Building a Foundation of Training

Community Collaboration to Make Cardiovascular Care Work

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In this issue of *Global Heart,* Khan et al. [1] present results from a pilot study that trained nonphysician health workers to provide counseling to treat and prevent cardiovascular disease (CVD) risk factors in Colombia, Malaysia, and Canada. This work is sorely needed, and not just because CVD remains the leading cause of human morbidity and mortality worldwide [1]. Major CVD risk factors such as hypertension are now more common, and more severe, in low- and middle-income countries than in wealthier ones [2], and increasingly disproportionately affect the poorest and most vulnerable people [3–5]. In these settings, qualified physicians are rare [6], so the best means for control of CVD and its risk factors are nonphysician health workers (NPHWs) [7]. These providers range from nurses with years of formal schooling to community health workers with only on-the-job training [8]. However, long-standing programs to promote maternal-child health [9,10] and prevent and treat human immunodeficiency virus/acquired immunodeficiency syndrome [11], among other conditions, have proven that all can be as effective as physicians for the care of acute and chronic conditions, including even the prescription of medications and other treatments.

Unfortunately, few studies have evaluated whether these NPHWs can screen for and manage CVD and other noncommunicable diseases [7,8,12,13]. Most such trials are 1-site or 1-model pilot studies [14–17] rather than programs adapted across multiple contexts. Moreover, these trials have chiefly focused on 1 cardiovascular condition, with a few recent exceptions [18–20]. Khan et al.'s [1] novel contribution is 2-fold: first, they have designed a program that is applied differently across multiple different country and cultural settings; and actively engaged with experts in these disparate communities to do so jointly. Second, Khan et al. [1] have applied this approach to the integrated control of multiple cardiovascular conditions—including hypertension, obesity, and tobacco and substance abuse—rather than focusing on only 1 at a time. Previous work shows that CVD treatment models based on overall cardiovascular risk are more efficient than this one-at-a-time approach, and led to integrated 10-year CVD risk assessment models by the American College of Cardiology [20], the European Society for Cardiology [21], and the World Health Organization (WHO) and International Society for Hypertension [22] among others. However, the use of these protocols in low- and middle-income countries is scant. For example, WHO's latest integrated CVD protocol called HEARTS due to its emphasis on 6 integrated concepts ranging from "Healthy Lifestyle" to "Systems for [care] Monitoring" [23] was released only in 2016, with few applications to date [24]; and trials using related strategies are still pending [25,26]. Khan et al. [1] pilot a training around the HEARTS protocol, show the reader how it can and should be adapted across multiple country contexts, and demonstrate the community engagement strategies this work requires, a strategy not often used in cardiovascular disease outcomes research [27].

Khan et al.'s [1] community engagement strategy is particularly compelling. After identifying elements of the HEARTS CVD screening, counseling, and treatment package that are potentially adaptable across cultures (e.g., differing counselor teaching styles across cultures), they engaged site coordinators and partner organizations in Colombia and Malaysia to recruit NPHWs, giving local teachers latitude in modifying and adapting the CVD curriculum accordingly. In Canada, Khan et al. [1] engaged firefighters to both provide and receive CVD training, with considerable latitude in curriculum design; there, they capitalized on an existing door-to-door fire safety program to perform home screening for CVD risk. In all 3 settings, the NPHWs performed well on 2 levels of standardized examination: 93% on a written module and 85% on an observed clinical examination. This result suggests that Khan et al. [1] have struck on a useful balance in defining which elements of HEARTS are relatively modifiable across settings and which (such as blood pressure measurement) are rigid, and have found an effective model for how to modify the HEARTS protocol to help students (less than one-half of whom had any prior health training) to succeed.

Additionally, although others have trained NPHWs to engage in specific elements of the HEARTS protocol—and found similarly positive results when examining their progress [14,16], none yet has used NPHWs to apply HEARTS in full, and prior work has usually involved doctors and nurses rather than laypeople [18]. A study using a prior WHO CVD risk algorithm involving age, blood pressure, body weight, and other risk measures to identify high-risk patients [14] found that nonphysicians could perform any of these tests nearly as well as physicians and, in most cases, could provide counseling and even prescriptions for these conditions with comparable competency. But this study did not directly assess clinical competency, whereas Khan et al. [1] used both written and practical overall examination to demonstrate global NHPW competency across all 3 sites. Similarly, a more recent study [16] showed that NPHWs can in fact calculate a patient's overall CVD risk—based on an integrated score

Dr. Heller has received support from Teva Pharmaceuticals.
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GLOBAL HEART

VOL. 13, NO. 2, 2018
ISSN 2211-8160/$36.00.
https://doi.org/10.1016/j.gheart.2018.04.001

with elements such as age, tobacco use, and blood pressure—as well as physicians, but did not measure an NPHW's ability to act on these scores effectively. By addressing all these elements of CVD screening, counseling, and treatment, and training NPHWs using a novel approach (HEARTS) that uses additional guidance on how to refer, and counsel patients beyond prior WHO models, Khan et al. [1] have pilot-tested a more comprehensive training model for integrated CVD care than has previously been examined.

Despite these innovations, however, this study from Khan et al. [1] is just the start of a new, urgently needed research agenda on integrated cardiovascular care from NPHWs: Khan et al. [1] evaluated human resources for CVD care, but not materials; also, they examined workers' pre-intervention knowledge, but not their post-intervention care competency. These factors, too, can make or break a program's efficacy. Further work still remains. For example, research in multiple sites demonstrates that NPHWs, even when highly trained, may lack the materials—such as essential medications and blood pressure cuffs—to render care consistently [8,28], or the information systems to track care [29]. Perhaps more urgently, even NPHWs who have the knowledge, supplies, and data systems to provide unsupervised CVD care encounter regulatory policies that prohibit them from doing so [8,30]. Khan et al. [1] acknowledge these regulatory barriers, but they were unable to surmount them in any of the 3 target sites. Further work to both identify and address these structural barriers to NHPW CVD care—for example, by furnishing health system "building blocks" such as strong information technology systems, consistent medication supplies, and supportive governance and supervision—would build on this important work focused on strengthening the quality of the NHPW workforce.

Furthermore, even within the domain of health workforce training, Khan et al.'s [1] work constitutes only 1 step in a complex process, albeit an important one. Although written and practical examinations are a strong measure of clinical competency, they do not establish how these nonphysician practitioners will actually perform in practice. That work requires structured observations, checklists, and other direct oversight, to ensure that care occurs consistently. Direct observation shows that NPHWs can competently provide select elements of cardiovascular care such as blood pressure or weight checks [14,16], but has not yet established their consistency in applying the HEARTS protocol from start to finish. Khan et al.'s [1] work and the HOPE (Heart Outcomes Prevention and Evaluation)-4 trial that created it [26] can serve as a crucial platform to develop and evaluate this competency. And even if nonphysicians can render the gamut of such care—including screening, counseling, and even supervised treatment with medications—as consistently as physicians can, their efficacy in achieving crucial health outcomes—for example, preventing new atherosclerotic CVD events such as stroke or myocardial infarctions—remains to be established by future studies.

Nonetheless, Khan et al.'s [1] work is a crucial first step in the direction of integrated cardiovascular care in low- and middle-income countries. Given that CVD is a leading cause of death, and its risk factors are on the rise globally, any progress in leveraging a new health workforce to tackle elements of this burden is welcome. And the use of culture-specific models to train and evaluate these workers serves as a blueprint for other contexts—demonstrating which elements of CVD protocols such as HEARTS can be adapted locally, and in what ways. Future work from the HOPE-4 trial and others would do well to build on these crucial lessons.

REFERENCES

1. Khan M, Lamelas P, Musa H, et al. Development, testing, and implementation of a training curriculum for nonphysician health workers to reduce cardiovascular disease. Glob Heart 2018;13:93–100.
2. GBD Compare. The Institute for Health Metrics and Evaluation (IHME). Available at: https://vizhub.healthdata.org/gbd-compare/. Accessed March 6, 2018.
3. Mills KT, Bundy JD, Kelly TN, et al. Global disparities of hypertension prevalence and control. Circulation 2016;134:441–50.
4. Di Cesare M, Khang YH, Asaria P, et al. Inequalities in non-communicable diseases and effective responses. Lancet 2013;381:585–97.
5. Sommer I, Griebler U, Mahlknecht P, et al. Socioeconomic inequalities in non-communicable diseases and their risk factors: an overview of systematic reviews. BMC Public Health 2015;15:914.
6. WHO. Global Strategy on Human Resources for Health: Workforce 2030. Geneva, Switzerland: WHO; 2016. Available at: http://www.who.int/hrh/resources/pub_globstrathrh-2030/en/. Accessed March 5, 2018.
7. Ogedegbe G, Gyamfi J, Plange-Rhule J, et al. Task-shifting interventions for cardiovascular risk reduction in low-income and middle-income countries: a systematic review of randomised controlled trials. BMJ Open 2014;4:e005983.
8. Joshi R, Alim M, Kengne AP, et al. Task shifting for non-communicable disease management in low and middle income countries—a systematic review. PLoS One 2014;9:e103754.
9. Schneider H, Okello D, Lehmann U. The global pendulum swing towards community health workers in low-and middle-income countries: a scoping review of trends, geographical distribution and programmatic orientations, 2005 to 2014. Hum Resourc Health 2016;14:65.
10. Phillips JF, Bawah AA, Binka FN. Accelerating reproductive and child health programme impact with community-based services: the Navrongo experiment in Ghana. Bull World Health Organ 2006;84:949–55.
11. Callaghan M, Ford N, Schneider H. A systematic review of task-shifting for HIV treatment and care in Africa. Hum Resourc Health 2010;8:8.
12. Khetan AK, Purushothaman R, Chami T, et al. The effectiveness of community health workers in CVD prevention in LMIC. Glob Heart 2017;12:233–43.
13. Jeet G, Thakur JS, Prinja S, Singh M. Community health workers for non-communicable diseases prevention and control in developing countries: Evidence and implications. PLoS One 2017;12:e0180640.
14. Abegunde DO, Shengelia B, Luyten A, et al. Can non-physician health-care workers assess and manage cardiovascular risk in primary care? Bull World Health Organ 2007;85:432–40.
15. Ogedegbe G, Plange-Rhule J, Gyamfi J, et al. A cluster-randomized trial of task shifting and blood pressure control in Ghana: study protocol. Implement Sci 2014;9:73.
16. Gaziano TA, Abrahams-Gessel S, Denman CA. An assessment of community health workers' ability to screen for cardiovascular disease risk with a simple, non-invasive risk assessment instrument in

Bangladesh, Guatemala, Mexico, and South Africa: an observational study. Lancet Glob Health 2015;3:e556–63.
17. Vedanthan R, Kamano JH, Naanyu V, et al. Optimizing linkage and retention to hypertension care in rural Kenya (LARK hypertension study): study protocol for a randomized controlled trial. Trials 2014; 15:143.
18. Mendis S, Johnston SC, Fan W, Oladapo O, Cameron A, Faramawi MF. Cardiovascular risk management and its impact on hypertension control in primary care in low-resource settings: a cluster-randomized trial. Bull World Health Organ 2010;88:412–9.
19. Kengne AP, Fezeu L, Sobngwi E, et al. Type 2 diabetes management in nurse-led primary healthcare settings in urban and rural Cameroon. Prim Care Diabetes 2009;3:181–8.
20. Stone NJ, Robinson JG, Lichtenstein AH, et al. 2013 ACC/AHA guideline on the treatment of blood cholesterol to reduce atherosclerotic cardiovascular risk in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol 2014;63:2889–934.
21. Reiner Ž, Catapano AL, De Backer G, et al. ESC/EAS guidelines for the management of dyslipidaemias: the Task Force for the management of dyslipidaemias of the European Society of Cardiology (ESC) and the European Atherosclerosis Society (EAS). Eur Heart J 2011;32: 1769–818.
22. WHO. Prevention of Cardiovascular Disease: Guidelines for Assessment and Management of Cardiovascular Risk. Geneva, Switzerland: WHO; 2007. Available at: http://apps.who.int/iris/bitstream/10665/43685/1/9789241547178_eng.pdf. Accessed March 6, 2018.
23. WHO. HEARTS: Technical Package for Cardiovascular Disease Management in Primary Health Care. Geneva, Switzerland: WHO; 2016. Available at: http://www.who.int/cardiovascular_diseases/hearts/Hearts_package.pdf. Accessed March 6, 2018.
24. Campbell NRC, Dashdorj N, Baatarsuren U, et al. Assessing healthcare professional knowledge, attitudes, and practices on hypertension management. Announcing a new World Hypertension League resource. J Clin Hypertens (Greenwich) 2017;19:830–2.
25. Kamath DY, Xavier D, Gupta R, et al. Rationale and design of a randomized controlled trial evaluating community health worker—based interventions for the secondary prevention of acute coronary syndromes in India (SPREAD). Am Heart J 2014;168:690–7.
26. Yusuf S. Heart Outcomes Prevention and Evaluation 4 (HOPE-4). Available at: https://clinicaltrials.gov/ct2/show/NCT01826019?term1/4HOPEþ4&rank1/41. Accessed March 6, 2018.
27. Horowitz CR, Robinson M, Seifer S. Community-based participatory research from the margin to the mainstream: are researchers prepared? Circulation 2009;119:2633–42.
28. Labhardt ND, Balo JR, Ndam M, Grimm JJ, Manga E. Task shifting to non-physician clinicians for integrated management of hypertension and diabetes in rural Cameroon: a programme assessment at two years. BMC Health Serv Res 2010;10:339.
29. Moon TD, Silva-Matos C, Cordoso A, Baptista AJ, Sidat M, Vermund SH. Implementation of cervical cancer screening using visual inspection with acetic acid in rural Mozambique: successes and challenges using HIV care and treatment programme investments in Zambézia Province. J Int AIDS Soc 2012;15:17406.
30. Haykin LA, Francke JA, Jackson E, et al. Examining Stakeholders' Perceptions of Heart Disease Care in Rural Ghana. Paper presented at: Consortium of Universities for Global Health Conference; March 16, 2018; New York City, NY.