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Nurse-Led Approaches to Improving Blood Pressure Control

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Abstract

Hypertension remains a global public health challenge, significantly increasing the risk of cardiovascular disease and stroke, with control rates remaining suboptimal and disparities persisting across ethnic and socioeconomic groups. Nurses play a pivotal role in hypertension management, contributing to patient education, lifestyle counselling, medication adherence, and team-based care models. Nurse-led interventions and research have demonstrated significant improvements in blood pressure control, addressing barriers to care and mitigating health disparities through culturally tailored and community-based strategies. By delivering patient-centered care and collaborating within multidisciplinary teams, nurses enhance adherence to treatment, support behavioral changes, and bridge the hypertension quality gap. Expanding the role of nurses and supporting their contributions in clinical practice and research are essential for achieving equitable health outcomes and reducing the global burden of hypertension.

Keywords: Blood Pressure Control, BP, Nurse

Introduction

Hypertension remains a critical global public health concern, with projections indicating that by 2025, over 1.5 billion individuals worldwide will be affected, contributing to nearly 50% of heart disease risk and 75% of stroke risk. Effective blood pressure (BP) reduction through lifestyle changes, antihypertensive therapies, or a combination of both can significantly lower the risk of cardiovascular disease (CVD) and stroke (James et al., 2014). Evidence suggests that even modest reductions in systolic BP (SBP) by 10 mm Hg or diastolic BP (DBP) by 5 mm Hg can lead to a 22% reduction in mortality risk from coronary heart disease and a 41% reduction in stroke-related mortality.

Despite the established benefits of hypertension treatment in reducing CVD-related morbidity and mortality, a considerable proportion of individuals with hypertension remain inadequately managed or undiagnosed. In the United States, for instance, despite decades of national educational campaigns targeted at the public and healthcare professionals, approximately 25% of individuals with hypertension are unaware of their condition, and nearly 30% are not actively engaged in hypertension care. Among the 45% of individuals with diagnosed hypertension who are receiving care, only 64% achieve BP control, with significantly lower rates, such as 39%, among Mexican American men (Gillespie et al., 2013, p.). Although overall BP control rates have shown improvement over the past decade, ethnic disparities persist, with Mexican Americans less likely to receive hypertension care, and African Americans, Hispanics, and Mexican Americans achieving lower control rates compared to their white counterparts (Gillespie et al., 2013, p.). The discrepancy between current hypertension outcomes and those achievable through best practices is referred to as the "quality gap," which contributes to thousands of preventable deaths annually. Expanding the role of nurses has emerged as one of the most effective strategies to enhance BP control. This paper explores the evolving roles of nurses across diverse clinical settings and within team-based care models and highlights examples of nurse-led research focused on mitigating hypertension health disparities (Proia et al., 2014; Santschi et al., 2014).

Background

The integral role of nurses in improving hypertension management has been recognized for nearly half a century, notably through public education initiatives and professional guidelines such as the US National High Blood Pressure Education Program's Joint National Committee reports. Initially, nurses' responsibilities were limited to BP measurement, monitoring, and patient education. However, during the 1960s and early 1970s, the role expanded to complement physician-led care as a result of findings from studies such as the Veterans Administration and Hypertension Detection and Follow-up Program, which demonstrated the efficacy of hypertension control.

Over time, with the introduction of evidence-based practice protocols and formalized training programs like those provided by the American Heart Association, nurses acquired advanced skills in assessing patient health, titrating medications, and addressing barriers to hypertension care. This facilitated their deeper involvement in the assessment and management of hypertension, culminating in the establishment of nurse-managed clinics (Barkauskas et al., 2011). Presently, the role of nurses continues to evolve globally, particularly in underserved low- and middle-income countries where the prevalence of hypertension and attention to noncommunicable diseases is rising. The focus is increasingly shifting toward advanced practice nurses, such as nurse practitioners (NPs), who have the legal authority to prescribe antihypertensive and other medications and can operate autonomously or as part of collaborative teams. This expanded role necessitates ongoing consideration of the legal scope of nursing practice.

Team-Based Hypertension Management

One of the defining features of effective hypertension care models is the integration of a multidisciplinary team that collaborates to deliver comprehensive care. A team-based approach prioritizes patient-centered care tailored to meet individual needs and is often implemented as part of multifaceted strategies, including clinical decision-making support (e.g., treatment algorithms), effective communication systems, and patient self-management programs. Team-based hypertension care involves the patient, primary care providers, and other healthcare professionals, such as nurses, pharmacists, physician assistants, dieticians, social workers, and community health workers. These professionals support the primary care provider by sharing responsibilities related to medication management, follow-up, and patient adherence and self-

management support. Such approaches have been shown to increase the proportion of patients achieving BP control and reduce SBP and DBP levels (Carter et al., 2012; Shaw et al., 2014). Randomized controlled trials (RCTs) and meta-analyses of team-based care models involving nurse or pharmacist interventions have demonstrated significant reductions in SBP and DBP, as well as higher rates of BP goal attainment, compared to usual care. Similarly, a systematic review of 52 studies on team-based primary care for individuals with hypertension reported reductions in SBP and DBP and improved BP control rates, although the implementation of team-based approaches varied significantly across studies (Proia et al., 2014). Notably, the review highlighted key factors influencing BP outcomes: (1) Greater BP improvements occurred when team members were authorized to independently adjust medications or make recommendations with the primary care provider's approval, compared to teams offering adherence support or educational interventions alone. (2) Improvements in BP control were comparable in both healthcare and community-based settings (Proia et al., 2014).

Additionally, a systematic review of studies, including eight RCTs, examining the role of community health workers in team-based hypertension care found notable enhancements in BP control, appointment adherence, and medication adherence.

The overarching goal of team-based care is to achieve effective BP control and mitigate the adverse consequences of uncontrolled hypertension. Clearly defined roles for each team member, based on their skills, knowledge, and availability, as well as patient-specific needs, allow primary care providers to delegate routine tasks to team members. This approach enables primary providers to focus on managing complex clinical issues encountered in hypertension care. The specific roles and contributions of nurses within team-based hypertension care models are elaborated in the following sections.

Identify Knowledge, Attitudes, Beliefs, and Experiences

A well-established framework serves as a guide for nurses and other healthcare professionals to deliver patient education, counseling, and skill-building interventions to help patients adopt four critical behaviors for achieving and maintaining long-term BP control: (1) deciding to control BP; (2) adhering to treatment recommendations, such as medication and lifestyle changes; (3) monitoring progress toward BP goals; and (4) addressing barriers that impede goal attainment. This evidence-based approach underscores the importance of the patient's active role as a decision-maker and problem-solver, with the nurse or other healthcare professional serving as an advisor or guide. The patient’s comprehension and acceptance of the diagnosis, as well as their expectations of care, are assessed to address concerns and clarify any misunderstandings.

Educate About Conditions and Treatment

Ensuring patients possess sufficient knowledge about hypertension, its risks when uncontrolled, and the treatment plan is crucial for BP control. Research has shown that education and counseling on hypertension management are associated with improved patient adherence (Gwadry-Sridhar et al., 2013; Nieuwlaat et al., 2014). Nurses deliver patient-centered care by involving patients in shared decision-making and collaboratively setting BP goals. Patients are consistently informed of their BP measurements and other diagnostic testing results. This process provides an opportunity for assessing knowledge, educating the patient, setting clear objectives, and reviewing progress toward these goals. Nurses stress the importance of continuing treatment even after BP control is achieved, clarifying that BP control does not equate to a cure. Furthermore, nurses play an essential role in teaching patients self-monitoring skills, such as home BP monitoring. Effective communication and building a trusting nurse-patient relationship are also vital for achieving sustained BP control.

Individualize the Regimen

To enhance adherence to treatment regimens and achieve BP control, nurses and other healthcare providers must individualize care to maximize patient motivation. This approach

involves addressing social and cultural factors, health literacy, self-care practices, and responses to treatment. Nurses assist patients in integrating treatment regimens into their daily routines, which is essential for long-term adherence and success. Nurses collaborate with patients to establish realistic, outcome-focused goals and develop strategies to achieve them. Follow-up is equally important, enabling nurses to assess progress and revise strategies when needed.

Nurses are specifically trained to counsel patients on lifestyle modifications, which are recommended for hypertensive patients with lifestyle-related risk factors, including obesity, physical inactivity, high sodium intake, and excessive alcohol consumption (Eckel et al., 2014). Weight loss, widely recognized as one of the most effective nonpharmacological strategies for lowering BP, requires behavioral changes in both diet and physical activity. Nurses provide support for patients to start or sustain aerobic exercise routines and to reduce sodium and alcohol intake to no more than 1 to 2 drinks per day. Given that many hypertensive patients also exhibit multiple cardiovascular disease risk factors, nurses educate and counsel patients on smoking cessation and lipid management to further mitigate cardiovascular risks. Achieving these lifestyle changes necessitates comprehensive clinical interventions, such as assessing baseline behaviors, educating patients on required changes, developing strategies for behavior change (e.g., setting short-term goals and self-monitoring), resolving adherence barriers, and reinforcing progress toward goals.

Promote Adherence and Address Barriers

Patient adherence to treatment recommendations remains a critical factor in BP control and is influenced by multiple variables. Reviews of adherence in randomized controlled trials targeting cardiovascular disease prevention have identified several successful interventions: signed agreements, behavioral skill training, self-monitoring, telephone or mail follow-up, support from spouses or key individuals, enhancement of self-efficacy, contingency contracting, exercise prescriptions, external cognitive aids, persuasive communication, nurse-managed clinics, and work- or school-based programs. Enhancing adherence to evidence-based guidelines for both patients and providers involves addressing challenges at multiple levels, including individual, provider, healthcare setting, and societal systems. Achieving success requires a combination of strategies, beginning with education, counseling, and skill-building for both patients and providers.

A key element of individualizing treatment regimens to promote BP control is identifying and addressing potential barriers. Nurses are particularly skilled in recognizing and addressing common barriers to BP control, such as limited knowledge, restricted access to healthcare or pharmacies, inadequate communication with clinicians, financial constraints related to care or medications, treatment complexity, medication side effects, transportation challenges, work schedule conflicts, inconvenient clinic locations, difficulty with appointment scheduling, and competing responsibilities such as child or elder care (Ogedegbe, 2008). Once barriers are identified, nurses collaborate with patients and other healthcare providers to mitigate or eliminate these challenges, thereby improving adherence and supporting BP control.

Provide reinforcement

It is essential to collaborate with individual patients to confirm their understanding of the steps required to achieve treatment goals and to engage them in treatment decisions. Nurses play a key role in addressing patient concerns, working jointly with patients to identify and mitigate barriers to care, and offering consistent reinforcement and support. Providing reminders, outreach, and follow-up services can significantly enhance patient engagement. Effective follow-up on missed visits, as well as interactions between visits through phone calls or digital methods, reinforces treatment goals and strengthens the patient-provider relationship. Achieving BP control relies on frequent monitoring, timely treatment regimen modifications,

and sustained patient interaction. These responsibilities necessitate dedicated time and specialized training to deliver the necessary education and counseling that support behavioral change.

Promote social support

Nurses are also effective in educating family members and friends to assist in the BP control process. Family members can provide daily encouragement and reinforcement of the patient's efforts to manage BP. When patients seek increased family involvement, family members should be encouraged to attend clinic visits and actively participate in the care process. Additionally, some patients may benefit from small group activities, such as support groups or group clinic visits, which can strengthen social support networks and foster motivation.

Collaborate with other professionals

In delivering care, nurses collaborate closely with patients and members of the hypertension management team to facilitate the achievement and maintenance of BP control. Sustained BP control over time necessitates ongoing educational and behavioral interventions, tailored care plans, and consistent reinforcement to equip patients with the knowledge, skills, motivation, and resources needed to adhere to treatment recommendations. To ensure success, patients must develop problem-solving abilities and gain an understanding of the behaviors required to manage hypertension effectively. Strategies to enhance these skills must be adapted to align with cultural norms and the practical capabilities of staff implementing the interventions.

Coordination of Care

Long-term BP control requires continuous monitoring, timely prescription refills, counseling, reinforcement of behavioral changes, and adjustment of treatment regimens when necessary. Care management must be personalized to minimize costs and improve adherence. Patients often encounter challenges such as visiting multiple providers across various settings, using multiple pharmacies, receiving conflicting messages, experiencing therapy disruptions, and dealing with insufficient communication between providers. Nurses are skilled in developing and maintaining collaborative networks, both formal and informal, that connect patients with necessary resources and services within and beyond the care setting. Additionally, nurses assist patients in comprehending complex treatment regimens and navigating the fragmented and often challenging health care system.

Manage the Clinic or Office

Nurses frequently assume roles in the establishment and management of hypertension clinics. In these settings, nurses may oversee and coordinate the activities of team members delivering direct care or consultations. To improve care consistency and adherence to treatment guidelines, nurses often develop decision support tools such as treatment algorithms, flow sheets, and reminder systems (both electronic and paper-based). Nurses may also be tasked with hiring, supervising, and training community health workers to implement intervention strategies, as well as administrative staff who handle BP measurements, appointment scheduling, reminder calls, lab results collection, and clinical outcomes data entry. Furthermore, nurses optimize resource utilization, including determining appropriate visit lengths, managing caseloads, and maximizing reimbursement for hypertension clinic services. Proper BP measurement is fundamental, and all health professionals responsible for measuring BP must use correct techniques (Pickering et al., 2005). Nurses frequently ensure that staff adhere to proper BP measurement protocols and that BP equipment remains calibrated and in good working condition.

Population Health Management

In the past decade, there has been a significant shift in healthcare delivery from individualized patient care, traditionally focused on a single physician-patient relationship or team-based approaches, to a broader responsibility for managing the health of larger patient populations.

Emerging care models endorsed by health systems and governmental policies emphasize improving outcomes, controlling healthcare costs, and rewarding measurable success.

Improving population health outcomes to reduce risk factors, morbidity, and mortality necessitates the integration of public health principles and preventive measures into conventional medical care. Hypertension remains a priority condition due to its high prevalence and the demonstrated benefits of effective management. Advancing public health through policy development and advocacy requires robust evidence to validate interventions. Considerable evidence supports the expanded role of nurses in hypertension care and control.

A recent Healthcare Trends and Forecasts survey identified population health management as the top value-based care priority among healthcare professionals, with 56% highlighting it as a key area in 2014. Successful population health management relies on diverse competencies, such as care coordination, decision making, and project management. These skills are particularly essential in addressing disparities in chronic conditions across communities. By aligning healthcare services with population needs, nurses and nurse practitioners (NPs) can develop comprehensive strategies to enhance hypertension care quality and reduce inequities. Nurses leverage technology to identify and analyze priority health needs within populations and, in collaboration with interdisciplinary teams, create targeted interventions to address or prevent those needs.

Performance Measurement and Quality Improvement

The importance of assessing and improving hypertension care processes and patient outcomes is widely recognized, and nurses frequently lead these initiatives within hypertension care settings. Performance measures are standardized, validated tools used to evaluate the execution of appropriate care processes and the achievement of desired clinical outcomes. Quality improvement strategies, including provider education, audit and feedback mechanisms, patient education, self-management support systems, patient reminders for follow-up visits, blood pressure monitoring, and system-level changes, have been proven to enhance blood pressure control (Go et al., 2014).

Moreover, multicomponent and multilevel strategies targeting the improvement of hypertension care organization and delivery at local, healthcare system, and national levels have been shown to result in significant blood pressure improvements. The expanding role of health information technologies further supports these quality improvement efforts. Tools such as electronic health records (EHRs), registry databases, telehealth, digital health (eHealth), and mobile communication technologies (mHealth) are increasingly utilized by nurses and healthcare teams to improve hypertension management (Borden et al., 2014; Burke et al., 2015).

These technological advancements allow care teams to facilitate appointment scheduling, reminders, and follow-up care; track blood pressure control trends; and conduct population-wide assessments to identify undiagnosed or undertreated hypertension. Additionally, these tools support monitoring clinic visit frequency, emergency department usage, and hospitalizations, as well as managing medication prescriptions and refills. Nurses also use digital tools to promote and monitor self-management behaviors, including adherence to medications, dietary modifications, and physical activity. Decision support tools based on evidence-based treatment protocols and algorithms further assist in the titration of antihypertensive medications. Such strategies are increasingly recognized as adjunctive approaches to improve hypertension care and long-term blood pressure control (Glynn et al., 2010).

Exemplars of Nurse-Led Research to Reduce the Hypertension Quality Gap and Ethnic Disparities

Beyond their traditional clinical responsibilities, nurses have played a significant role in conducting both clinic- and community-based research aimed at addressing the hypertension quality gap and ethnic disparities in outcomes. Nurse-led research initiatives to improve hypertension outcomes date back to the 1950s. In the 21st century, nurses are at the forefront of research teams investigating the social, cultural, economic, and behavioral determinants influencing hypertension outcomes. The following studies exemplify the pivotal role nurses play in advancing hypertension care and control through research.

The Comprehensive High Blood Pressure Care and Control in Young Urban Black Men Study was a nurse-led 5-year randomized controlled trial (RCT) that targeted hypertensive urban African American men (N = 309). This study evaluated the impact of an intensive, multidisciplinary educational-behavioral-pharmacological intervention delivered by a nurse practitioner–community health worker–physician team (NP/CHW/MD) compared to a less intensive education and referral approach. At the 36-month follow-up, the intensive intervention group exhibited better blood pressure (BP) control and reduced progression of left ventricular hypertrophy (LVH). By the 5-year mark, LVH prevalence in the intensive intervention group was significantly lower compared to the less intensive group (37% vs. 56%; P = 0.02). Although BP control rates between groups (44% in the intensive group vs. 31% in the less intensive group; P = 0.05) were significant at 3 years, this difference was not sustained through the 5-year follow-up period. This study demonstrated that through individualized, multidisciplinary approaches and the provision of free medications, it is possible to recruit, retain, and effectively treat inner-city young African American men with hypertension, thereby improving BP control and addressing barriers to care.

Internationally, the HiHi Study was a cross-sectional descriptive study (N = 403) conducted among periurban Black South Africans. This study aimed to identify determinants of hypertension care and control using the PRECEDE-PROCEED Model as a guiding framework. Results indicated that predictors of better systolic BP (SBP), diastolic BP (DBP), and overall BP control were younger age, female sex, higher education, fewer antihypertensive medications, moderate alcohol consumption, and improved adherence to hypertension management recommendations. This study underscored the importance of interventions targeting patient, provider, and system-level factors to enhance hypertension care outcomes within primary healthcare settings in South Africa.

The COACH Trial was an RCT designed to assess the effectiveness of a comprehensive cardiovascular disease (CVD) risk reduction program delivered by NP/CHW teams compared to enhanced usual care among primarily low-income patients in urban community health centers (N = 525). The intervention included aggressive pharmacological management, low-literacy educational materials, and tailored behavioral counseling for lifestyle modifications and barrier resolution to improve adherence and control. Results revealed significantly greater improvements in SBP (difference = 6.2 mmHg), DBP (difference = 3.1 mmHg), and patient perceptions of the quality of chronic illness care in the NP/CHW intervention group compared to the enhanced usual care group.

Commodore-Mensah et al. conducted a cross-sectional epidemiological study (N = 253) to explore the association between acculturation and CVD risk factors, including hypertension, among African immigrants in the United States (Commodore-Mensah et al., 2016; Commodore-Mensah et al., 2016). This population is often studied collectively with African-Americans despite notable cultural and ethnic differences. Hypertension diagnosis, treatment, and control rates were 40%, 53%, and 50%, respectively, with an 88% prevalence of overweight and obesity. The study found that African immigrants who identified equally with both US society and their African culture (integrationists) were more likely to achieve BP

control compared to those who identified predominantly with their African culture (traditionalists) (68% vs. 25%; P = 0.011). This research addressed CVD disparities from an ethnic rather than racial perspective (Commodore-Mensah et al., n.d.), highlighting the need for culturally tailored public health interventions for this distinct minority group.

The Self-Help Intervention Program for High Blood Pressure Care (SHIP-HBP) (Kim et al., 2011) utilized community-based participatory research principles in a 15-month trial designed to improve BP control among Korean immigrants (N = 359). The intervention included a 6-week behavioral education phase followed by 12 months of home BP telemonitoring and bilingual nurse telephone counseling. Evidence-based hypertension treatment guidelines and behavioral recommendations were culturally adapted and translated to suit first-generation Korean immigrants. The program resulted in a significant and sustained increase in BP control rates. At baseline, only 30% of participants had achieved BP control. After the initial education phase (3 months), BP control rates rose to 73%, and this improvement continued through the 12-month follow-up period, reaching 83.2% (P < 0.001).

Conclusion

The role of nurses in hypertension management is increasingly critical in addressing this global public health challenge. Over the years, nurses have evolved from performing basic care tasks to assuming leadership in patient education, adherence support, and treatment management. Nurse-led interventions, especially within team-based care models, have demonstrated measurable success in improving blood pressure control and reducing hypertension disparities across populations. By leveraging evidence-based strategies, fostering strong patient relationships, and utilizing advanced technology, nurses bridge the hypertension quality gap and contribute to enhanced cardiovascular outcomes. Moving forward, empowering nurses with expanded responsibilities, training, and resources will be essential to mitigating the global burden of hypertension and ensuring equitable healthcare delivery.

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