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NURSING INOVATION: TELENURSING INTERVENTIONS TO IMPROVE MEDICATION ADHERENCE AND BLOOD PRESSURE CONTROL AMONG HYPERTENSION PATIENTS IN PRIMARY HEALTH CARE: SYSTEMATIC REVIEW

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ABSTRACT
Hypertension is a chronic condition with a high global prevalence that requires long-term management. One of the main challenges in achieving optimal blood pressure control is poor medication adherence. Technology-based approaches, such as telenursing, offer innovative solutions to enhance patient engagement in disease management. Methods: A Systematic Literature Review (SLR) was conducted following the PRISMA guidelines. Literature searches were performed in Scopus, PubMed, ScienceDirect, and Google Scholar for studies published between 2021 and 2026. A total of 4,301 records were identified, and seven randomized controlled trials (RCTs) met the inclusion criteria. The findings showed that most telenursing interventions significantly improved medication adherence and reduced blood pressure levels. Multicompoent interventions combining education, remote monitoring, and reminder systems demonstrated greater effectiveness compared to single-component approaches. Telenursing represents a promising strategy for hypertension management in primary healthcare. Its implementation requires adequate system support and evidence-based practice standards to optimize nursing care delivery.

Keywords: blood pressure; hypertension; medication adherence; nursing innovation; telenursing

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INTRODUCTION

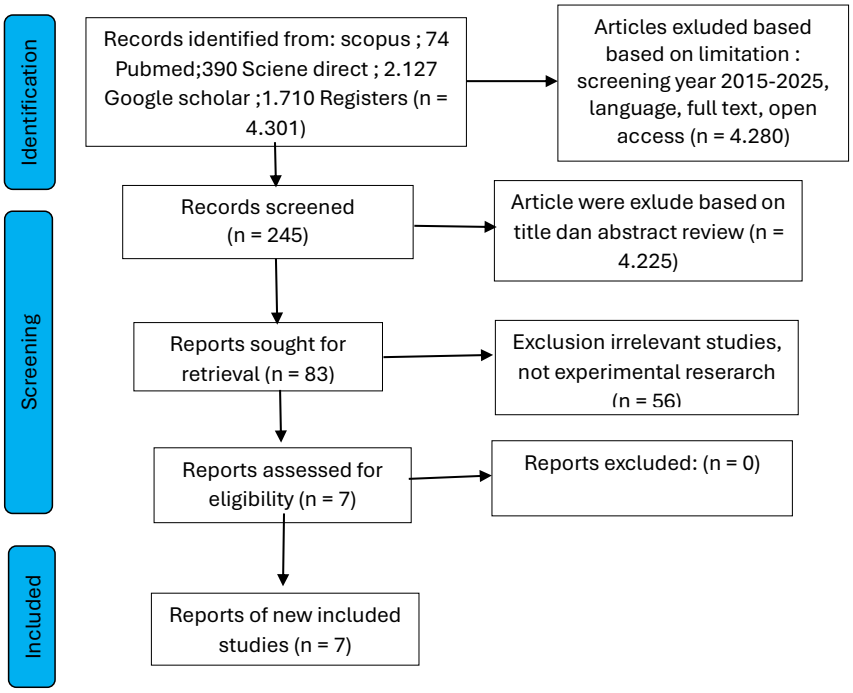
Hypertension is one of the most prevalent non-communicable diseases globally and remains a major risk factor for cardiovascular morbidity and mortality. According to the World Health Organization (2021), hypertension contributes significantly to the global burden of disease, and its prevalence continues to increase worldwide. Effective management of hypertension requires long-term treatment and continuous monitoring; however, many patients fail to achieve optimal blood pressure control, primarily due to poor medication adherence and inadequate self-management behaviors (Roth et al., 2023). Medication adherence is a critical determinant of successful hypertension management. Patients often experience challenges in maintaining regular medication intake, adhering to lifestyle modifications, and attending follow-up care. These challenges are influenced by multiple factors, including limited access to healthcare services and insufficient support from healthcare providers (Hamine et al., 2021). As a result, uncontrolled hypertension remains a major public health issue, particularly in primary healthcare settings.

Recent advancements in evidence-based nursing practice have introduced innovative approaches to address these challenges. Telenursing has emerged as a promising strategy that utilizes digital communication technologies to deliver nursing care remotely. This approach includes patient education, remote blood pressure monitoring, and continuous follow-up, which can improve patient engagement and self-management (Omboni et al., 2022). Several studies have demonstrated that telehealth-based interventions can significantly improve medication adherence and blood pressure control. For example, home blood pressure monitoring combined with professional support has been shown to enhance treatment outcomes (Margolis et al., 2022; Tucker et al., 2021).

Furthermore, digital health interventions provide scalable and cost-effective solutions for chronic disease management (Xu et al., 2022). Therefore, this systematic literature review aims to identify, analyze, and compare evidence-based telenursing interventions that have been tested through controlled clinical trials. The findings are expected to provide a scientific basis for developing effective and sustainable nursing strategies in the management of hypertension, particularly in primary healthcare settings

METHOD

This study employed a systematic literature review design following the PRISMA guidelines to identify and synthesize evidence on the effectiveness of telenursing interventions in improving medication adherence and reducing blood pressure among patients with hypertension. Although numerous studies have examined telehealth and digital health interventions in hypertension management, several research gaps remain. Many existing studies focus on general telehealth approaches without specifically highlighting nurse-led interventions such as telenursing. In addition, variations in intervention components, duration, and implementation settings contribute to inconsistencies in reported outcomes. Several studies also involve limited sample sizes or short follow-up periods, which may affect the generalizability of findings. Furthermore, some recent publications are still protocols without completed results, limiting the strength of available evidence. Therefore, a systematic review is necessary to specifically identify and compare evidence-based telenursing interventions that have been clinically tested.



Gb.1. *Flow Diagam PRISMA*

The initial search identified 4,301 records from four databases, including Scopus (74), PubMed (390), ScienceDirect (2,127), and Google Scholar (1,710). After applying inclusion criteria (publication years 2021–2026, English language, full-text availability, and open access), 4,218 records were excluded. A total of 83 articles remained for further screening. After removing duplicate records (n = 27), 56 unique articles were assessed based on title and abstract. During the title and abstract screening stage, 41 articles were excluded due to their relevance to the topic. Fifteen articles were then further evaluated through full-text reading. Of these, seven articles met the inclusion criteria and were analyzed in this SLR. Inclusion criteria included articles with a randomized controlled trial (RCT) design or RCT protocol, focused on patients involving adult

patients diagnosed with hypertension, implementing telenursing or nurse-led telehealth interventions, reporting outcomes related to medication adherence or blood pressure and were available in full-text open access. Exclusion criteria included articles with a non-experimental observational design, literature reviews, editorials, or pilot studies with a very limited number of participants.

RESULT

Table 1 presents a summary of the selected studies included in this review, highlighting the authors, study designs, and key research findings. The table of this review indicate that telenursing interventions have a positive impact on both medication adherence and blood pressure control among patients with hypertension.

Table 1.
Review Results

No	Title / Author	Study Design	Research Findings
1	Mohammadzadeh et al. (2026)	Randomized Controlled Trial	Telenursing intervention significantly improved medication adherence and contributed to better blood pressure control compared to usual care.
2	Calderón-Anyosa et al. (2023)	Randomized Controlled Trial	Home blood pressure telemonitoring combined with nurse support improved hypertension control and patient compliance.
3	Zhang et al. (2023)	Randomized Controlled Trial	Telemonitoring interventions resulted in significant reductions in systolic and diastolic blood pressure compared to standard care.
4	Halvorsen et al. (2024)	Randomized Controlled Trial	Nurse-led digital follow-up improved self-management behaviors and contributed to improved blood pressure outcomes among hypertensive patients.
5	Sadeghi-Gandomani et al. (2021)	Randomized Controlled Trial	Telenursing intervention significantly reduced blood pressure and improved patient awareness and adherence to treatment.
6	Yatabe et al. (2021)	Randomized Controlled Trial	Telemedicine-based nursing interventions improved blood pressure monitoring adherence and resulted in better hypertension control.
7	Naqvi et al. (2022)	Randomized Controlled Trial	Mobile-based and nurse-supported interventions improved medication adherence and showed positive effects on blood pressure reduction.

The seven analyzed studies demonstrated considerable attention to the use of telenursing and nurse-led telehealth interventions in improving medication adherence and blood pressure control among patients with hypertension. Most studies evaluated multicomponent interventions combining remote monitoring, patient education, and continuous follow-up, while several studies highlighted the integration of digital technologies such as mobile applications and telemonitoring systems.

In terms of interventions, several studies confirmed the effectiveness of telenursing in improving medication adherence. Mohammadzadeh et al. showed that structured telenursing interventions significantly increased patient adherence to antihypertensive therapy compared to usual care. Similarly, Naqvi et al. demonstrated that mobile-based interventions supported by nurses improved adherence behaviors and patient engagement in treatment. These findings indicate that continuous communication and monitoring play a crucial role in enhancing adherence.

Regarding clinical outcomes, multiple studies reported significant reductions in blood pressure following telenursing interventions. Zhang et al. (2023) found that telemonitoring significantly reduced both systolic and diastolic blood pressure compared to standard care. Likewise, Yatabe et al. (2021) demonstrated that telemedicine-based interventions improved blood pressure control through regular monitoring and feedback. These results highlight the importance of remote monitoring in achieving better clinical outcomes.

Multicomponent interventions were consistently found to be more effective than single-component approaches. Calderón-Anyosa et al. (2023) reported that combining home blood pressure

monitoring with nurse-led support resulted in improved hypertension control. Similarly, Halvorsen et al. (2024) showed that digital follow-up combined with nursing interventions enhanced self-management behaviors and contributed to improved blood pressure outcomes. These findings suggest that integrating multiple strategies provides a more comprehensive approach to hypertension management. In contrast, some studies indicated variability in outcomes depending on intervention characteristics. Sadeghi-Gandomani et al. (2021) reported improvements in blood pressure and patient awareness; however, the magnitude of effect varied among participants. Differences in intervention duration, intensity, and patient characteristics may explain these variations

Overall, the available evidence supports the important role of telenursing in improving both behavioral and clinical outcomes among patients with hypertension. The diversity of interventions—including telemonitoring, mobile-based applications, and nurse-led follow-up—demonstrates adaptability to different healthcare settings and patient needs. However, common limitations across studies include relatively small sample sizes, short follow-up periods, and variability in intervention design, which may affect the generalizability of findings.

DISCUSSION

The results of this systematic literature review indicate that telenursing and nurse-led telehealth interventions play a significant role in improving medication adherence and blood pressure control among patients with hypertension. Of the seven studies analyzed, the majority evaluated multicomponent telenursing interventions combining remote monitoring, patient education, and continuous follow-up. This pattern suggests that integrated, nurse-led digital interventions are the dominant and most effective approach in supporting hypertension management.

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In terms of clinical outcomes, multiple studies reported significant reductions in blood pressure following telenursing interventions. Zhang et al. (2023) demonstrated that telemonitoring significantly reduced both systolic and diastolic blood pressure compared to standard care. Likewise, Yatabe et al. (2021) showed that telemedicine-based nursing interventions improved blood pressure control through regular monitoring and timely feedback. These findings emphasize the role of continuous monitoring in enabling early detection of blood pressure fluctuations and improving treatment outcomes.

Multicomponent interventions were found to be more effective than single-component approaches. Calderón-Anyosa et al. (2023) showed that the combination of home blood pressure monitoring and nurse-led support resulted in better hypertension control. Similarly, Halvorsen et al. (2024) reported that digital follow-up integrated with nursing care improved self-management behaviors and contributed to better clinical outcomes. These results suggest that combining multiple strategies—education, monitoring, and follow-up—provides a more comprehensive and effective intervention model.

However, variations in outcomes were observed across studies. Sadeghi-Gandomani et al. (2021) reported improvements in blood pressure and patient awareness, but the magnitude of these effects varied. These differences may be attributed to variations in intervention duration, intensity, patient

characteristics, and healthcare settings. Such variability highlights the need for standardized intervention protocols and outcome measurements.

When compared with global evidence, these findings are consistent with studies on other chronic diseases, such as diabetes and cardiovascular disorders, where telehealth interventions have been shown to improve treatment adherence and clinical outcomes. This suggests that telenursing has broad applicability across chronic disease management, including hypertension.

Despite the promising findings, several limitations should be considered. First, many studies involved relatively small sample sizes and were conducted in single-center settings, limiting the generalizability of the results. Second, there was variability in outcome measurement tools, particularly for medication adherence, which made direct comparison across studies challenging. Third, differences in intervention design and duration contributed to heterogeneity in findings. The practical implications of this review highlight the importance of integrating telenursing into routine primary healthcare practice. Nurses can play a central role in delivering remote care through education, monitoring, and continuous support. Telenursing interventions can also enhance healthcare accessibility and efficiency, particularly in settings with limited resources.

Future research should focus on large-scale, multicenter randomized controlled trials with standardized intervention protocols and longer follow-up periods. Additionally, further exploration of advanced digital technologies, such as mobile health applications and artificial intelligence-based monitoring systems, is needed to optimize telenursing interventions. Strengthening the evidence base will support the integration of telenursing as a key component of hypertension management in primary healthcare.

CONCLUSION

A systematic review showed that patients with hypertension often experience challenges in maintaining medication adherence and achieving optimal blood pressure control due to long-term therapy demands, lifestyle modifications, and limited access to continuous healthcare support. Various nursing innovations have been proven effective in addressing these challenges, particularly through telenursing interventions that integrate remote monitoring, patient education, and continuous follow-up. These interventions consistently contribute to improving medication adherence, reducing blood pressure, and enhancing patients' self-management abilities..

The nursing implications of this review emphasize the importance of implementing evidence-based telenursing interventions, including telemonitoring, nurse-led education, and digital communication platforms, to support patients with hypertension in primary healthcare settings. Nurses play a central role in integrating these innovations into daily clinical practice, not only as providers of care but also as facilitators of patient engagement and self-management. With a holistic, patient-centered, and technology-based approach, nurses can help patients improve adherence, achieve better blood pressure control, and enhance overall health outcomes in managing chronic conditions.

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