Development, Testing, and Implementation of a Training Curriculum for Nonphysician Health Workers to Reduce Cardiovascular Disease

Maheer Khan*,†, Pablo Lamelas*,†, Hadi Musa*, Jared Paty*,†, Tara McCready*, Robby Nieuwlaat*,†, Eleonor Ng*, Patricio Lopez-Jaramillo‡,§, Jose Lopez-Lopez‡,‖, Khalid Yusoff¶,#, Fadhlina A. Majid¶, Kien Keat Ng**, Len Garis††,‡‡, Oyere Onuma§§, Salim Yusuf*,†, Jon-David Schwalm*,†

Hamilton, Ontario, and Surrey and Abbotsford, British Columbia, Canada; Floridablanca and Bucaramanga, Colombia; Kuala Lumpur, Malaysia; and Geneva, Switzerland

ABSTRACT

Background: Cardiovascular disease (CVD) is the leading cause of death worldwide. The need to address CVD is greatest in low- and middle-income countries where there is a shortage of trained health workers in CVD detection, prevention, and control.

Objectives: Based on the growing evidence that many elements of chronic disease management can be shifted to nonphysician health care workers (NPHW), the HOPE-4 (Heart Outcomes Prevention and Evaluation Program) aimed to develop, test, and implement a training curriculum on CVD prevention and control in Colombia, Malaysia, and low-resource settings in Canada.

Methods: Curriculum development followed an iterative and phased approach where evidence-based guidelines, revised blood pressure treatment algorithms, and culturally relevant risk factor counseling were incorporated. Through a pilot-training process with high school students in Canada, the curriculum was further refined. Implementation of the curriculum in Colombia, Malaysia, and Canada occurred through partner organizations as the HOPE-4 team coordinated the program from Hamilton, Ontario, Canada. In addition to content on the burden of disease, cardiovascular system pathophysiology, and CVD risk factors, the curriculum also included evaluations such as module tests, in-class exercises, and observed structured clinical examinations, which were administered by the local partner organizations. These evaluations served as indicators of adequate uptake of curriculum content as well as readiness to work as an NPHW in the field.

Results: Overall, 51 NPHW successfully completed the training curriculum with an average score of 93.19% on module tests and 84.76% on the observed structured clinical examinations. Since implementation, the curriculum has also been adapted to the World Health Organization's HEARTS Technical Package, which was launched in 2016 to improve management of CVD in primary health care.

Conclusions: The robust curriculum development, testing, and implementation process described affirm that NPHW in diverse settings can be trained in implementing measures for CVD prevention and control.

Noncommunicable diseases (NCD), including cardiovascular disease (CVD), cancer, respiratory illnesses, and diabetes result in 40 million deaths each year [1]. Among NCD, CVD alone is responsible for an estimated 17.7 million deaths, making it the most common cause of death around the world [2]. In response to this growing crisis, the United Nations' 2030 Agenda for Sustainable Development recognized NCD as a major challenge to sustainable development and urged member countries to commit to developing national responses to reduce premature NCD deaths by 30% by the year 2030. In 2013, the World Health Organization (WHO), in consultation with the World Heart Federation and other organizations, developed the "Global Action Plan for the Prevention and Control of NCDs 2013–2020," which includes 9 global targets that have the greatest impact on NCD mortality [3].

Achieving these global targets requires the development and implementation of collaborative and coordinated programs across different settings. The need is greatest in low- and middle-income countries (LMIC), where more than three-quarters of global NCD deaths occur [1]. Addressing CVD in LMIC and resource-constrained settings in high-income countries (HIC) requires a combination of low-cost evidence-based medications (antihypertensives and statins), along with effective and sustainable population-wide interventions that target CVD risk factors such as

The authors report no relationships that could be construed as a conflict of interest.

This work was supported by the Canadian Institutes of Health Research as part of the Global Alliance for Chronic Disease program (grant 120389), Canadian Institutes of Health Research's Strategy for Patient Oriented Research, through the Ontario Strategy for Patient Oriented Research Support Unit, the Ontario Ministry of Health and Long-Term Care, and the Department of Management of Noncommunicable Diseases, World Health Organization.

From the *Population Health Research Institute, Hamilton, Ontario, Canada; †Department of Medicine, Division of Cardiology, McMaster University, Hamilton, Ontario, Canada; ‡Research Institute, Fundación Oftalmológica de Santander, Floridablanca, Colombia; §Masira Institute, Medical School, Universidad de Santander, Bucaramanga, Colombia; ‖Internal Medicine Post Graduate Course, Medical School, Universidad Autonoma de Bucaramanga, Bucaramanga, Colombia; ¶Universiti Teknologi Majlis Amanah Rakyat, Faculty of Medicine, Kuala Lumpur, Malaysia; #UCSI University, Faculty of Medicine and Health Sciences, Kuala Lumpur, Malaysia; **National Defence University of Malaysia, Faculty of Medicine, Kuala Lumpur, Malaysia; ††City of Surrey, Fire Services, Surrey, British Columbia, Canada; ‡‡University of the Fraser Valley, School of Criminology and Criminal Justice, Abbotsford, British Columbia, Canada; and the §§World Health Organization, Cardiovascular Disease, Geneva, Switzerland. Correspondence: J. D.

Schwalm (schwalj@mcmaster.ca).

GLOBAL HEART

VOL. ■, NO. ■, 2017
ISSN 2211-8160/$36.00.
https://doi.org/10.1016/j.gheart.2017.11.002

tobacco, lack of physical activity, unhealthy diet, and harmful use of alcohol [4–6]. Delivery of these interventions is important in primary health care, which provides the most appropriate setting for task-shifting.

Experience in LMIC shows that many elements of chronic disease management do not require the expertise of highly trained physicians and alternatives to the physician-centered model of CVD control can be implemented successfully. For example, the Asset-Based Community Development (ABCD) model considers locally trained nonphysician health care workers (NPHW) as critical players in improving the health status of their communities [7]. The training of NPHW, which can range from village volunteers to nurse practitioners, is part of a wider initiative on task-shifting supported by WHO, where NPHW are trained to take on more responsibility in the diagnosis, treatment, and management of many chronic conditions (Figure 1). Furthermore, task-shifting is a proposed strategy in some of the World Heart Federation roadmaps, such as secondary prevention, atrial fibrillation, and raised blood pressure.

Although many successful task-shifting efforts have focused on infectious diseases such as malaria, tuberculosis, or human immunodeficiency virus/acquired immunodeficiency syndrome [8,9], there is growing evidence available to suggest that task-shifting within the context of CVD can be just as successful [10–14]. Recognizing a need to further evaluate task-shifting initiatives, coupled with health system strategies to address the growing burden of CVD, the HOPE-4 (Heart Outcomes Prevention and Evaluation–4) program has developed, pilot-tested, and implemented an NPHW training curriculum in Colombia, Malaysia, and Canada to diagnose, manage, and control CVD risk [15]. Communities in Malaysia and Colombia were chosen based on previous population-based studies that highlight a shortage of physicians, especially in rural areas and the public sector along with poor blood pressure control among populations at risk. In Canada, communities were targeted as part of existing community health promotion programs in the inner city. The overall objective of the HOPE-4 study is to develop, implement, and evaluate an evidence-based, contextually appropriate program for CVD assessment, treatment, and control. The curriculum is a component of the larger HOPE-4 program and laid the foundation for the current primary health care worker training curriculum in the WHO's HEARTS Technical Package (Figure 2) [16]. We describe the development of the HOPE-4 NPHW training curriculum, testing results from the implementation process, as well as adaptation to the HEARTS Technical Package.

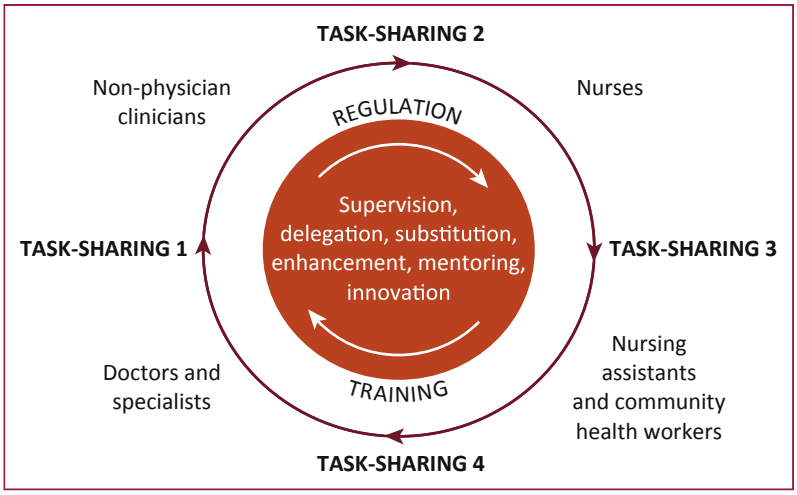

FIGURE 1. Task-sharing to expand the pool of human resources for health. Reproduced with permission from World Health Organization [16].

METHODS

Curriculum Development

The standardized NPHW training curriculum for the assessment, management, and control of CVD was developed by the Population Health Research Institute with input and support from WHO. The interdisciplinary team responsible for developing the curriculum consisted of 2 masters in global health students, a cardiologist and knowledge translation researcher, a clinical epidemiologist, and a dietician. A phased approach to curriculum development began with defining the need for a curriculum and culminated in a comprehensive, 9-module training program for NPHW. Ongoing input from participating stakeholders, including health care providers, clinical researchers, and NPHW in Colombia, Malaysia, and Canada was encouraged throughout the curriculum development phases. The feedback from the stakeholders occurred at 2 points specifically. During the development process, stakeholder involvement was used to design the modules and incorporate local perspectives on topics such as diet and physical activity. After developing the curriculum, stakeholder feedback was used to overcome logistical and NPHW training challenges.

Phase 1 focused on defining the need for a standardized curriculum across a variety of settings. The decision to develop this curriculum with the ultimate goal of training NPHW follows 2 decades of research collaborations attempting to target CVD globally [17]. In defining this need, we concluded that a standardized approach that includes "fixed" and "adaptable" elements in the training curriculum would facilitate implementation across diverse settings. The fixed components of the curriculum were identified as the evidence-based diagnosis, treatment initiation, and achievement of blood pressure (BP) control targets whereas adaptable components include counseling techniques, cultural differences, and teaching styles appropriate to local settings. Based on identified gaps in BP detection, management, and control identified in the PURE (Prospective Urban Rural Epidemiology) study, BP has been identified as a target for the intervention and evaluation in the wider HOPE-4 intervention.