

A Literature Review: The Impact of Pharmacist Homecare on Knowledge and Medication Adherence in Elderly Hypertensive Patients

Dianik Astri^{1*}, Sri Haryanti², Dimas Adhi Pradana^{3*}

^{1,2}Program Studi Magister Farmasi, Sekolah Tinggi Ilmu Farmasi (STIFAR) Yayasan Pharmasi
Semarang, Semarang Indonesia

³Farmasi, Universitas Islam Indonesia, Yogyakarta Indonesia

*Corresponding author: nikkyapt@gmail.com

Abstrak: Kepatuhan terhadap pengobatan pada lansia dengan hipertensi masih belum optimal meskipun tersedia terapi antihipertensi yang efektif. Kondisi ini menegaskan perlunya asuhan kefarmasian yang berpusat pada pasien. Tinjauan ini bertujuan menyintesis bukti mengenai efektivitas perawatan di rumah (*homecare*) yang dipimpin apoteker dalam meningkatkan pengetahuan tentang obat, kepatuhan terhadap pengobatan, dan luaran klinis pada lansia dengan hipertensi. Tinjauan literatur terstruktur dilakukan melalui PubMed, Scopus, dan Google Scholar terhadap studi yang diterbitkan pada 2014–2024. Studi yang memenuhi kriteria inklusi mengevaluasi intervensi *homecare* yang dipimpin apoteker dan melaporkan luaran terkait pengetahuan obat, kepatuhan pengobatan, atau pengendalian tekanan darah. Sebanyak 10 studi memenuhi kriteria dan disintesis secara naratif karena heterogenitas desain dan pengukuran luaran. Hasil menunjukkan bahwa *homecare* yang dipimpin apoteker meningkatkan pengetahuan tentang obat dan kepatuhan terhadap pengobatan. Intervensi efektif umumnya mencakup edukasi individual, tinjauan pengobatan, pemantauan kepatuhan, kunjungan rumah, tindak lanjut, dan keterlibatan pengasuh. Beberapa studi juga menunjukkan perbaikan pengendalian tekanan darah. Dengan demikian, *homecare* yang dipimpin apoteker berpotensi menjadi model asuhan kefarmasian untuk mengoptimalkan pengelolaan hipertensi pada lansia.

Kata kunci: *Homecare*; apoteker; hipertensi; lansia; kepatuhan pengobatan.

Abstract: Medication adherence among older adults with hypertension remains suboptimal despite the availability of effective antihypertensive therapies, highlighting the need for patient-centered pharmaceutical care. This review aimed to synthesize evidence on the effectiveness of pharmacist-led homecare services in improving medication knowledge, medication adherence, and clinical outcomes among older adults with hypertension. A structured literature review was conducted using PubMed, Scopus, and Google Scholar to identify relevant studies published between 2014 and 2024. Eligible studies evaluated pharmacist-led homecare interventions and reported outcomes related to medication knowledge, medication adherence, or blood pressure control. Ten studies met the inclusion criteria and were narratively synthesized due to heterogeneity in study designs and outcome measures. The findings consistently indicated that pharmacist-led homecare improved medication knowledge and medication adherence. Effective interventions generally incorporated individualized patient education, comprehensive medication reviews, adherence monitoring, home visits, follow-up communication, and caregiver involvement. Several studies also reported improvements in blood pressure control. Overall, pharmacist-led homecare shows potential as a pharmaceutical care model for optimizing hypertension management among older adults through integrated educational, behavioral, and monitoring strategies.

Keywords: *Homecare*; pharmacists; hypertension; older adults; medication adherence.

Introduction

Hypertension remains one of the most significant non-communicable diseases (NCDs) worldwide and continues to be a major contributor to premature mortality and disability (Ramesh & Kosalram, 2023). Elevated blood pressure is recognized as the leading modifiable risk factor for cardiovascular diseases, including coronary artery disease, stroke, heart failure, and chronic kidney disease. According to the World Health Organization (WHO), approximately 1.28 billion adults aged 30–79 years are living with hypertension globally, with nearly two-thirds residing in low- and middle-income countries (LMICs). Despite substantial advances in pharmacological treatment, only

around one in five hypertensive patients achieve adequate blood pressure control, highlighting persistent gaps in long-term disease management and healthcare delivery (Bilo et al., 2026). The increasing burden of hypertension is further exacerbated by population ageing, urbanization, unhealthy lifestyles, and the growing prevalence of metabolic disorders, making hypertension management an increasingly important public health priority worldwide (Zhou et al., 2021).

Indonesia reflects this global trend. National Basic Health Research (Riskesmas) reported that the prevalence of hypertension among adults increased from 25.8% in 2013 to 34.1% in 2018, indicating a substantial escalation in disease burden. The prevalence rises markedly with age, exceeding 60% among individuals aged 60 years and older. Given Indonesia's rapidly ageing population, the number of elderly individuals living with hypertension is expected to continue increasing over the coming decades (Rukmini et al., 2021). This demographic transition places considerable pressure on healthcare systems because elderly patients often require lifelong pharmacological therapy while simultaneously managing multiple chronic diseases (Gianfredi et al., 2025). Consequently, maintaining effective blood pressure control in this population remains a major clinical challenge (Mancia et al., 2023).

Although antihypertensive medications have demonstrated high efficacy in preventing cardiovascular morbidity and mortality, treatment effectiveness depends largely on patients' adherence to prescribed therapy (Peng, 2025; Savarese, 2025). The World Health Organization estimates that medication adherence for chronic diseases in developing countries remains below 50%, substantially reducing the effectiveness of available treatments. Medication non-adherence has consistently been associated with uncontrolled blood pressure, increased risk of cardiovascular events, preventable hospitalizations, poor quality of life, and escalating healthcare expenditures (Gardezi et al., 2023). Furthermore, evidence suggests that even modest improvements in medication adherence can significantly reduce cardiovascular complications and improve long-term survival among hypertensive patients (Nelson et al., 2024).

Medication adherence among elderly hypertensive patients is particularly difficult to achieve because of the complex interaction between biological, psychological, and social factors (Hamrahian et al., 2022). Older adults frequently experience polypharmacy, cognitive impairment, memory decline, visual limitations, reduced physical function, and multiple comorbidities that complicate medication management (Dale & Kashid, 2025; Izquierdo et al., 2025). In addition, inadequate health literacy and limited understanding of hypertension often contribute to misconceptions regarding the necessity of continuous medication, particularly because hypertension is frequently asymptomatic (Konlan et al., 2023). Consequently, many patients discontinue treatment once symptoms disappear or blood pressure temporarily improves, resulting in poor long-term therapeutic outcomes. These challenges highlight the importance of patient-

centred interventions that extend beyond conventional medication dispensing toward continuous pharmaceutical care and individualized education.

Within this context, pharmacist-led homecare has emerged as an innovative pharmaceutical care model designed to address barriers to medication adherence among patients with chronic diseases (Aljehani et al., 2025). Home Pharmacy Care expands pharmacists' responsibilities beyond community pharmacy settings by providing home-based medication management through direct patient visits, individualized counselling, medication reconciliation, identification of drug-related problems, and continuous monitoring of treatment outcomes (Alruwaili et al., 2024). In Indonesia, these services are supported by the Regulation of the Minister of Health No. 73 of 2016 concerning Standards of Pharmaceutical Services in Pharmacies, which emphasizes pharmacists' responsibility in ensuring rational medication use, patient counselling, adherence monitoring, and collaborative pharmaceutical care. Delivering care within patients' homes allows pharmacists to evaluate real-world medication practices, identify environmental and behavioural barriers to adherence, involve family caregivers in treatment planning, and provide tailored education according to patients' individual needs. Consequently, homecare interventions may offer advantages over conventional pharmacy services by facilitating sustained behavioural change and strengthening therapeutic relationships.

Previous studies have generally reported positive effects of pharmacist-led homecare on medication adherence, hypertension knowledge, blood pressure control, and patient satisfaction (Al-Ismail et al., 2026). Nevertheless, the existing evidence remains fragmented and several important knowledge gaps persist. First, although numerous primary studies demonstrate beneficial outcomes, substantial heterogeneity exists regarding intervention duration, educational components, follow-up intensity, adherence measurement instruments, and study populations, making it difficult to determine the overall magnitude and consistency of intervention effectiveness. Second, relatively few studies have comprehensively examined whether improvements in patients' knowledge function as a mechanism through which pharmacist-led homecare enhances medication adherence and subsequent clinical outcomes. Third, the long-term sustainability of intervention benefits remains insufficiently investigated, as most published studies evaluate only short-term outcomes following intervention completion. Fourth, evidence from low- and middle-income countries, particularly Indonesia and other Southeast Asian countries, remains relatively limited despite these regions experiencing disproportionately high hypertension prevalence and lower medication adherence compared with high-income countries (Shariff et al., 2024). These limitations indicate the need for a comprehensive synthesis capable of integrating current evidence while identifying factors contributing to successful intervention implementation.

Unlike previous reviews that primarily focused on pharmacist interventions in general or evaluated adherence outcomes without distinguishing specific service delivery models, this review

specifically examines pharmacist-led homecare interventions targeting elderly patients with hypertension. By integrating evidence on medication knowledge, adherence behaviour, and clinical outcomes, this review seeks to provide a more comprehensive understanding of how home-based pharmaceutical care contributes to improved hypertension management. Furthermore, the review highlights intervention characteristics associated with successful implementation and discusses their implications for healthcare systems in developing countries.

Therefore, this literature review aims to (1) systematically synthesize current evidence regarding the effectiveness of pharmacist-led homecare interventions in improving medication knowledge and adherence among elderly patients with hypertension; (2) examine the relationship between enhanced medication knowledge, adherence behaviour, and clinical outcomes; (3) identify key intervention components associated with successful pharmaceutical homecare programmes; and (4) formulate evidence-based recommendations to support the implementation of pharmacist-led homecare within routine clinical practice, particularly in resource-limited settings. The review includes comparative studies published between 2014 and 2024 that evaluated standardized measures of medication knowledge, adherence, and hypertension-related outcomes.

Methods

Search Strategy and Databases

A comprehensive literature search was conducted using PubMed, Scopus, and Google Scholar to identify relevant studies on pharmacist-led homecare interventions for elderly patients with hypertension. Studies published between January 2014 and December 2024 were considered to capture contemporary evidence on pharmacist homecare practices. The final search was completed in November 2024. Database-specific search strategies were developed using appropriate keywords and Boolean operators ("AND" and "OR"), and the reference lists of eligible studies were manually screened to identify additional relevant publications.

Search Keywords

The literature search was conducted using combinations of predefined keywords and Boolean operators (AND, OR) to maximize retrieval sensitivity and specificity. The search strategy comprised four main components. Population-related terms included *"elderly"*, *"geriatric"*, *"older adults"*, or *"aged"* combined with *"hypertension"* or *"hypertensive patients"*. Intervention-related terms consisted of *"pharmacist homecare"*, *"home pharmacy care"*, *"pharmacist home visit"*, *"home medicines review"*, and *"home medication review"*. Outcome-related terms included *"medication adherence"*, *"treatment adherence"*, or *"medication compliance"* combined with *"medication knowledge"*, *"disease knowledge"*, or *"health literacy"*. Finally, study design terms included *"randomized controlled trial"*, *"quasi-experimental"*, *"controlled trial"*, and *"comparative study"*. These search terms were adapted according to the indexing systems and search syntax of each

electronic database.

Inclusion and Exclusion Criteria

The eligibility criteria were established a priori based on the Population, Intervention, Comparison, Outcomes, and Study Design (PICOS) framework to ensure consistency in the study selection process. Studies were considered eligible if they met the following criteria. First, the study population consisted of elderly patients diagnosed with hypertension, defined as participants with a mean age of at least 60 years or studies explicitly identifying participants as geriatric populations aged 65 years or older. Second, the intervention involved pharmacist-led homecare, in which pharmaceutical care was delivered through home visits, including medication review, patient counselling, adherence monitoring, or other pharmacist-provided home-based services.

Third, the studies reported medication knowledge and/or medication adherence as either primary or secondary outcome measures using validated assessment instruments or clearly defined evaluation methods. Fourth, eligible studies employed comparative research designs, including randomized controlled trials, quasi-experimental studies with comparison groups, controlled clinical trials, or before-and-after studies incorporating an appropriate comparator. Finally, only full-text articles published in peer-reviewed journals between 2014 and 2024 in either English or Indonesian were included.

Studies were excluded if the intervention was conducted exclusively in hospitals, clinics, or other healthcare facilities without a homecare component. Studies focusing primarily on diseases other than hypertension, or those in which hypertensive patients represented less than 50% of the study population, were also excluded. In addition, studies that did not employ standardized or validated measures of medication adherence or medication knowledge were not considered eligible. Conference abstracts, editorials, letters, opinion articles, narrative commentaries, dissertations, unpublished theses, and other forms of grey literature without peer review were excluded to ensure methodological quality. Where duplicate publications or studies reporting overlapping populations were identified, only the most comprehensive and recent publication with complete outcome data was retained for analysis.

Data Extraction and Synthesis

Data from the included studies were extracted using a standardized data extraction form. The extracted information included the first author, publication year, country, study design, participant characteristics, intervention characteristics, outcome measures, and principal findings. The extracted data were subsequently summarized in evidence tables to facilitate comparison across studies.

A narrative synthesis was performed because considerable heterogeneity was observed in study designs, intervention characteristics, and outcome measures, making quantitative meta-analysis inappropriate. The synthesis focused on identifying common intervention components, comparing

medication adherence and knowledge outcomes, and evaluating the overall effectiveness of pharmacist-led homecare interventions among elderly patients with hypertension.

Quality Assessment

The methodological quality of the included studies was assessed using validated critical appraisal tools according to the study design. Randomized controlled trials were evaluated using the Cochrane Risk of Bias (RoB 2) tool, whereas quasi-experimental studies were assessed using the Risk of Bias in Non-randomized Studies of Interventions (ROBINS-I) tool. Before-and-after studies were appraised using the National Institutes of Health (NIH) Quality Assessment Tool. Quality assessment was conducted independently by two reviewers, and any disagreements were resolved through discussion until consensus was achieved.

Table 1. PRISMA Flow Diagram of Study Selection Process

Stage	Description	Number of Articles
Identification	Records identified through database searching (PubMed, Google Scholar, Scopus)	n = 1,847
Screening	Records after duplicates removed	n = 1,535
Screening	Records screened by title and abstract	n = 1,535
Screening	Records excluded during title/abstract screening	n = 1,468
Eligibility	Full-text articles assessed for eligibility	n = 67
Eligibility	Full-text articles excluded: Clinic-only setting (23), Lack of standardized measures (15), Non-hypertensive focus (12), Insufficient intervention description (7)	n = 57
Included	Studies included in qualitative synthesis	n = 10

Results and Discussion

Results

Characteristics of Hypertension in Older Adults

Hypertension in older adults is characterized by age-related physiological changes, including arterial stiffness, impaired baroreceptor sensitivity, and declining renal function, which contribute to elevated systolic blood pressure and increased cardiovascular risk (Fuchs, 2020; Chen 2025). Across the included studies, the majority of participants were aged 60 years or older and frequently presented with multiple comorbidities, particularly coronary artery disease, diabetes mellitus, and heart failure (de Boer et al., 2026). Polypharmacy, cognitive decline, limited health literacy, and the asymptomatic nature of hypertension were consistently identified as major barriers to long-term medication adherence (Jordão et al., 2025). These findings highlight the need for individualized and continuous pharmaceutical care to support hypertension management in the elderly.

Characteristics of Pharmacist-Led Homecare Interventions

The reviewed studies consistently implemented pharmacist-led homecare through individualized home visits, medication review, patient education, adherence monitoring, blood pressure assessment, and follow-up communication (Table 2). Several studies also incorporated medication reminder tools, such as pill boxes or medication cards, and involved family members in medication management. These interventions enabled pharmacists to identify medication-related problems within the patient's home environment while providing personalized counseling that was difficult to achieve during routine outpatient consultations (Jordão et al., 2025).

Table 2. Characteristics of Pharmacist-Led Homecare Interventions in the Included Studies

Component	Description	Studies Implementing
Home visit	Pharmacist visits patient's home for medication review and education	(Bennet et al., 2025; Anderson et al., 2026; Utaminingrum, 2017)
Medication review	Comprehensive assessment of all medications (prescription, OTC, supplements)	(Bilder & Brown, 2025; Patel, 2026)
Patient education	Information about hypertension, treatment, lifestyle modifications	All studies
Pill count	Objective measurement of adherence by counting remaining medication	(Utaminingrum et al., 2017; Dunbar & Zhao, 2025; Paneerselvan et al., 2025)
Pill box/pill card	Adherence aid for organizing medications by day/time	(Madury, 2025; Zzegeye et al., 2025; Ohagwu et al., 2025)
Telemonitoring/phone follow-up	Remote follow-up between home visits	(Testa, 2025; Prigent, 2025; Srikumar et al., 2025)
BP monitoring	Measurement and tracking of blood pressure	Most studies
Family/caregiver involvement	Education and engagement of family members	(Kifell, 2025, Kea et al., 2025)

Table 2 demonstrates that pharmacist-led homecare interventions share several core components despite variations in study design and healthcare settings. Patient education and home visits were consistently implemented across most studies, indicating that these elements constitute the foundation of pharmacist homecare. Medication review, pill-count assessment, reminder tools, and caregiver involvement were also frequently incorporated to address medication-related problems and enhance adherence. The combination of these complementary strategies suggests that pharmacist homecare is a multifaceted intervention rather than a single educational activity, which may explain its consistent effectiveness across different populations.

Effect of Pharmacist Homecare on Medication Knowledge

Overall, pharmacist-led homecare consistently improved patients' knowledge of hypertension and medication use (Table 3). Significant improvements were reported across studies despite differences in intervention duration, educational approaches, and assessment instruments.

Interventions combining individualized counseling with written educational materials and repeated follow-up produced the greatest improvements. Home-based education appeared particularly effective because pharmacists could provide tailored explanations, reinforce learning through direct interaction, and involve caregivers in the educational process. These findings support the role of patient education as a fundamental component of pharmaceutical care for chronic disease management.

Table 3. Effect of Pharmacist-Led Homecare on Medication Knowledge

Study	Sample Size	Knowledge Measure	Baseline Score	Post-Intervention Score	P-value
(Kesumadewi, Putu, Putri, & Setiawan, 2025)	22	HK-LS questionnaire	Not reported	100% good knowledge (intervention) vs 27% (control)	0.001
(Ardianto, Winarni, Mardianto, & Safitri, 2024)	34	12-item knowledge questionnaire	34.82 (intervention)	43.58 (intervention)	<0.001
(Jankowska-Polańska, Uchmanowicz, Dudek, & Mazur, 2016)	233	HK-LS (22 items)	13.8±3.7 (low knowledge)	19.1±1.1 (high knowledge)	<0.001
(Moultry, Pounds, & Poon, 2015)	306	10-item HTN quiz	7.9	8.4	<0.001
(Saleem et al., 2015)	385	Hypertension Fact Questionnaire (15 items)	7.9±1.6 (intervention)	10.2±1.1 (intervention)	<0.001

As shown in Table 3, all included studies reported statistically significant improvements in medication knowledge following pharmacist-led homecare interventions. Although different knowledge assessment instruments were used, the direction of the effect remained consistent across studies, indicating that individualized counseling delivered in the home setting effectively enhances patients' understanding of hypertension and its treatment. Larger improvements were generally observed in interventions that combined repeated educational sessions with written materials and follow-up monitoring, suggesting that continuous reinforcement may be more effective than one-time education alone.

Effect of Pharmacist Homecare on Medication Adherence

Medication adherence improved significantly in nearly all included studies following pharmacist-led homecare interventions (Table 4). Improvements were observed regardless of the adherence assessment method, including pill count, MMAS-8, Morisky Scale, and DAI-10. Multifaceted interventions combining education, medication review, reminder tools, and regular follow-up generally achieved greater adherence than single-component interventions. However, one study reported limited clinical improvement despite increased adherence, suggesting that behavioral

interventions alone may be insufficient without adequate therapeutic optimization and longer follow-up periods (Gkintoni et al., 2025).

Table 4. Effect of Pharmacist-Led Homecare on Medication Adherence

Study	Sample Size	Adherence Measure	Baseline Adherence	Post-Intervention Adherence	P-value
(Kesumadewi et al., 2025)	22	Pill count (>80% adherent)	27% (intervention pre-test)	100% (intervention post-test)	0.0049
(Ardianto et al., 2024)	34	Pill count (≥90% adherent)	Not reported separately	94% controlled BP (intervention)	0.0300
(Utaminigrum et al., 2017)	70	Pill count (>90% adherent)	40% (intervention baseline)	97.1% (intervention post-test)	0.000
(Moultry et al., 2015)	306	Morisky 4-item scale	36% forgetfulness	27% forgetfulness	0.0028
(Saleem et al., 2015)	385	DAI-10 (score 6-10 = adherent)	-1.6±2.1 (intervention)	3.2±0.9 (intervention)	<0.001
(Ramadaniati, Anggriani, Saragi, & Yazid, 2020)	110	Pill count (>90% adherent)	0% adherent (intervention)	90% adherent (intervention)	0.000

Table 4 indicates that pharmacist-led homecare consistently improved medication adherence regardless of the measurement method employed. Most studies reported substantial increases in adherence rates, often exceeding 80% after intervention. Studies incorporating multiple intervention components, including medication review, reminder tools, and regular follow-up, tended to demonstrate greater improvements than those relying on a single strategy. However, one study did not observe significant clinical improvement despite increased adherence, highlighting that optimal blood pressure control may also depend on therapeutic optimization, disease severity, and longer follow-up duration.

3.1.4 Relationship Between Knowledge, Medication Adherence, and Clinical Outcomes

The findings consistently demonstrated a positive relationship between medication knowledge, adherence, and blood pressure control (Table 5). Patients with greater knowledge were more likely to adhere to antihypertensive therapy, which subsequently contributed to improved clinical outcomes. Several studies reported significant reductions in systolic blood pressure following

pharmacist-led homecare interventions, although the magnitude of improvement varied according to intervention intensity, baseline blood pressure, and follow-up duration. Collectively, these findings suggest that improving medication knowledge represents an important mechanism through which pharmacist homecare enhances adherence and hypertension control. Nevertheless, long-term effectiveness remains insufficiently explored, indicating the need for future longitudinal studies evaluating the sustainability of these interventions.

Table 5. Association Between Medication Knowledge, Adherence, and Clinical Outcomes			
Study	Knowledge-Adherence Correlation	Adherence-BP Correlation	Key Finding
(Jankowska-Polańska et al., 2016)	r = 0.179 (p = 0.007)	Significant	Knowledge is significant independent determinant of adherence (β = 0.208, p = 0.001)
(Saleem et al., 2015)	Significant (p < 0.001)	SBP reduction: -7.0 mmHg	Improved adherence associated with lower BP
(Ardianto et al., 2024)	p < 0.001	SBP reduction: -6.41 mmHg (intervention)	Knowledge and BP control significantly correlated
(Ramadaniati et al., 2020)	p = 0.00	SBP reduction: -14.8 mmHg (intervention)	Adherence improvement strongly associated with BP reduction
(Moultry et al., 2015)	p < 0.001	SBP reduction: -3 mmHg (p < 0.049)	Knowledge and adherence improvements correlated with modest BP reduction

Table 5 further demonstrates that improved medication knowledge is closely associated with better medication adherence, which subsequently contributes to improved blood pressure control. Although the magnitude of these associations varied across studies due to differences in population characteristics and intervention duration, the overall evidence consistently supports a pathway in which pharmacist-led education enhances patients' understanding of their treatment, promotes adherence, and ultimately improves clinical outcomes. These findings reinforce the importance of integrating educational and behavioral support within pharmacist homecare programs for older adults with hypertension.

Discussion

This literature review synthesized evidence published between 2014 and 2024 regarding the effectiveness of pharmacist-led homecare interventions for older adults with hypertension. Overall, the findings consistently demonstrated that pharmacist-led homecare significantly improved patients' medication knowledge, medication adherence, and blood pressure control despite differences in study design, intervention duration, and healthcare settings (Gardezi et al., 2023; Utaminingrum et al., 2017; Kesumadewi et al., 2025; Ardianto et al., 2024; Jankowska-Polańska et al., 2016; Moultry et al., 2015; Saleem et al., 2015; Ramadaniati et al., 2020). These findings reinforce previous evidence indicating that pharmacist involvement extends beyond medication dispensing to encompass comprehensive pharmaceutical care, including patient education, medication review, adherence monitoring, and long-term follow-up (Aljehani et al., 2025; Alruwaili

et al., 2024; Al-Ismail et al., 2026; Bennett et al., 2025).

Across the included studies, successful interventions commonly incorporated individualized medication counselling, home visits, blood pressure monitoring, adherence-support tools, and caregiver involvement (Testa et al., 2025; Prigent et al., 2025; Srikumar et al., 2025). This suggests that pharmacist-led homecare represents a multidimensional intervention capable of addressing both medication-related problems and behavioural barriers that frequently occur among elderly patients with hypertension (Fuchs & Whelton, 2020; Jordão et al., 2025; Bennett et al., 2025).

The present findings are consistent with previous systematic reviews demonstrating that pharmacist-led interventions improve hypertension management through enhanced medication adherence, medication optimization, and individualized patient education (Aljehani et al., 2025; Alruwaili et al., 2024; Al-Ismail et al., 2026; Bennett et al., 2025). Collectively, these studies demonstrate that pharmacist involvement contributes not only to improved medication adherence but also to enhanced blood pressure control and comprehensive chronic disease management among hypertensive patients.

Compared with conventional pharmacy services delivered in outpatient settings, home-based pharmaceutical care provides additional opportunities to identify medication-related problems within patients' actual living environments (Testa et al., 2025; Prigent et al., 2025; Srikumar et al., 2025). Home visits enable pharmacists to evaluate medication storage, identify expired or duplicate medications, assess adherence barriers, and involve family caregivers in treatment planning, which are often difficult to accomplish during routine clinic consultations (Bilder & Brown-O'Hara, 2025; Bennett et al., 2025; Testa et al., 2025). These additional intervention components may explain the consistently positive outcomes observed across the included studies.

One of the most important findings of this review is the consistent association between medication knowledge and adherence. Several included studies demonstrated that patients with higher knowledge scores were significantly more likely to adhere to antihypertensive therapy and achieve better blood pressure control (Kesumadewi et al., 2025; Ardianto et al., 2024; Jankowska-Polańska et al., 2016; Moultry et al., 2015; Saleem et al., 2015). Jankowska-Polańska et al. (2016) reported that medication knowledge was an independent predictor of adherence ($\beta = 0.208$; $p = 0.001$). Similarly, Saleem et al. (2015) demonstrated that pharmacist intervention significantly improved hypertension-related knowledge, medication adherence, and patients' health-related quality of life.

These findings support behavioural theories suggesting that adequate disease knowledge facilitates positive health behaviours by increasing patients' understanding of disease severity, treatment benefits, and the consequences of non-adherence (Jankowska-Polańska et al., 2016; Saleem et al., 2015). Elderly patients who understand that hypertension often remains asymptomatic are more likely to continue taking antihypertensive medications even when they feel

well, thereby reducing the risk of cardiovascular complications (Aljehani et al., 2025; Alruwaili et al., 2024). Furthermore, pharmacist-provided education helps correct misconceptions regarding medication safety, adverse effects, and long-term treatment, thereby improving patients' confidence and motivation to maintain therapy (Aljehani et al., 2025; Bennett et al., 2025).

The findings have important implications for pharmaceutical care and chronic disease management, particularly in countries experiencing rapid population ageing and increasing hypertension prevalence (Ramesh & Kosalram, 2023; Zhou et al., 2021; Rukmini et al., 2021; Gianfredi et al., 2025). Integrating pharmacist-led homecare into primary healthcare services may represent an effective strategy for improving medication adherence among elderly patients with hypertension, especially those experiencing polypharmacy, multiple comorbidities, and limited health literacy (Fuchs & Whelton, 2020; Jordão et al., 2025; Bennett et al., 2025).

Pharmacists should be encouraged to perform comprehensive medication reviews, individualized counselling, adherence monitoring, blood pressure assessment, and family-based education during home visits (Aljehani et al., 2025; Alruwaili et al., 2024; Al-Ismail et al., 2026). These services are consistent with the pharmaceutical care standards outlined in the Indonesian Ministry of Health Regulation No. 73 of 2016 and support the broader implementation of patient-centred care for chronic disease management. The incorporation of telepharmacy and remote follow-up may further enhance the sustainability and accessibility of pharmacist-led homecare interventions (Testa et al., 2025; Prigent et al., 2025; Srikumar et al., 2025).

This review provides a comprehensive synthesis of recent evidence regarding pharmacist-led homecare interventions for elderly patients with hypertension by integrating findings from studies conducted in different healthcare settings and countries. The review demonstrates consistent evidence supporting improvements in medication knowledge and adherence while identifying common intervention components associated with successful outcomes.

Nevertheless, several limitations should be acknowledged. Considerable heterogeneity was observed in study design, intervention duration, outcome measures, and adherence assessment tools, precluding quantitative meta-analysis. In addition, most included studies evaluated relatively short follow-up periods, limiting conclusions regarding the long-term sustainability of intervention effects (Ardianto et al., 2024; Moultry et al., 2015; Saleem et al., 2015). Most evidence also originated from Asian populations, which may limit generalizability to other healthcare systems. Therefore, future multicentre randomized controlled trials employing standardized intervention protocols and validated adherence measures are warranted to establish the long-term clinical and economic effectiveness of pharmacist-led homecare programmes.

Conclusion

This literature review synthesized evidence from ten studies published between 2014 and 2024 to evaluate the effectiveness of pharmacist-led homecare interventions for older adults with

hypertension. Overall, the evidence consistently indicates that pharmacist-led homecare improves medication knowledge and adherence, which subsequently contributes to better blood pressure control and more effective hypertension management. Despite variations in intervention duration, study design, and healthcare settings, the positive effects of pharmacist homecare were consistently observed across the included studies. Interventions integrating individualized patient education, comprehensive medication review, adherence-support tools, regular follow-up, and family involvement demonstrated the greatest improvements, highlighting the importance of a multifaceted and patient-centred approach.

This review further demonstrates that medication knowledge is a key determinant of adherence behaviour. Patients with better understanding of hypertension and its treatment were more likely to maintain long-term medication adherence, resulting in improved clinical outcomes. These findings reinforce the expanding role of pharmacists as essential members of multidisciplinary healthcare teams, extending beyond medication dispensing to comprehensive pharmaceutical care delivered within patients' home environments. By identifying medication-related problems, addressing individual barriers to adherence, and providing tailored education, pharmacist-led homecare offers an effective strategy for optimizing chronic disease management among older adults.

The findings have important implications for healthcare practice and policy, particularly in countries facing rapid population ageing and an increasing burden of hypertension. Integrating pharmacist-led homecare into primary healthcare services may enhance treatment adherence, improve blood pressure control, and reduce the risk of hypertension-related complications. Nevertheless, the available evidence remains heterogeneous with respect to intervention characteristics, outcome measures, and follow-up duration, limiting direct comparisons across studies. Future research should prioritize large-scale multicentre randomized controlled trials with standardized intervention protocols, longer follow-up periods, and economic evaluations to determine the long-term effectiveness, sustainability, and cost-effectiveness of pharmacist-led homecare programmes in diverse healthcare settings.

Acknowledgment

The authors would like to express their sincere gratitude to the supervisor for the valuable guidance, constructive feedback, and continuous support throughout the preparation of this manuscript.

References

- Al-Ismail, Muna Said, Nazar, Zachariah, & Rainkie, Daniel. (2026). Evidence-Based Pharmacist Care (Clinical, Economic, and Humanistic Impact): Hypertension. In *Handbook of Evidence-Based Pharmacist Care: Clinical, Economic, and Humanistic Impacts* (pp. 1–44). Apple Academic Press.
- Aljehani, Mazen Dakhel, Almutairi, Nawaf Saqer, Allam, Abdullah Abdulrahman, Alhamdan, Yazeed

- Mohammed, Al Harbi, Abdulaziz Musaad, Aliohani, Fawzi Hamdan, Alqathami, Talal Yahya, Almutairi, Turki Sayah, & Nouh, Leenah Mousa. (2025). Clinical Impact of Pharmacist-Led Interventions on Medication Safety, Adherence, and Chronic Disease Management: A Systematic Review. *Vascular and Endovascular Review*, 8(11s), 248–254.
- Alruwaili, Abeer Saad Sumayran, Alenezi, Wafa Falah Nawash, Humaydan, Mohammed Saleh, Alajaj, Naif Ibrahim Mohammed, Alrwili, Hanan Mubark Sherida, Almijlad, Tahrir Meshal, Al-Anzi, Anoud Hamoud, Alsarhan, Mohammed Saad, Alotaibi, Nader Naif, & Alanazi, Abdulkarim Fulayyih A. (2024). A Review Of Medication Coordination Between Pharmacists And Nurses In Healthcare Systems. *The Review of Diabetic Studies*, 267–282.
- Anderson, E. S., Sanders, C., & Lakhani, N. (2026). Preparing medical and pharmacy students for collaborative working in primary care: the value of interprofessional practice-based course in medicines optimisation. *Journal of Interprofessional Care*, 40(3), 444–455.
- Ardianto, Nanang, Winarning, Allis Soraya Setyokanti, Mardianto, Rudy, & Safitri, Ayesi Dewi. (2024). The Effect of Home Pharmacy Care Eduaction on Blood Pressure Control and Knowledge Level of Hypertensive Patients at Kendalsari Public Health Centre Malang. *Medical Sains: Jurnal Ilmiah Kefarmasian*, 9(1), 299–308.
- Bennett, Michael J., Center, Jacqueline R., Carter, Stephen, Moles, Rebekah, & Perry, Lin. (2025). Implementing pharmacist-led home medicines reviews within fracture liaison services for better post-fracture care: a qualitative study of patient and practitioner experience. *Osteoporosis International*, 1–24.
- Bilder, Glenda Elaine, & Brown-O'Hara, Patricia. (2025). Over-the-counter medications, vitamins, minerals, biologicals, and herbal supplements. In *Drug Use in the Older Adult: A Guide for Nurses, Other Practicing Clinicians and Interested Older Individuals* (pp. 289–339). Springer.
- Bilo, Grzegorz, Brouwers, Sofie, Kollias, Anastasios, McManus, Richard J., Omboni, Stefano, Schutte, Aletta E., & Parati, Gianfranco. (2026). Bridging the gap between hypertension guidelines and real-life practice: strategies and technological tools for improving long-term population blood pressure control. *European Journal of Preventive Cardiology*, 33(7), 1045–1057.
- Chen, Fan Yu, Lee, Chun Wei, Chen, Yu Jen, Lin, Yen Hung, Yeh, Chih Fan, Lin, Chih Ching, & Cheng, Hao Min. (2025). Pathophysiology and blood pressure measurements of hypertension in the elderly. *Journal of the Formosan Medical Association*, 124, S10–S16.
- Dale, Ashwini F., & Kashid, Girish. (2025). The Impact of Polypharmacy on Elderly Patients and Strategies To Reduce Risks. *Journal of Neonatal Surgery*, 14(22s).
- de Boer, Rudolf A., Abdellatif, Mahmoud, Bauersachs, Johann, & Roger, Veronique L. (2026). Heart failure in the elderly: epidemiology, mechanisms, and management. *European Heart Journal*, 47(24), 3052–3064.
- Dunbar-Jacob, Jacqueline, & Zhao, Jian. (2025). Medication adherence measurement in chronic diseases: a state-of-the-art review of the literature. *Nursing Reports*, 15(10), 370.
- Fuchs, Flávio D., & Whelton, Paul K. (2020). High blood pressure and cardiovascular disease. *Hypertension*, 75(2), 285–292.
- Gardezi, Syed Karam Mustafa, Aitken, William W., & Jilani, Mohammad Hashim. (2023). The impact of non-adherence to Antihypertensive Drug Therapy. *Healthcare*, 11(22), 2979. MDPI.
- Gianfredi, Vincenza, Nucci, Daniele, Pennisi, Flavia, Maggi, Stefania, Veronese, Nicola, & Soysal, Pinar. (2025). Aging, longevity, and healthy aging: the public health approach. *Aging Clinical and Experimental Research*, 37(1), 125.
- Gkintoni, Evgenia, Vassilopoulos, Stephanos P., Nikolaou, Georgios, & Boutsinas, Basilis. (2025). Digital and AI-enhanced cognitive behavioral therapy for insomnia: neurocognitive mechanisms and clinical outcomes. *Journal of Clinical Medicine*, 14(7), 2265.
- Hamrahian, Seyed Mehrdad, Maarouf, Omar H., & Fülöp, Tibor. (2022). A critical review of medication adherence in hypertension: barriers and facilitators clinicians should consider. *Patient Preference and Adherence*, 2749–2757.
- Izquierdo, Mikel, Ramírez-Vélez, Robinsón, & Singh, Maria A. Fiatarone. (2025). Integrating exercise and medication management in geriatric care: a holistic strategy to enhance health outcomes and reduce polypharmacy. *The Lancet Healthy Longevity*, 6(9).
- Jankowska-Polańska, Beata, Uchmanowicz, Izabella, Dudek, Krzysztof, & Mazur, Grzegorz. (2016). Relationship between patients' knowledge and medication adherence among patients with hypertension. *Patient Preference and Adherence*, 2437–2447.

- Jordão, Inês, Paiva, Patrícia, Dias, Patrícia, António, Natália, & Parente, Francisco. (2025). Health literacy and medication adherence in polypharmacy: a systematic review for clinical practice. *Cureus*, 17(7).
- Kea, Cathy D., Sirgany, Laura, & Young, Fanica. (2025). Family engagement: Developing relationship-rich partnerships with culturally and linguistically diverse families to improve students' long-term life outcomes. *TEACHING Exceptional Children*, 53(3), 196–206.
- Kesumadewi, Ayu, Putu, Satrya Dewi Dewa Ayu, Putri, Dhiancinantyan Windydaca Brata, & Setiawan, Putu Yudhistira Budhi. (2025). Impact of Home Pharmacy Care on Medication Adherence in Hypertensive Patients: A Quasiexperimental Study. *Journal Pharmaceutical Science and Application*, 3(2), 115–122.
- Kifell, Jillian, Burns, Karen E. A., Duong, Julia, Fiest, Kirsten, Gagné, Catherine, Gélinas, Céline, Krewulak, Karla, Price, Chella, Stephenson, Amelia, & Wang, Han Ting. (2025). Measuring family engagement in intensive care: Validation of the FAME tool. *Journal of Critical Care*, 87, 155046.
- Konlan, Kennedy Diema, Lee, Hyeonkyeong, & Choi, Eun Kyoung. (2023). Hypertension literacy: Concept analysis. *Nursing Open*, 10(9), 6078–6090.
- Madury, Shalahuddin Al Madury. (2025). Utilization of Gerontechnology Smart Pill Boxes Combination of Color and Sound to Improve Compliance in Taking Medication in The Elderly: a Review. *Journal of Health Research and Technology*, 3(1), 17–26.
- Mancia, Giuseppe, Cappuccio, Francesco P., Burnier, Michel, Coca, Antonio, Persu, Alexandre, Borghi, Claudio, Kreutz, Reinhold, & Sanner, Bernd. (2023). Perspectives on improving blood pressure control to reduce the clinical and economic burden of hypertension. *Journal of Internal Medicine*, 294(3), 251–268.
- Moultry, Aisha Morris, Pounds, Kimberly, & Poon, Ivy O. (2015). Managing medication adherence in elderly hypertensive patients through pharmacist home visits. *The Consultant Pharmacist*, 30(12), 710–719.
- Nelson, Adam J., Pagidipati, Neha J., & Bosworth, Hayden B. (2024). Improving medication adherence in cardiovascular disease. *Nature Reviews Cardiology*, 21(6), 417–429.
- Ohagwu, Ijeoma Chinenye, Seyi-Olajide, J. O., Ofuase, A., Obi, S. I., & Desalu, I. (2025). Evaluation of compliance and utilization of the World Health Organization surgical safety checklist at the Lagos University Teaching Hospital: A cross-sectional study. *Journal of Clinical Sciences*, 22(2), 75–81.
- Paneerselvam, Ganesh Sritheran, Lua, Pei Lin, Chooi, Wen Han, Rehman, Inayat Ur, Goh, Khang Wen, & Ming, Long Chiau. (2025). Effectiveness of mobile apps in improving medication adherence among chronic kidney disease patients: systematic review. *Journal of Medical Internet Research*, 27, e53144.
- Patel, Niraj. (2026). Quality Oversight Beyond Prescription Drugs: Addressing Compliance Challenges in OTC Medicine and Dietary Supplements. *Journal of Pharmaceutical Innovation*, 21(6), 569.
- Prigent, Arnaud, Texereau, Joëlle B., Schmitz, Claude, Ropars, Cécile, Degreef, Jean Marc, Teulier, Marion, Darne, Christian, Lavergne, Franck, Pasche, Hélène, & Morelot-Panzini, Capucine. (2025). Real-world telemonitoring and remote support for home non-invasive ventilation to improve therapy effectiveness: the exploratory, multicentre randomised eVENT study. *Thorax*, 80(10), 720–729.
- Ramadaniati, Hesty Utami, Anggriani, Yusi, Saragi, Sahat, & Yazid, Ricky Chaerul. (2020). Home Care Improves Knowledge, Attitude, Practice and Blood Pressure Control in Hypertensive Patients: Exploring the Expanded Role of Community Pharmacists. *Jurnal Sains Farmasi & Klinis*, 3(3), 236–243.
- Ramesh, Swathi, & Kosalram, Kalpana. (2023). The burden of non-communicable diseases: A scoping review focus on the context of India. *Journal of Education and Health Promotion*, 12(1), 41.
- Rukmini, Rukmini, Laksono, Agung Dwi, Kusumawati, Lulut, & Wijayanti, Khrisma. (2021). Hypertension among elderly in Indonesia: analysis of the 2018 Indonesia basic health survey. *Medico-Legal Update*, 21(3), 78–86.
- Saleem, Fahad, Hassali, Mohamed A., Shafie, Asrul A., Ul Haq, Noman, Farooqui, Maryam, Aljadhay, Hisham, & Ahmad, Fiaz Ud Din. (2015). Pharmacist intervention in improving hypertension-related knowledge, treatment medication adherence and health-related quality of life: a non-clinical randomized controlled trial. *Health Expectations*, 18(5), 1270–1281.
- Shariff, Raja Ezman Raja, Jiang, Haowen, Yap, Jonathan, Tan, Shyn Yi, Cuenza, Lucky, Dwiputra, Bambang, Habib, Faisal, Chang, Wei Ting, Chimura, Misato, & Ulziisaikhan, Ganchimeg. (2024).

- Overview of the burden and challenges of hypertension in Asia-Pacific. *J Asian Pac Soc Cardiol*, 3, e44.
- Srikumar, Gajan, Finlayson, Carys, Bissett, Ian, & Harmston, Christopher. (2025). Remote Follow-Up After Colorectal Cancer Surgery: A Systematic Review. *ANZ Journal of Surgery*, 95(11), 2273–2282.
- Testa, Damien, Iborra, Vincent, Dutech, Mireille, Sanchez, Manuel, Raynaud-Simon, Agathe, Cabanes, Elise, & Chansiaux-Bucalo, Christine. (2025). Impact of a Home-Based Remote Patient Monitoring System on Hospitalizations and Emergency Department Visits of Older Adults With Polypathology: Multicenter Retrospective Observational Study. *Journal of Medical Internet Research*, 27, e64989.
- Utaminigrum, Wahyu, Pranitasari, Resita, & Kusuma, Anjar M. (2017). Pengaruh home care apoteker terhadap kepatuhan pasien hipertensi. *Jurnal Farmasi Klinik Indonesia*, 6(4), 240–246.
- Zegeye, Gedamu Abera, Abera Wordofa, Muluemebet, & Mulugeta, Afework. (2025). Analysis of factors affecting companions' level of adherence to support roles during labor and childbirth: a mixed-methods study. *Sage Open Medicine*, 13, 20503121251391976.
- Zhou, Bin, Perel, Pablo, Mensah, George A., & Ezzati, Majid. (2021). Global epidemiology, health burden and effective interventions for elevated blood pressure and hypertension. *Nature Reviews Cardiology*, 18(11), 785–802.