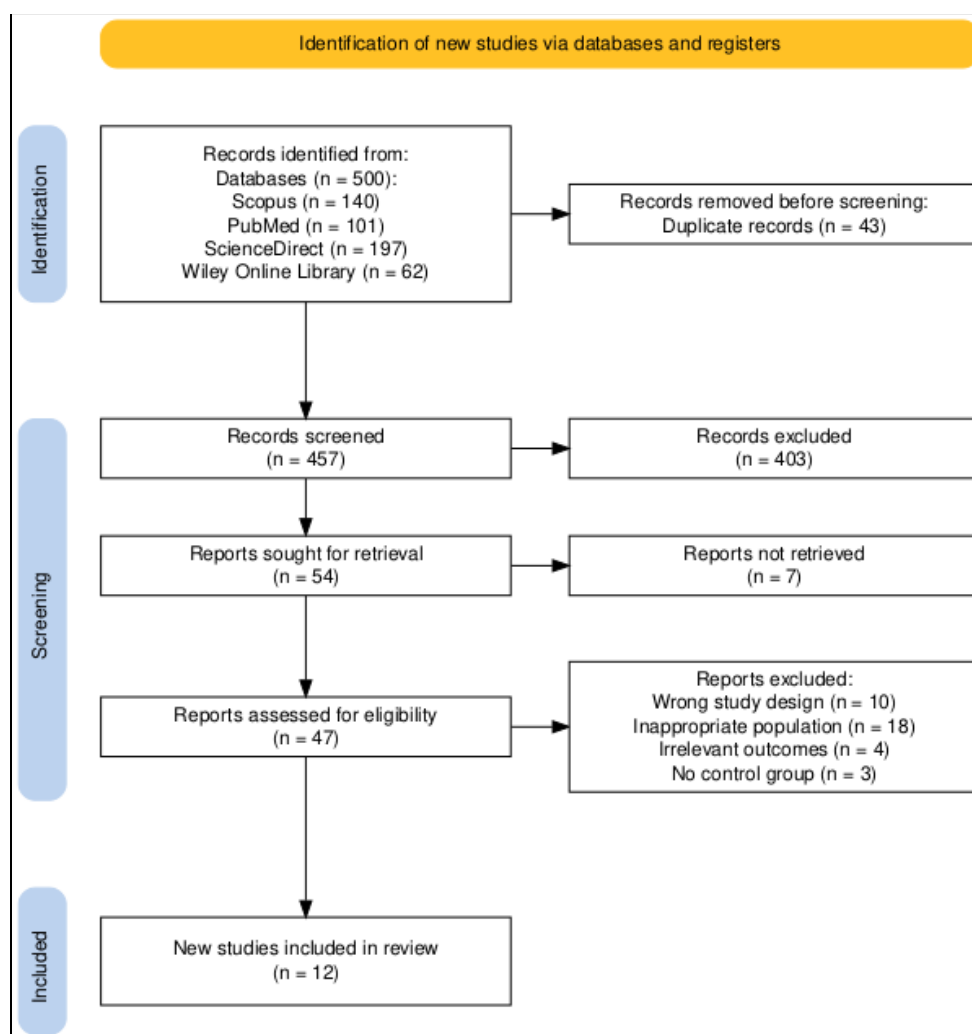


Figure 1. PRISMA 2020 flow diagram of the study selection process

The risk of bias in the included randomized controlled trials was evaluated using the Cochrane Risk of Bias 2 (RoB 2) tool. Most randomized trials demonstrated an overall low risk of bias across assessed domains. Some concerns were identified primarily in the domain of deviations from the intended interventions owing to the non-blinded nature of the behavioral and educational interventions. Other domains, including the randomization process, missing outcome data, outcome measurement, and selective

reporting, were consistently judged to be at low risk, supporting the internal validity of the randomized evidence (Figure 2).

Study (RCT)	D1	D2	D3	D4	D5	Overall
Cutrona et al., 2025	✓	⚠	✓	✓	✓	✓
Zhang et al., 2021	⚠	⚠	✓	✓	✓	⚠
Delavar et al., 2020	✓	✓	✓	✓	✓	✓
Alsaqer, 2022	✓	⚠	✓	✓	✓	✓
Sarinukul et al., 2023	✓	✓	✓	✓	✓	✓
Fu, et al., 2020	✓	⚠	✓	✓	✓	✓
Jiang et al., 2025	✓	✓	✓	✓	✓	✓

D1: Bias arising from the randomization process
 D2: Bias due to deviations from intended interventions
 D3: Bias due to missing outcome data
 D4: Bias in measurement of the outcome
 D5: Bias in selection of the reported result

✓ = Low risk
 ⚠ = Some concerns
 ✗ = High risk

Figure 2. Risk of Bias Assessment of RCT Using the Cochrane RoB 2 Tool

For quasi-experimental studies, the risk of bias was assessed using the Risk of Bias in Non-randomized Studies of Interventions (ROBINS-I). Most quasi-experimental studies were judged to have a moderate risk of bias, primarily due to potential confounding and deviations from the intended interventions. This is inherent to non-randomized community-based behavioral interventions, where random allocation and blinding are not feasible. Nevertheless, baseline comparability, structured intervention protocols, and objective outcome measurements reduced the risk of serious biases. The overall ROBINS-I assessment is shown in Figure 3.

Study	D1	D2	D3	D4	D5	D6	D7	Overall
Sukpattanasrikul et al., 2022	⚠	✓	✓	⚠	✓	✓	✓	⚠
Putri et al., 2021	⚠	✓	✓	⚠	✓	✓	✓	⚠
Bumrungsuk, 2022	✓	✓	✓	✓	✓	✓	✓	✓
Kamaryati et al., 2025	⚠	✓	✓	⚠	✓	✓	✓	⚠
Moolsart & Kritpolviman, 2025	⚠	✓	✓	⚠	✓	✓	✓	⚠

D1: Bias due to confounding
 D2: Bias in selection of participants
 D3: Bias in classification of interventions
 D4: Bias due to deviations from intended interventions
 D5: Bias due to missing data
 D6: Bias in measurement of outcomes
 D7: Bias in selection of the reported result

✓ = Low risk
 ⚠ = Some concerns
 ✗ = High risk

Figure 3. Risk of Bias Assessment of Studies Using the ROBINS-I Tool

The methodological quality of the included studies was further evaluated using the Joanna Briggs Institute (JBI) critical appraisal tool. A summary of the critical appraisal results is presented in Table 1. Overall, 11 of the 12 included studies were classified as high quality, while one randomized controlled trial was rated as moderate quality. No

study was assessed as low quality, indicating that the majority of the included studies were methodologically sound and suitable for synthesis in this review.

Table 1. Summary of Critical Appraisal Results of Included Studies Using the Joanna Briggs Institute (JBI) Checklist

Study	Study Design	Appraisal Score	Items Met (n)	Percentage (%)	Quality Category
Fu et al., 2020	RCT (Cluster)	13	11	84.6	High
Jiang et al., 2025	RCT	13	11	84.6	High
Cutrona et al., 2025	RCT	13	11	84.6	High
Delavar et al., 2020	RCT	13	13	100.0	High
Sarinukul et al., 2023	RCT	13	11	84.6	High
Zhang et al., 2021	RCT	13	8	61.5	Moderate
Alsaqer & Bebis, 2022	RCT	13	11	84.6	High
Sukpattanasrikul et al., 2022	Quasi-experimental	9	9	100.0	High
Putri et al., 2021	Quasi-experimental	9	8	88.9	High
Bumrungsuk, 2022	Quasi-experimental	9	9	100.0	High
Kamaryati et al., 2025	Quasi-experimental	9	9	100.0	High
Moolsart & Kritpolviman, 2025	Quasi-experimental	9	8	88.9	High

Information: High quality (80–100%), Moderate quality (50–79%), Low quality (<50%)

Twelve studies were included in this systematic review, comprising seven randomized controlled trials (RCTs) and five quasi-experimental studies. The studies were conducted across multiple countries, with the majority originating from Asia, particularly Thailand (Sukpattanasrikul et al., 2021; Bumrungsuk, 2022; Sarinukul et al., 2023; Moolsart & Kritpolviman, 2025), China (Zhang et al., 2021; Jiang et al., 2025), Indonesia (Putri et al., 2021; Kamaryati et al., 2025), Iran (Delavar et al., 2020), Jordan (Alsaqer, 2022), and Hong Kong (Fu et al., 2020). Additional studies have been conducted in the United States (Cutrona et al., 2025). All included studies involved older adults with hypertension, some of whom had uncontrolled blood pressure at baseline (Delavar et al., 2020; Fu et al., 2020; Sukpattanasrikul et al., 2021; Kamaryati et al., 2025; Moolsart & Kritpolviman, 2025). The interventions were implemented in various settings, including primary healthcare facilities, community-based environments, and home-based contexts.

All 12 studies evaluated self-care or self-management-based interventions for hypertension management among older adults. The identified interventions were predominantly self-care or self-management-based approaches employing various strategies, such as (1) structured self-management education, (2) nurse-led interventions, (3) familybased interventions, and (4) technology-based interventions. Digital components included mobile health applications, text messaging, home blood pressure self-monitoring, and smart device use. The duration of the interventions ranged from 6 weeks to 18 months.

The primary outcomes most frequently assessed were systolic and diastolic blood pressure. Overall, 10 of the 12 included studies reported significant improvements in blood pressure control, particularly in terms of reductions in systolic blood pressure

(Delavar et al., 2020; Fu et al., 2020; Sukpattanasrikul et al., 2021; Zhang et al., 2021; Alsaqer, 2022; Bumrungsuk, 2022; Sarinukul et al., 2023; Jiang et al., 2025; Kamaryati et al., 2025; Moolsart & Kritpolviman, 2025).

Improvements in self-care behaviors were reported in seven studies (Sukpattanasrikul et al., 2021; Putri et al., 2021; Zhang et al., 2021; Alsaqer, 2022; Bumrungsuk, 2022; Kamaryati et al., 2025; Cutrona et al., 2025), although the effect was not statistically significant in one study (Moolsart & Kritpolviman, 2025). Improvements in medication adherence were reported in three studies (Delavar et al., 2020; Zhang et al., 2021; Alsaqer, 2022), while enhanced self-efficacy was observed in three studies (Zhang et al., 2021; Cutrona et al., 2025; Alsaqer, 2022). Improvements in QoL were reported in four studies (Sukpattanasrikul et al., 2021; Zhang et al., 2021; Sarinukul et al., 2023; Kamaryati et al., 2025). The detailed characteristics and extracted data of the included studies are summarized in Table 2.

Table 2. Summary and characteristics of included studies

Study Country	(Year),	Design	Population	Intervention	Results
Delavar et al. (2020), Iran		RCT, single-center, parallel-group	112 older adults with uncontrolled primary hypertension and inadequate health literacy	The health literacy–tailored self-management education program consisted of two face-to-face educational sessions (30–45 min each) and four follow-up telephone sessions. Educational materials were adapted to low health literacy levels and delivered using the teach-back method. The intervention focused on improving the understanding of hypertension, medication adherence, and home blood pressure monitoring skills. Duration: ~6 weeks.	Significant improvements in medication adherence and significant reductions in mean systolic and diastolic blood pressure were observed compared with those in the usual care group. No significant difference was observed between the groups in the proportion of participants who achieved target blood pressure control.
Fu et al. (2020), Hong Kong		Cluster RCT	291 older adults with uncontrolled hypertension	Group-based risk assessment and management program (RAMP) involving multidisciplinary group education (physicians and nurses), structured self-care education, lifestyle modification	The intervention group achieved significantly higher blood pressure control rates (78.9% vs. 36.5% at 18 months),

Sukpattanasrikul et al. (2021), Thailand	Quasi-experimental	156 older adults with uncontrolled hypertension	counseling, and hands-on training in home blood pressure monitoring (HBPM). Participants were provided with HBPM devices and received individualized nursing follow-up at 6 weeks. Follow-up assessments were conducted at 6, 12, and 18 months. Individual- and family based self-management programs grounded in Individual and Family Self-Management Theory. The components included culturally tailored hypertension education, small group discussions for goal setting and action planning, self-care skills training (diet, physical activity, stress management, and medication adherence), and active caregiver involvement. Monthly group meetings and telephone follow-ups. Duration: 16 weeks.	greater reductions in systolic and diastolic blood pressure, and prevention of weight gain compared with the usual care group.
Putri et al. (2021), Indonesia	Quasi-experimental, pre-post with control group	134 older adults with hypertension	Community-based nursing self-management intervention consisting of four structured home visits (55–60 min per session). The program included hypertension education, nutrition and physical activity management, stress reduction and relaxation techniques, reduction of smoking and alcohol use, direct demonstrations, and the use of self-	The intervention significantly improved self-care adherence and overall health status compared to the control group ($p < 0.001$). Self-management was identified as the strongest predictor of improved outcomes after

			management modules and workbooks. Family members were involved as active caregivers in the study.	controlling for confounding factors.
Zhang et al. (2021), China	RCT	120 older adults with hypertension	Nursing care based on the Roy Adaptation Model (RAM), including comprehensive assessment and individualized interventions across four adaptive domains (physiological function, self-concept, role function, and interdependence). The intervention incorporated self-care education on diet, physical activity, medication adherence, and emotional regulation, with monthly follow-ups. Duration: 3 months.	Significant improvements in self-efficacy, self-care behaviors, medication adherence, and quality of life, along with significant reductions in systolic and diastolic blood pressure were observed. Blood pressure control rates were higher in the intervention group (85.4% vs 64.6%).
Alsaqer (2022), Jordan	RCT	110 older adults with hypertension	Nurse-led self-care management intervention supported by mobile health (mHealth). Participants received self-care education based on WHO and AHA guidelines, used four mHealth applications (BP monitoring, medication reminders, stress management, and physical activity), and received weekly follow-up by public health nurses via phone and WhatsApp for 3 months.	The nurse-supported mHealth intervention significantly reduced systolic blood pressure (~14 mmHg) and improved self-care maintenance, monitoring, and confidence compared with the control groups. No significant differences were observed in the diastolic blood pressure.
Bumrungsuk (2022), Thailand	Quasi-experimental, repeated measures	91 older adults with hypertension	The self-management training program was based on Creer's concept and included small-group	Significant improvements in self-management behaviors and

			education, self-management skills training (goal setting, self-monitoring, self-reflection), structured physical activity, group discussions, and home visits for reinforcement. Duration: 13 weeks.	significant reductions in systolic blood pressure were observed at weeks 4 and 13, the and changes in diastolic blood pressure were not significantly different between the groups.
Sarinukul et al. (2023), Thailand	RCT	34 older women with stage 1 hypertension	A moderate-intensity stepping exercise program was conducted in groups under instructor supervision. Sessions lasted 60 min, three times per week for eight weeks, including warm-up, core exercise, and cool-down phases.	The stepping exercise group demonstrated significant reductions in systolic and diastolic blood pressure and improved physical performance, whereas the control group showed no significant changes.
Jiang et al. (2025), China	RCT	517 older adults with hypertension	Intelligent Hypertension Excellence Center (iHEC) model integrating app-based self-monitoring, remote blood pressure management, online consultations, automated reminders, and data-driven treatment adjustments. Follow-up duration was 12 months.	The iHEC intervention resulted in greater reductions in systolic blood pressure (-4.2 mmHg) and higher blood pressure control rates (60.2% vs. 48.1%) with a lower risk of excessive blood pressure reduction.
Cutrona et al. (2025), USA	RCT	516 Black older veterans with hypertension	The narrative-informed intervention combined video storytelling from Black veterans and bidirectional text messaging over 6	No significant differences were observed between the groups in terms of systolic or

			months, aimed at enhancing motivation, self-efficacy, and self-care behaviors.	diastolic blood pressure reduction. Both groups experienced significant overall blood pressure reductions and high engagement with text-based intervention.
Kamaryati et al. (2025), Indonesia	Quasi-experimental	141 older adults with uncontrolled hypertension and family caregivers	The Self and Family Management Support Program (12 weeks) included education for patients and families, self-management skills training, joint goal setting, home visits, individual coaching, follow-up calls, and daily self-monitoring using logbooks.	Significant improvements in blood pressure control, self-management behaviors, knowledge, and quality of life were observed, with consistent effects maintained through week 12.
Moolsart & Kritpolviman (2025), Thailand	Quasi-experimental, two-group pretest-posttest	91 older adults with uncontrolled hypertension	Smart device-based self-health monitoring program using smartwatches, a decision-support application, daily self-monitoring (BP, activity, diet, stress), digital education via LINE, tele-nursing, and home-based feedback grounded in self-regulation theory. Duration: 12 weeks.	Significant reductions in systolic, diastolic, and mean arterial pressures were observed compared with those in usual care, although differences in self-management behaviors were not statistically significant.

Discussion

Hypertension in older adults represents a complex and multifactorial chronic health condition, with a prevalence that is increasing steadily alongside global population aging. Blood pressure control in this population is frequently challenged by age-related physiological decline, multimorbidity, cognitive limitations, low health literacy, and a high degree of dependence on family support and primary healthcare services (Handayani et al., 2025). In this context, self-care or self-management based interventions have emerged as a key strategy for improving blood pressure control and preventing long-term cardiovascular complications among older adults with

hypertension (Izadirad & Jangizahi, 2025). This systematic review synthesizes the current empirical evidence on the effectiveness of self-care management-based interventions in older adults with hypertension, with a primary focus on blood pressure control and related supportive outcomes (Fu et al., 2020).

Types and Components of Self-Care Management Interventions

The synthesis of findings indicates that self-care management interventions for older adults with hypertension are predominantly multicomponent in nature and are designed to address clinical, behavioral, and psychosocial needs simultaneously. The included interventions can be broadly categorized into four main approaches: (1) structured self-management education and training, (2) interventions with active nurse-led support, (3) family based interventions, and (4) technology-based interventions. These approaches are frequently combined to create more comprehensive and sustainable strategies (Alsaqer, 2022; Cutrona et al., 2025; Kamaryati et al., 2025; Sukpattanasrikul et al., 2021).

The core components consistently identified across studies included hypertension education, lifestyle modification (such as low-sodium diet, physical activity, and stress management), enhancement of medication adherence, and home blood pressure monitoring (HBPM) (Fu et al., 2020). HBPM has emerged as a fundamental element of effective self-care interventions, as it provides more representative blood pressure measurements than clinic-based assessments and promotes active patient engagement in disease management (Mancia et al., 2023; Unger et al., 2020).

Several interventions have been explicitly grounded in behavioral and nursing theories, including the Roy Adaptation Model, Self and Family Management Theory, and Self-Regulation Theory (Delavar et al., 2020; Sukpattanasrikul et al., 2021; Zhang et al., 2021). Theory-based approaches offer a strong conceptual foundation for understanding behavior change mechanisms, particularly in enhancing older adults' adaptive capacity to chronic illness and long-term care demands (Kamaryati et al., 2025; Zhang et al., 2021). Recent literature supports the notion that interventions informed by theoretical frameworks are more effective than health education programs that lack a clear conceptual basis (Daryabeygi-Khotbehsara et al., 2021).

Overall, the findings of this review indicate that self-care management-based interventions for older adults with hypertension are most effective when implemented as multicomponent strategies that integrate educational, behavioral, and supportive elements. Interventions combining structured education, nurse-led support, family involvement, and home blood pressure monitoring have consistently demonstrated the potential to enhance patient engagement and improve blood pressure control. Furthermore, incorporating theory-based frameworks appears to strengthen intervention effectiveness by facilitating sustained behavior change and adaptive self-management. These findings highlight the importance of designing comprehensive, context-sensitive self-care interventions that address the complex clinical and psychosocial needs of older adults with hypertension.

Effectiveness of Interventions on Blood Pressure Control

Overall, this review demonstrates that self-care management interventions are effective in reducing blood pressure among older adults, particularly in systolic blood pressure. Of the 12 included studies, 10 reported significant reductions in systolic blood pressure in the intervention groups compared with standard care (Delavar et al., 2020; Fu et al., 2020; Sukpattanasrikul et al., 2021; Zhang et al., 2021; Alsaqer, 2022; Bumrungsuk,

2022; Sarinukul et al., 2023; Jiang et al., 2025; Kamaryati et al., 2025; Moolsart & Kritpolviman, 2025). One study reported no statistically significant differences between the groups (Cutrona et al., 2025), while another did not directly report blood pressure outcomes but demonstrated improvements in self-care adherence and overall health status (Putri et al., 2021). These findings were observed in both randomized controlled trials and quasi-experimental designs.

In contrast, the effects on diastolic blood pressure were more variable and not consistently significant across studies. This pattern aligns with physiological evidence indicating that increased arterial stiffness in older adults renders systolic blood pressure a more dominant and responsive indicator of non-pharmacological interventions (McEvoy et al., 2024). Consequently, reductions in systolic blood pressure have substantial clinical relevance, as they are strongly associated with decreased risks of stroke and coronary heart disease (Mancia et al., 2023).

Notably, a small number of studies did not identify significant differences between the intervention and control groups, particularly when the control groups received active components, such as bidirectional text messaging or routine blood pressure monitoring. These findings suggest that even low-intensity self-care interventions may confer certain clinical benefits and highlight the importance of carefully considering the nature of standard care when interpreting intervention effects (Cutrona et al., 2025).

Overall, these findings indicate that self-care management-based interventions are consistently effective in improving systolic blood pressure control among older adults, with more stable and pronounced effects observed for systolic than for diastolic blood pressure. This suggests that systolic blood pressure may serve as a more sensitive indicator of intervention effectiveness in this population, particularly in the context of age-related vascular changes.

The variability in outcomes across studies highlights the importance of intervention characteristics and the conditions of the comparators. Multicomponent interventions integrating education, behavioral support, and regular monitoring tend to produce more consistent benefits, whereas studies with active control conditions have demonstrated that even low-intensity interventions may contribute to blood pressure improvement. These findings underscore the need for comprehensive, context-sensitive intervention designs and careful interpretation of effectiveness in real-world settings.

Variation in Effectiveness According to Intervention Characteristics

Intervention duration was a key determinant of effectiveness. Studies with medium- to long-term interventions (≥ 12 weeks) and ongoing follow-up have demonstrated more stable and consistent blood pressure control than short-term interventions (Fu et al., 2020; Jiang et al., 2025). This observation is consistent with recent meta-analytic evidence indicating that meaningful health behavior change requires time and repeated reinforcement to achieve a sustained clinical impact (Zhou et al., 2023).

Although short-term interventions may improve knowledge and awareness, they are often insufficient to produce durable changes in blood pressure outcomes. Therefore, the design of self-management interventions for older adults should prioritize sustainability and incorporate structured follow-up mechanisms as core components (Boima et al. 2024). Beyond duration, intervention intensity and delivery methods also influence effectiveness. High-intensity interventions integrating education, skills training, and nurse-led support yield more consistent outcomes than single-component

interventions (Alsaqer, 2022; Putri et al., 2021). Nurses play a pivotal role in facilitating behavior change through tailored educational, motivational, and supportive approaches aligned with the individual needs of older adults.

Technology-based interventions, including mobile health applications, telemonitoring, and smart devices, have demonstrated considerable potential for improving blood pressure control, particularly among older adults with uncontrolled hypertension. However, their effectiveness is strongly influenced by digital literacy and professional support. Evidence suggests that technology-enhanced interventions combined with telenursing or nurse coaching are more effective than standalone digital solutions (Moolsart & Kritpolviman, 2025; Tran et al., 2025).

Secondary Outcomes: Adherence, Self-Care Behaviors, and Quality of Life

Beyond primary clinical outcomes, self-care management interventions positively influenced secondary outcomes, including medication adherence, self-care behaviors, self-efficacy, and health-related quality of life. Improvements in medication adherence were reported in at least three studies (Delavar et al., 2020; Zhang et al., 2021; Alsaqer, 2022), while self-care behaviors were enhanced in seven studies (Sukpattanasrikul et al., 2021; Putri et al., 2021; Zhang et al., 2021; Alsaqer, 2022; Bumrungsuk, 2022; Kamaryati et al., 2025; Moolsart & Kritpolviman, 2025). Improvements in QoL were reported in four studies (Sukpattanasrikul et al., 2021; Zhang et al., 2021; Sarinukul et al., 2023; Kamaryati et al., 2025). Interventions tailored to health literacy levels were particularly effective in improving medication adherence, although their impact on categorical blood pressure control often requires longer intervention durations (Delavar et al., 2020). Improvements in self-care behaviors and self-efficacy are key mediators of long-term blood pressure control, as older adults with stronger self-management capacity are more likely to sustain healthy behaviors and adhere to recommended therapies (Zhou et al., 2023).

Family support is a critical determinant of intervention success, particularly in collectivist cultural contexts. Family based interventions have demonstrated broader and more sustained effects on blood pressure control, self-care behaviors, and quality of life among older adults (Kamaryati et al., 2025; Sukpattanasrikul et al., 2021). Families provide instrumental, emotional, and social support that strengthens older adults' capacity to engage in self-care activities. Additionally, community involvement and primary healthcare integration enhance the sustainability of interventions. The World Health Organization emphasizes that chronic disease management in older adults requires community-based approaches and strengthening nurses' roles as frontline providers in primary care (World Health Organization, 2004).

Overall, these findings indicate that self-care management interventions extend beyond clinical blood pressure outcomes by consistently improving the behavioral and psychosocial domains essential for long-term disease management. Evidence suggests that self-care behaviors and medication adherence act as key mechanisms through which these interventions achieve sustained blood pressure control, while improvements in the quality of life reflect broader patient-centered benefits.

Furthermore, the effectiveness of these interventions appears to be strengthened by contextual and supportive factors, particularly family involvement and community care. These elements enhance patient engagement, reinforce adherence, and support the sustainability of self-management. Taken together, these results highlight the

importance of integrating behavioral, social, and contextual components into self-care interventions to optimize hypertension management in older adults.

Implications for Nursing Practice

Based on this synthesis, effective self-care management interventions include structured education, nurse-led support, family involvement, and the use of digital technology. Effectiveness in blood pressure control is most evident in reductions in systolic blood pressure, with variability influenced by the intervention duration, intensity, and delivery methods. The most consistently improved secondary outcomes were medication adherence, self-care behaviors, self-efficacy, and quality of life, with family support being a key reinforcing factor.

Overall, the evidence synthesized in this review indicates that self-care management-based interventions represent an effective, relevant, and practical approach for hypertension control in older adults. The greatest effectiveness was achieved through multicomponent interventions integrating structured education, HBPM, nurse-led support, and family involvement. These findings are consistent with current international guidelines advocating integrated, patient-centered approaches to hypertension management (Mancia et al., 2023; McEvoy et al., 2024).

From a nursing practice perspective, these findings underscore the strategic role of nurses in facilitating self-care among older adults. Nurses should develop competencies in HBPM education, behavioral coaching, digital health utilization, and collaboration with families and communities. Nurse-led self-management programs integrated into primary care and supported by digital technologies have substantial potential to improve sustained hypertension control and reduce the burden on healthcare systems.

Limitations

This systematic review has several limitations that should be considered when interpreting its findings. First, substantial heterogeneity was observed across the included studies in terms of intervention components, duration, intensity, delivery methods, and outcome measurements, which limited comparability and precluded quantitative synthesis through a meta-analysis. In addition, although randomized controlled trials comprised a large proportion of the included studies, the inclusion of quasi-experimental designs introduced potential risks of selection bias and confounding, which may have influenced the consistency and strength of the evidence.

Second, most of the included studies were conducted in Asian countries, which may limit the generalizability of the findings to older adult populations in other cultural and healthcare contexts. Variability in blood pressure measurement protocols, follow-up duration, and assessment tools for secondary outcomes may also have contributed to inconsistent results, particularly for diastolic blood pressure. Furthermore, the restriction to English-language publications within the past five years may have introduced language and publication bias, despite ensuring the inclusion of recent and relevant studies.

Contribution to global nursing practice

The findings of this systematic review contribute to global nursing practice by strengthening the evidence base for nurse-led self-care management interventions in the control of hypertension among older adults. The results demonstrate that multicomponent interventions—integrating structured education, home blood pressure monitoring, behavioral coaching, and sustained follow-up—are effective in improving

systolic blood pressure and key self-management outcomes in diverse settings. These findings reinforce the pivotal role of nurses as primary facilitators of chronic disease self-management and support the expansion of nurse-led models of care within primary healthcare systems worldwide, particularly in aging populations with a growing burden of hypertension.

Moreover, this review highlights the importance of culturally responsive, family inclusive, and technology-supported nursing interventions for enhancing long-term hypertension management. By demonstrating the added value of family engagement, digital health tools, and theory-informed nursing frameworks, the findings offer practical guidance for adapting self-care interventions to different healthcare contexts and resource availability. This evidence can inform nursing education, clinical guidelines, and health policy development, promote the integration of patient-centered, sustainable self-care strategies into routine nursing practice globally, and contribute to improved cardiovascular outcomes and reduced healthcare burden among older adults.

Conclusion

Self-care management-based interventions are an effective approach to improving blood pressure control among older adults with hypertension, particularly in reducing systolic blood pressure. Evidence from this review indicates that the majority of the included studies (10 out of 12) reported significant reductions in systolic blood pressure, highlighting the consistent effectiveness of these interventions. Multicomponent strategies that integrate structured education, home blood pressure monitoring, nurse-led support, family involvement, and digital health technologies demonstrated the most consistent benefits compared with standard care strategies.

These findings highlight the critical role of nurses in designing and implementing integrated, patient-centered self-care management programs for older adults with hypertension. Interventions that incorporate community-based approaches, family support, and digital health technologies are more likely to enhance the long-term adherence and sustainability of blood pressure control. Strengthening these components within primary healthcare systems may significantly reduce the burden of hypertension-related complications in aging populations. Future research should focus on evaluating the long-term effectiveness and cost efficiency of these multicomponent interventions and developing context-specific implementation models tailored to diverse healthcare settings.

Author Contribution

All authors contributed substantially to the conception and design of the study, literature search, data extraction, data synthesis, and interpretation of the results. All authors were involved in drafting and critically revising the manuscript, approved the final version, and agreed to be held accountable for all aspects of the work.

Conflict of interest

The authors declare no conflicts of interest.

Acknowledgment

The authors would like to thank all the researchers whose studies were included in this systematic review. No specific financial funding or technical assistance was received for the preparation of this manuscript.

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