


TeleNursing in the Prevention and Management of Cardiovascular Risk in Older Adults with Hypertension: a Scoping Review

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Abstract

Introduction

The global increase in the older adult population has led to a higher demand for healthcare services, as greater longevity is associated with a rise in the prevalence of chronic conditions like hypertension (HTN). Geographic barriers and current limitations in healthcare services pose significant challenges to access, especially for older adults. Various national and international organizations advocate that telenursing should be widely available to mitigate these challenges by enhancing care delivery, improving proximity to nursing services, and achieving better health outcomes.

Objective

To map the available evidence on the contribution of telenursing to the prevention and management of cardiovascular risk in older adults with HTN.

Methods

Following the Joanna Briggs Institute methodology, we conducted the scoping review and used the PRISMA-ScR checklist as a complementary guide. We searched the databases MEDLINE, CINAHL, Open Access Scientific Repository, and Google Scholar for articles and documents up to May 2023, with no temporal filter.

Results

Seven studies met the inclusion criteria. Six major dimensions characterize the potential of telenursing in older adults with HTN: cardiovascular risk prevention and management, self-management of hypertension, improved quality of life, therapeutic adherence, prevention of clinical inertia, and monitoring of adverse events.

Conclusion

Telenursing contributes to the prevention and management of cardiovascular risk and fosters a partnership relationship with older adults, supporting self-management of their health and promoting self-care.

Keywords

Telenursing, Cardiovascular Risk, Hypertension, Older Adults.

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Introduction

The aging population is an inevitable reality that has significantly shaped healthcare challenges and priorities, particularly in nursing. According to the National Institute of Statistics¹, projections indicate a concerning ratio of 128,0 to 181,3 older adults per 100 young people, with the trend expected to double by 2080. This demographic shift has led to a growing prevalence of chronic diseases (CDs), affecting 43,9% of the population in Portugal. The World Health Organization (WHO)² reported in 2023 that hypertension (HTN) is the most prevalent noncommunicable CD, affecting 46% of the global population, with 1,28 billion adults unaware of their condition. In Portugal, recent studies^{3,4} show a 36% prevalence of HTN, making it one of the leading causes of mortality. Alarmingly, only 38,9% of those diagnosed with HTN take medication, and just 28,9% manage to keep their blood pressure (BP) under control. In hospitals, the prevalence of HTN among inpatients ranges from 50,5% to 72%.

HTN is a chronic condition characterized by elevated blood pressure levels, with values consistently at or above 140/90 mmHg. HTN can be primary (essential) when no identifiable cause exists or secondary when caused by an associated disease^{5,6}. Cardiovascular risk refers to the probability of developing heart and blood vessel diseases, such as myocardial infarction, stroke, or heart failure. This risk is influenced by various factors, including HTN, hypercholesterolemia, diabetes, smoking, obesity, and a sedentary lifestyle.^{5,6} Proper management of these modifiable risk factors can help reduce the likelihood of severe cardiovascular events.^{5,6}

Given this challenging scenario, there is a need for innovative and sustainable strategies to address issues related to aging and chronic diseases. In 2021, the WHO², amid the COVID-19 pandemic, outlined the “Global Strategy on Digital Health,” aiming to promote the appropriate use of digital resources and adaptable technologies across nations to tackle major healthcare challenges and promote equitable access to these resources, ensuring that no one is excluded⁵. Similarly, the Shared Services of the Ministry of Health (SPMS)⁷, in 2019, defined *Telehealth* in the National Strategic Plan for TeleHealth (PENTS) as a promising solution that includes Telenursing (TN) (with teleconsultation and telemonitoring), proposing to shape the future of nursing care. Despite being significantly driven by the challenges posed by the COVID-19 pandemic, TN was already a reality that needs to persist, evolve, and improve continuously and systematically, regardless of that exceptional situation.⁷

Nursing TeleConsultation (TC) can be defined as a consultation where the nurse, remotely and using various technologies, assesses a person’s clinical situation and plans

the provision of healthcare, representing a significant advance in preventive, evaluative, diagnostic, and interventional approaches⁷. TeleMonitoring (TM), on the other hand, involves using technologies to remotely monitor biometric parameters such as blood pressure, heart rate, capillary glucose, weight, oximetry, and temperature, which are transmitted to the care provider⁸. Nurses should utilize TM whenever necessary to create nursing diagnoses and consequently plan interventions⁷. Technology-based care models have been widely used and enhanced after the COVID-19 pandemic, especially in the older adult population.⁹

Given the findings of previous systematic reviews that highlight the effectiveness of TE in reducing HTN values¹⁰, particularly systolic blood pressure, cholesterol levels, self-efficacy, and therapeutic adherence, this review focuses on a more specific population group, those aged 65 and older¹¹. This study aims to map existing evidence on the effectiveness of TE in managing HTN to prevent and control cardiovascular risk (CR) in older adults (OA). The study seeks to contribute significantly to advancing nursing care by providing important insights into the effective implementation of this innovative approach in the context of population aging and chronic diseases.

Methods

This scoping review followed the Joanna Briggs Institute (JBI) methodology.¹² The search strategy and article analysis adhered to the guidelines for systematic reviews and meta-analysis extensions, specifically PRISMA-ScR.¹³ We registered the protocol on the Open Science Framework (OSF) at [Open Science Framework \(OSF\) at Open Science Framework \(OSF\) \[osf.io/76pnm\]\(https://open science framework \(OSF\) at Open Science Framework \(OSF\) osf.io/76pnm\)](https://open science framework (OSF) at Open Science Framework (OSF) osf.io/76pnm) to avoid duplicating scientific evidence.

Selection criteria

The inclusion and exclusion criteria were established based on the Population, Concept, and Context (PCC) framework, following the JBI’s guiding principles. We formulated the research question: What is the contribution of Nursing Teleconsultation (C) to the prevention and control of cardiovascular risk in older adults with hypertension (P) across various contexts (C)?

Population: Individuals aged 65 and older, with or without controlled hypertension;

Concept: Contributions of teleconsultation in the prevention and control of HTN and cardiovascular risk (CR);

Context: Any healthcare setting.

We excluded articles unrelated to the research question or nursing care, those without defined objectives, and those of an editorial or opinion nature. This review included studies with qualitative, quantitative, and mixed designs, incorporating previous systematic reviews addressing the

research question, with no restrictions on language or timeframe.

Search strategy

To validate the novelty of the topic under study, we searched various databases on May 19, 2023, including PubMed, JBI Evidence Synthesis, and PROSPERO, and found no completed or registered scoping review protocols. Following the Peer Review of the Electronic Search Strategies checklist⁹, two authors (M.D. and A.R.) developed the search strategy, which was validated by a third author (I.G.).

We utilized MEDLINE (via PubMed) and CINAHL Complete (EBSCOhost) electronic databases for article searches. The descriptors were validated in the Medical Subject Headings (MeSH) to ensure a high-quality selection and data extraction process. The search strategy is detailed in Table 1. We also used Google Scholar and the Open Access Scientific Repository in Portugal, guided by the same temporal delimitation, with descriptors validated in Health Sciences (DeSC).

Table 1 - MEDLINE (EBSCOhost) and CINAHL Complete (EBSCOhost) search strategy conducted on 05/19/2023

<i>Search</i>	<i>Descriptors</i>
#1	"tele*"
#2	"Hipert* OR Cardion* Risk"
#3	"Aged: 65+ years"
#4	"nurs*"
#5	["tele*" AND ("Hipert* OR Cardion* Risk") AND "Aged: 65+ years" AND "nurs*"]

Article selection process and eligibility criteria

We extracted all documents based on their title and abstract, aligning them with the defined scoping review

objective. Duplicate articles were removed using Mendeley[®] 19.4 (Mendeley Ltd., Elsevier, Amsterdam, The Netherlands). We extracted and organized data as follows: author(s), year and country of study, objective, methodology, population/sample size, and the contribution of TN to the prevention and control of cardiovascular risk in OA. Any disagreements regarding the inclusion of reports were resolved through discussion with a third reviewer.

Results

Characteristics of Included Studies, Context, and Population

The initial search identified 49 articles. After removing duplicates (n=2) and excluding articles with participants under 65 years of age (n=10), 37 articles remained. Further analysis of titles and abstracts led to the exclusion of 1 unrelated article and 10 due to lack of full-text access, leaving 26 eligible articles. Upon review, 22 were found to involve populations under 65 years, resulting in 7 articles for detailed analysis. These selected studies, from six different countries, are discussed and synthesized in this paper, as shown in Figure 1.

The included articles originated from the United States (n=2), Canada (n=1), Spain (n=1), Brazil (n=1), Japan (n=1), and the United Kingdom (n=1). The study designs include randomized controlled trials (n=2), observational studies (n=2), cross-sectional descriptive quantitative (n=1), qualitative studies (n=1), and a narrative review. Table 2 summarizes the extracted information, including author/year of publication, main objective, methodology, sample/population under study, care context, and concept.

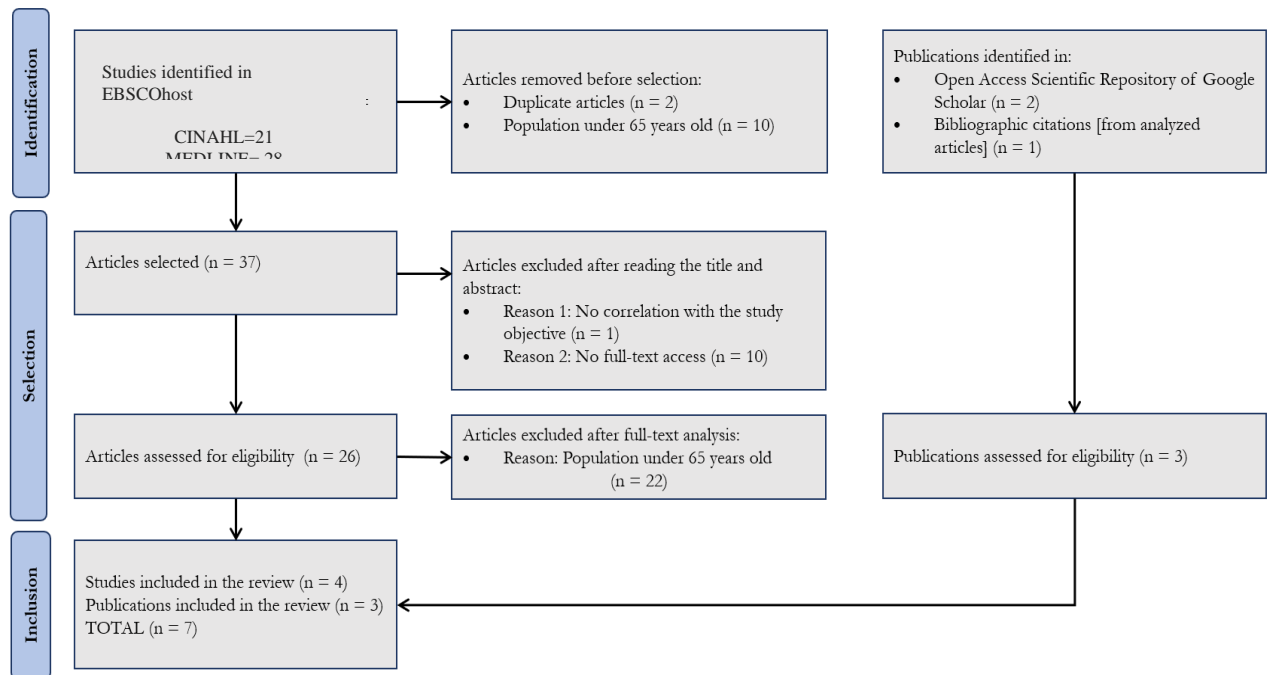


Figure 1. PRISMA flowchart of the article and publication selection process

Table 2. Systematization of articles and publications included in the scoping review

Author(s)/ Year of publication/ Country	Objective	Methodology	Population/ Sample composition/ Care context	Contributions of telenursing to the prevention and control of cardiovascular risk in older adults with hypertension
Millan-Calenti et al. ¹⁵ , 2016 Espanha	Define the profile, medication consumption patterns, and frequency of diseases among teleassistance users.	Descriptive cross-sectional study Study duration: six months. Regular calls + SOS service.	742 older adults (men and women) over 65 years using teleassistance; 75% were on cardiovascular medication; Mean age: 83.3 years; Comorbidity of 2,8 diseases/person; 51,1% with hypertension (HTN), 34,7% with myocardial infarction and heart failure. Outpatient care.	Reduces the need for travel; provides regular monitoring; Improves QoL for OA and caregivers; Decreases hospitalization rates; Enhances self-management of HTN and BP control in older adults; Increases medication adherence; Suitable for individuals with mobility issues; Reduces incidence, severity, and costs associated with falls.
Adie et al. ¹⁶ , 2010 Reino unido	Investigate whether telephonic follow-up for blood pressure control improved risk factor management in individuals with CVA or TIA.	Randomized controlled study Study duration: six months. Initial contact + TC at the end of six months.	56 individuals (men and women) over 18 years old with a stroke or transient ischemic attack 1 month ago; 27 received usual care, 29 usual care plus TN; Mean age: 72.5 years; 69.7% with HTN; 21,5% with hypercholesterolemia. 43% with TIA, 57% with minor stroke, 12,5% with previous stroke and TIA; 18% smokers. Outpatient care.	Lowers BP in both groups; Improves medication knowledge in the TC group; Significantly reduces total cholesterol in both groups; Smoking cessation in TC group; Reduces recurrence of stroke and transient ischemic attack; Highlights time limitations and small sample size; Insufficient for improving adherence; Recommends motivational interviewing; Patients maintained contact with hospitals.

Jensen et al.¹⁷, 2009 Estados Unidos	Describe healthcare-seeking behavior and cardiovascular risk-reducing therapies provided to high-risk participants at a health fair.	Observational study Study duration: one month. Teleconsultation one month after initial contact.	447 participants (men and women) over 18 years old at high CVD risk; Mean age: 69 years; 62% with HTN; Smokers (14,3%), diabetes (50%), hypercholesterolemia (47,4%). HCC: Angina (16.6%), MI (9,6%), Coronary revascularization (12,3%); No control group; Outpatient care.	Motivates seeking healthcare professionals or scheduling appointments; Encourages self-knowledge about the disease, CR, diet, and exercise; Improves healthcare adherence; Fosters a sense of empowerment; Prompts healthcare professionals to implement and enhance strategies to reduce CR; Only one study addressed smoking cessation; Recommends longer TC duration and effective messaging; Suggests motivational interviewing.
Correia et al.¹⁸, 2020 Brasil	Report on the use of nursing teleorientation for hypertensive patients in social isolation under specialized outpatient care.	Experience report (qualitative) Study duration: April 7-10, 2020, during the pandemic (social isolation). Daily phone contact.	53 participants (men and women) over 60 years with resistant HTN: 27 in the TM group, 26 in the control group; Mean age: 69 years; Outpatient care; Weekly video calls.	Avoided travel during the pandemic; Strengthen trust with healthcare professionals; Reinforces self-care, medication adherence, and dietary care; Promoted active listening during isolation and reduced loneliness; Enhances QoL.
Idris et al.¹⁹, 2015 Estados Unidos	Determine the practicality and acceptability of a novel home TM system (Health Connect).	Randomized controlled study Study duration: 3 months. Weekly video calls.	28 participants (men and women) over 65 years old with NYHA class II/III systolic heart failure and LVEF 35%: 14 in the TM group and 14 in the control group; Mean age: 69 years; 96% with HTN; Smokers (39%), diabetes (57%); Dyslipidemia (67%); HCC: Angina (32%) Outpatient care.	Decreased readmission rates in the TM group; Additional benefit from virtual consultations with healthcare professionals; Fosters a sense of empowerment—patients gain insight and awareness about the disease; Promotes medication adherence; Ideal opportunity for patient education; Reports high patient satisfaction; Detects changes in vital signs enabling early healthcare intervention; No significant difference in hospital readmission or death between groups.
Padwal et al.²⁰, 2018 Canadá	Compare the cost-effectiveness of TM versus usual care in older adults with cerebrovascular disease in residential facilities.	Observational study. Study duration: 3 months, then quarterly for 20 years.	279 participants with a recent minor cerebrovascular event; Mean age: 67,6 years.	Cost savings, improved QoL, and health outcomes; Reduces the number of strokes, MI, unstable angina, and deaths in the TM group; Lowers BP in the TM group; Recommends strategies and funding for widespread implementation of TM; Suggests case management.
Fujiwara et al.²¹, 2023 Japão	Address and discuss current evidence on TM systems for managing HTN in older adults.	Narrative review.	Older adults over 65 years in telemonitoring; People with HTN.	Reduces CVD risk; Prevents falls and postural hypotension; Identifies masked HTN; Detects seasonal variations; Reduces workload; Provides accurate BP reporting; Mitigates some patient technological illiteracy; Identifies potential non-adherence and prevents complications; Offers comprehensive estimates of average BP levels; Improves education and communication with physicians; Reduces risk of syncope and falls; Decreases geographic barriers; Reduces unnecessary office visits; Enhances disease self-management; Provides access to high-quality healthcare in remote areas; Better BP control and prevention of adverse events.

HCC = history of cardiovascular conditions; CVA/stroke = cerebrovascular accident; TIA = transient ischemic attack; CV = cardiovascular; CAD = coronary artery disease; CVD = cardiovascular disease; MI = myocardial infarction; QoL = quality of life; BP = blood pressure; TC = teleconsultation; TM = telemedicine.

Discussion

To analyze the collected data, we adopted an approach based on the various dimensions identified concerning TN contributions: control and prevention of cardiovascular risk (CR), disease self-management, quality of life (QoL) improvement, therapeutic adherence, clinical inertia, and monitoring and prevention of adverse events.

CR control and prevention

We identified that TN is a promising tool for CR management by promoting self-care, therapeutic adherence, and healthy eating habits, as reported by Correia et al.¹⁸. Adie et al.¹⁶ emphasized TN's role in regular hospital contact and effective blood pressure (BP) reduction among groups using telemedicine. As highlighted by Padwal et al.²⁰, this BP reduction is directly linked to a decreased risk of cardiovascular diseases.

Another significant point is telemedicine's ability to identify masked hypertension, detect seasonal variations, and provide comprehensive estimates of average BP levels.²¹ These elements are crucial for a personalized and effective intervention in cardiovascular risk prevention and control. Jensen et al.¹⁷ emphasize that TN not only encourages regular contact with healthcare professionals but also actively promotes seeking knowledge about their condition and cardiovascular risk factors. This empowerment dynamic helps individuals gain health awareness, encouraging healthy lifestyle habits like a balanced diet and regular exercise. Moreover, TN effectively addresses patients' technological illiteracy, as observed by Fujiwara et al.²¹. Overcoming these technological barriers is essential to ensuring equitable access to the benefits of TN for all populations in cardiovascular risk prevention and management. The findings from Idris et al.¹⁹ show high user satisfaction with TN, reinforcing the positive acceptance of this approach.

The significant reduction in total cholesterol and smoking cessation among individuals participating in TC further highlights the effectiveness of TC in overall cardiovascular health management.¹⁷

Disease self-management (hypertension)

Evidence suggests that TN plays a crucial role in improving hypertension self-management among older adults^{16,18,20}. Regular monitoring of BP levels has led to significant reductions, both in community settings¹⁶ and institutional environments²¹. Additionally, TC has encouraged frequent contact with healthcare professionals, resulting in regular appointment scheduling, which is vital for HTN control¹⁷. The empowerment dynamic facilitated by TC is evident as clients gain a deeper understanding, awareness, and knowledge of the disease and CV risk.^{17,19}

Quality of life (QoL)

TN has shown positive impacts on QoL for both older adults^{18,20,17} and caregivers¹². This improvement in QoL is reflected in reduced readmission rates^{17,21} and overall health enhancement.¹⁰

Compared to hospital admissions, the cost savings associated with teleconsultations further highlight the model's effectiveness.^{17,20} High satisfaction rates among individuals indicate a positive acceptance of this approach¹⁵, underscoring the importance of considering patient experiences when developing teleconsultation services. Additionally, there was a decrease in the recurrence of stroke and transient ischemic attack^{16,12} and a reduction in cardiovascular disease risk.^{10,20}

Therapeutic adherence

TN has emerged as a significant facilitator for improving therapeutic adherence among older adults.^{16,18,19,21} Enhanced medication knowledge in the teleconsultation group, where issues related to medication regimen management were addressed^{16,20}, and the early detection of potential non-adherence¹⁸ contributed to positive outcomes.

Prevention of clinical inertia

TN not only strengthens the trust between healthcare professionals and patients¹⁸ but also motivates professionals to implement more effective strategies to reduce cardiovascular risk¹⁷. Early detection of vital sign changes¹⁹, identification of masked hypertension, and reduced workload through self-recorded data transmission¹⁸ allow for timely healthcare interventions¹⁹. Additionally, TN provides comprehensive BP estimates and improves communication with physicians¹⁸. It offers an ideal opportunity for patient education, emphasizing its role in both treatment and prevention.¹⁹

Monitoring and prevention of adverse events

Regular monitoring enabled by TN contributes to preventing adverse events²⁰, especially among more vulnerable populations, such as institutionalized clients. The reduction in the risk of syncope and falls is particularly noteworthy, highlighting the importance of teleconsultation in ensuring patient safety²¹. Adie et al.¹⁶ observed a significant decrease in the number of events, including strokes, myocardial infarctions, unstable angina, and mortality, in the group utilizing telemedicine. Findings from Padwal et al.²⁰ support this reduction, reinforcing the effectiveness of telemedicine in preventing these critical events. These results underscore the value of TN as a crucial tool in managing and preventing adverse ischemic events.

Although not directly linked to cardiovascular risk prevention, frailty in OA is a vital consideration when examining the benefits of nursing teleconsultation. Studies by Fujiwara et al.²¹ and Millan-Calenti et al.¹⁵ highlight

teleconsultation's ability to prevent incidence, reduce severity, and minimize costs associated with falls and postural hypotension, two significant challenges for frail older adults. Fujiwara et al.²¹ also emphasize that teleconsultation can overcome technological illiteracy among clients, eliminating barriers that could impede access to healthcare. Both Millan-Calenti et al.¹⁵ and Fujiwara et al.²¹ indicate that teleconsultation reduces unnecessary travel, providing convenience and easing the logistical burden for those in fragile conditions. As Millan-Calenti et al.¹⁵ noted, teleconsultation is particularly suitable for individuals with mobility limitations, offering an accessible and effective alternative for obtaining healthcare. Fujiwara et al.²¹ further emphasize the ability of teleconsultation to overcome geographical barriers, providing a crucial opportunity for access to high-quality healthcare in remote areas, surpassing the traditional challenges of distance. Correia et al.¹⁸ highlight that TC not only promotes active listening but also reduces loneliness, especially during periods of social isolation, and its utility in avoiding travel during pandemics, offering a safe and effective solution.

Conclusion

TN emerges as a significant catalyst for digital transformation in healthcare, enhancing accessibility and proximity to nursing care.²²⁻²⁴ It offers a comprehensive and effective approach for preventing and managing vascular risk in OA with HTN. It delivers substantial benefits in disease self-management, QoL, therapeutic adherence, clinical inertia, and adverse event monitoring. The mapped evidence suggests that broader integration of TC into nursing practice could be a valuable strategy for cardiovascular health management, particularly in populations with greater frailty and vulnerability. Several studies have highlighted the effectiveness of TN; however, it remains underexplored in people aged 65 and older. Future studies should focus on evaluating the effectiveness of TN, clarifying the nursing intervention components that promote hypertension control, and enhancing the quality and safety of TN use. Additionally, research should investigate the expectations and needs of older adults regarding TN and the health outcomes reported by these individuals.

Study limitations

The inability to retrieve articles without full text available could be a limitation of this review, as it might have contributed new data to the synthesized evidence.

Authors' contributions

Dias, Mário R: Conception and design of the study; Collection of data; Analysis and interpretation of data;

Statistical analysis; Writing of the manuscript; Critical revision of the manuscript

Ramos, Ana F: Conception and design of the study; Collection of data; Analysis and interpretation of data; Statistical analysis; Writing of the manuscript; Critical revision of the manuscript

Gomes, Idalina D: Conception and design of the study; Collection of data; Analysis and interpretation of data; Statistical analysis; Writing of the manuscript; Critical revision of the manuscript

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No conflicts of interest were declared by the authors.

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