Primary Prevention in LMIC
From Population-Based Surveys to Risk Factor Interventions

Andrew E. Moran*, Jagat Narula[†]
New York, NY, USA

More than two-thirds of cardiovascular disease deaths occur in low- or middle-income countries (LMIC) [1]. Much of that burden could be restricted by way of primary prevention. Performance indicators reflect the current state of primary prevention in LMIC. For example, in the case of hypertension, only about one-third of people with hypertension in LMIC are aware of their diagnosis, and only about one-quarter of them had their hypertension treated [2]. Fortunately, emerging evidence is mapping innovative pathways for improving primary cardiovascular disease prevention in resource-challenged settings. This issue of *Global Heart* highlights primary prevention in 3 ways: 1) population-based surveys of preventable risk factors; 2) assessment of clinic- and community-based approaches to treating dyslipidemia and multiple risk factors; and 3) evaluations of the key role of lay health workers in delivering primary prevention services.

Two studies from India set the stage by recognizing poor cardiovascular health in contemporary populations living in LMIC. In one of the studies, by Prabhakaran et al. [3], increased body weight, captured as increase in age-standardized mean body mass index, explained unhealthful temporal trends in downstream cardiovascular risk factors in both urban and rural populations. The authors dispelled the common assumption that cardiovascular risk factor exposures cluster in cities, as the smoking prevalence increased in rural but not in urban men, and similarly total cholesterol increased in rural but not in the urban adults. The second study, by Gupta et al. [4], found a low proportion of the population that could claim 4 or more normal cardiovascular health factors (including moderate physical activity and healthful diet, along with traditional cardiovascular risk factors) in 11 Indian cities.

Also in this issue of *Global Heart*, a Cochrane Review by Uthman et al. [5] analyzes the multiple risk factor interventions for the primary prevention of cardiovascular disease in the LMIC settings. The intervention studies selected implementation of different combinations of diet, exercise, weight loss, or smoking cessation counseling over a period of 6 to 30 months. Although the number of available intervention trials is small, there was reasonable evidence that multiple risk factor interventions could modestly lower blood pressure and reduce adiposity. This state-of-the-art review emphasizes the need for high quality trials to demonstrate the efficacy and sustainability of these interventions in people at risk.

In many of the primary prevention trials reviewed by Uthman et al. [5], the intervention was carried out by nonphysician health care providers. "Task-shifting"

primary prevention interventions to trained, lower-cost health workers might become the key to affordable primary prevention in LMIC. In a review of 11 primary cardiovascular disease prevention programs by Khetan et al. [6], the community health workers succeeded in achieving model improvements in screening for or treatment of cardiovascular risk factors. In most cases, these community health workers represented a resource that was already at hand. In some LMIC, community health workers are already engaged in promoting family planning and maternal, newborn, and child health, and should be able to discharge an important role in prevention of noncommunicable diseases as well. However, Neupane et al. [7] found that the level of literacy in relation to risk factors, such as hypertension, in community health workers is relatively low, suggesting that the education of the nonphysician prevention program extenders would be needed before they could be tasked with delivering strategic interventions.

In all of the cardiovascular disease primary prevention stories reported in this issue of *Global Heart*, the prevention strategy was focused on the individual patient level. However, the success of any primary prevention would require innovations at the health care system and population level. Primary prevention delivered by community health workers and other health care providers would require robust training opportunities and periodic assessment of their knowledge. Successful pharmacologic management of cardiovascular disease risk factors would need system changes to improve the availability, accessibility, and affordability of the essential medications. It is expected that the policy interventions for the delivery of primary prevention at the population level would potentially achieve sustained behavioral change more successfully than individual-level interventions. Tobacco product taxation has substantially influenced smoking patterns. Similar examples of policy interventions contributing to cardiovascular disease prevention include South Africa's sugar tax and Mexico's soda tax [8,9], Singapore's government's war on diabetes [10], and the Chinese government's effort toward air quality regulation and pollution control [11].

REFERENCES

1. Benziger CP, Roth GA, Moran AE. The global burden of disease study and the preventable burden of NCD. Glob Heart 2016;11:393–7.
2. Mills KT, Bundy JD, Kelly TN, et al. Global disparities of hypertension prevalence and control: a systematic analysis of population-based studies from 90 countries. Circulation 2016;134:441–50.

3. Prabhakaran D, Roy A, Praveen PA, et al. 20-Year trend of CVD risk factors: urban and rural national capital region of India. Glob Heart 2017;12:209–17.

4. Gupta B, Gupta R, Sharma KK, Gupta A, Mahanta TG, Deedwania PC. Low prevalence of AHA-defined ideal cardiovascular health factors: a study of urban Indian men and women. Glob Heart 2017;12:219–25.

5. Uthman OA, Hartley L, Rees K, Taylor F, Ebrahim S, Clarke A. Multiple risk factor interventions for primary prevention of CVD in LMIC: a Cochrane review. Glob Heart 2017;12:199–208.

6. Khetan AK, Purushothaman R, Chami T, et al. The Effectiveness of community health workers for CVD prevention in LMIC. Glob Heart 2017;12:233–43.

7. Neupane D, McLachlan CS, Mishra SR, Kallestrup P. Understanding and motivations of female community health volunteers about blood pressure control: a prerequisite for developing community-based hypertension interventions in Nepal. Glob Heart 2017;12:227–32.

8. Brand South Africa. WHO endorses South Africa's sugar tax. Available at: https://www.brandsouthafrica.com/governance/health-services/endorses-south-africas-sugar-tax. Accessed October 9, 2017.

9. Colchero MA, Rivera-Dommarco J, Popkin BM, Ng SW. In Mexico, evidence of sustained consumer response two years after implementing a sugar-sweetened beverage tax. Health Aff (Millwood) 2017;36:564–71.

10. Khalik S. Singapore MOH to wage war on diabetes. Available at: http://www.asiaone.com/moh-wage-war-diabetes. Accessed October 9, 2017.

11. Huang C, Moran AE, Coxson PG, et al. Potential cardiovascular and total mortality benefits of air pollution control in urban China. Circulation 2017 [E-pub ahead of print].