A Global Perspective on Using Implementation Research to Address Hypertension-Associated Target Organ Damage

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Hypertension, a major risk factor for cardiovascular disease, imposes a significant public health burden and challenge to address it worldwide. Scaling up delivery of proven, effective interventions for hypertension could significantly advance the goal of reducing the global burden. Although significant progress has been made in many countries, some lament that large-scale initiatives focused on reducing blood pressure in global populations have not effectively addressed this challenge. Late-stage implementation research plays a critical role in determining effective and sustainable scale-up of these initiatives.

In this article, we briefly discuss some of the global initiatives that have been funded by the National Heart, Lung, and Blood Institute of the US National Institutes of Health. Intervention delivery strategies in low resource settings must have demonstrated effectiveness and consideration for the social, cultural and physical context (eg, access, affordability, and availability of medications) in which a program is being delivered in order to be sustainable nationally and globally. Hence, the use of implementation research is central to determining sustainable delivery of evidence-based and tailored interventions focused on hypertension control. The sustained control of hypertension in global populations holds tremendous potential for reducing morbidity, premature mortality, and the adverse economic impact of cardiovascular disease in all regions. *Ethn Dis*. 2016; 26(3):395-398; doi:10.18865/ed.26.3.395

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Introduction

Globally, approximately one billion people are estimated to have hypertension. Among those diagnosed with hypertension, control rates vary among countries.[1] By 2025, the number of adults living with high blood pressure will increase to an estimated 1.56 billion, with around two-thirds living in low or lower-middle income countries.[1] Currently, global estimates indicate that approximately 7.6 million deaths are attributed to hypertension annually, with the majority of these deaths also occurring in low-, lower middle- and upper middle-income countries.[2,3] The high burden of hypertension in lower middle-income countries has not declined during recent decades.[4] Hypertension is significantly associated with negative outcomes, including end organ damage such as retinopathy, ischemic and hemorrhagic stroke, chronic kidney disease, and myocardial infarction (MI).[5,6] Moreover, these negative outcomes are largely preventable by interventions such as lifestyle adjustments and primary care medical treatments that control hypertension. A robust discussion of target organ damage associated with hypertension is in this issue of *Ethnicity and Disease.* Here, we focus on research approaches that can address the increasing burden of hypertension and subsequent target organ damage in global populations.

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Critical Challenges Addressing Hypertension-Associated Mortality Globally

Current statistical models suggest that targeting hypertension prevention and control globally will provide the largest benefit among risk factors in reducing premature cardiovascular disease (CVD)-associated mortality by 2025.[3] This modeling data demonstrated that hypertension is rising faster within emerging economies than in the rest of the world. These secular trends have galvanized several groups to mobilize, including the United Nations (UN), the World Health Organization (WHO), and

other non-governmental organizations (NGOs), to address this prevalent condition.[7,8] In part, as a result of the UN Political Declaration of 2012, hypertension has become a central focus of an agenda aligned with reducing non-communicable diseases (NCDs). Nearly all of the recent UN targets for reducing chronic NCDs relate directly or indirectly to hypertension, making this a high priority issue requiring a global systematic approach.[9] To address the goals of preventing CVD-associated mortality and developing a systematic global approach, the WHO, in collaboration with other NGOs, has identified affordable strategies for controlling hypertension and other NCDs. These strategies include reducing dietary salt intake, CVD screening, replacing trans-fat in foods with polyunsaturated fat, multi-drug therapy for those at high-risk for MIs and strokes, and prescribing aspirin for secondary prevention of CVD.[8] Many have labeled these interventions as "best buys" - affordable strategies for addressing hypertension and other NCDs via specific programs and/or initiatives that can lead to sustainable reductions in blood pressure globally. Although these approaches have been readily accepted by many countries, a significant gap remains in the implementation of these and other beneficial evidence-based interventions that can address the increasing burden of hypertension globally. Specifically, the "how to do it" aspect of the aptly labeled "WHO best buys" is not readily available. The dearth of evidence for context- specific delivery of these interventions is an important gap that impedes high-fidelity implementation, leaving few interventions effectively implemented in emerging economies. The critical challenge faced by WHO's 'best buys' is finding optimal effective strategies that can be sustained after the withdrawal of donor funding for the initial scale-up. Given the challenges of delivering WHO's 'best buys' for hypertension in various international environments and the need for culturally appropriate tailoring, late-stage translation research investigating optimal strategies for delivery of proven effective interventions will be needed. Late-stage translation research focuses on identifying optimal strategies for the adoption and implementation of evidence-based interventions, which are sustainable and, when scaled up, should result in significant population-level public health impact. A comprehensive understanding of the specific contextual, community, and cultural factors that will drive sustainable adoption of these interventions is needed. Consideration of these factors has led to sustainable adoption of healthy behaviors (intake of low-fat diets, increased physical activity) and reduction in cardiovascular risk in local communities in the United States.[10-12]

Here, we focus on research approaches that can address the increasing burden of hypertension and subsequent target organ damage in global populations.

Building the Evidence Base to Address the Global Burden of Hypertension

The National Heart, Lung, and Blood Institute (NHLBI) promotes the health of people both within the United States and globally via several initiatives that address the vexing burden of hypertension.[13] Two recent noteworthy programs are the NHLBI-UnitedHealth Global Health Centers of Excellence Program (CoE) and the Global Alliance for Chronic Diseases (GACD), both joint efforts with other funding agencies. Both initiatives conducted research to address the prevention and control of hypertension in various settings, and when possible, included health care delivery system research in these settings.[14] Some examples of the NHLBI-supported GACD collaborative efforts include:

Fuster and colleagues (U01HL114200) designed a strategy that utilized multidisciplinary implementation research approaches to address the challenge of linking and retaining hypertensive individuals in a hypertension management program in rural Kenya. The intervention used community health workers, equipped with a tailored behavioral communication strategy and a

smartphone-based tool linked to an electronic health record.

Ogedegbe and colleagues (U01HL114198) used a cluster randomized trial to evaluate the comparative effectiveness of the WHO CVD risk management package for hypertension control delivered by community health nurses as part of Ghana's Community-based Health Planning and Services program.

Gilman and colleagues (U01HL114180) studied the impact of a population-level intervention based on sodium reduction and potassium increase (exchange of ordinary salt for a low-sodium, high-potassium salt substitute) on blood pressure among adults in Peru. The implementation of this strategy involved participants from villages, their families and local leaders to local institutions and local, regional and national authorities.

These early efforts to undertake proof-of-concept studies are promising and demonstrate that these interventions to improve blood pressure control can be executed with fidelity and rigor in low resource settings. The aspect that needs further elucidation is utilization of late-stage translation research to identify and address the barriers that impede adoption and sustainability of delivering evidence-based interventions. As an illustration, although Fuster, Ogedegbe, and Gilman have undertaken exemplary research on reducing blood pressure, national level adoption and population impact has not been ideal. The final stage of research is needed to translate the findings of these investigators in order to achieve population-level impact.

Opportunities to Address the Global Hypertension Burden with Implementation Research

Significant opportunities to study implementation strategies for hypertension treatment and control exist globally. These efforts hold immense promise to reduce the hypertension burden. However, context-specific strategies are not readily available, thus leaving few of these interventions being effectively implemented within low resource settings.

The final stage of research is needed to translate the findings of these investigators in order to achieve population-level impact.

NHLBI-funded research demonstrates that the impact of evidence-based population-level intervention approaches (eg, dietary sodium reduction and potassium increase) can improve blood pressure among adults in Peru.[15-17] The implementation of these strategies involved participants, stakeholders from communities, health systems, providers and managers at various levels including local leaders, local institutions, and local, regional, and national authorities. Shroufi and colleagues conducted a systematic review of cost-effective interventions for the prevention of cardiovascular disease in low- and middle-income countries[18] and found that while more studies of cardiovascular preventive interventions were needed in low- and middle-income settings, a wide range of interventions for the prevention of cardiovascular disease are cost effective across all world regions, a finding also noted by others.[19]

Conclusion

Hypertension represents a major disease burden in the global community, especially among low- and middle-income countries. It is an important contributor to the development of CVD globally, and often leads to target organ damage if left untreated. It is imperative that we find ways to implement evidence-based interventions to prevent, treat and control hypertension. The prevention, treatment and control of hypertension globally require strong collaboration between government organizations, researchers, community-based organizations, health care systems, individuals and families. Previous research has identified "best buys"—cost-effective, evidence-based interventions that can reduce high blood pressure in populations. The current challenge is to build sustainable, reliable and reproducible

ways to implement these "best buy" strategies among various populations and across different settings, using the principles of translation research and implementation science.

Disclaimer

The views expressed in this article are those of the authors and do not necessarily represent the views of the National Heart, Lung, and Blood Institute, or the National Institutes of Health.

Conflict of Interest

No conflicts to report.

Author Contributions

Research concept and design: Peprah; Acquisition of data: Peprah; Data analysis and interpretation: Peprah; Manuscript draft: Peprah, Lopez-Class, Shero, John-Sowah, Engelgau; Supervision: Peprah, Engelgau

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