Approaches to Sustainable Capacity Building for Cardiovascular Disease Care in Kenya

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KEYWORDS

• Capacity building • Low- and middle-income countries • Kenya • Sustainable cardiovascular care

KEY POINTS

- Essential quality cardiovascular care is possible and sustainable in Kenya despite resource constraints.
- Investment in skilled manpower, specialized equipment and resources, pharmacy services and clear policies are being harnessed to address this epidemic and reduce VD-related premature deaths.
- Building strong partnerships and embracing equity in service delivery coupled with primary prevention of emerging CVD should be further enhanced for best yields.

INTRODUCTION

Cardiovascular disease (CVD) is the leading cause of morbidity and mortality worldwide, with the majority of these occurring in low- and middle-income countries (LMICS).[1] By 2020, it is estimated that CVD will remain as the leading contributor to the global health burden, accounting for 73% of total global mortality and 56% of total morbidity.[2] Toward the end of last century, CVD was identified as an emerging epidemic in these countries in contrast with high-income countries (HICs), where this menace is largely being controlled via identification of major risk factors through population-based studies and effective strategies, building on investments in prevention programs, skilled manpower, and sophisticated equipment for the treatment of those with established disease.[1] Although the prevalence of traditional CVD risk

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factors has been relatively low in most LMICs, epidemiologic and nutritional transitions coupled with tobacco trends have put a great proportion of individuals, especially the urban poor, at risk of early CVD-related death.[2–4]

Most LMICs are still afflicted with diseases of poverty like tuberculosis, malaria, and human immunodeficiency virus (HIV) infections.[5] Splitting the overstretched health budgets and resources between these endemic diseases and the emerging CVDs is a challenge in regions where resources are limited.[6] Moreover, HIV infection poses additional cardiovascular risks to those infected, thus complicating the picture because most antiretroviral therapy treatment programs do not currently support treatment for noncommunicable disease comorbidities.[7,8] Sustainable health care financing, therefore, calls for more innovative ways of funding for treatment for CVD and building capacity to supplement the meager resources this epidemic attracts from respective national governments, like the model recently described at a referral hospital in western Kenya, where a strong partnership between a North American university and the local hospital has positively transformed cardiovascular care in that region.[9] Developed country partnerships are also growing, providing not only the resources but also the much needed technical expertise like the *Academic Model Providing Access to Healthcare* (AMPATH) model in Kenya and the *Madaktari Africa* initiative in Tanzania.[10,11] In this review, we describe how Moi Teaching and Referral Hospital (MTRH), and Kenyatta National Hospital (KNH) and Tenwek Mission Hospital in Kenya as major public facilities offering specialized cardiac care and representatives of similar settings in other LMICS have developed the various elements toward building capacity for cardiovascular care and their experiences to date. KNH is situated in the Kenyan Capital of Nairobi and is the largest referral hospital in East and Central Africa with a bed capacity of 2500 and also serves as the teaching hospital for the University of Nairobi. MTRH is the only other public referral hospital in the country with a bed capacity of 800 and serves as the teaching hospital for Moi University in Eldoret, Western Kenya. Tenwek, in contrast, is a small mission hospital situated about 200 km west of Nairobi in the central Rift Valley with very well-established cardiovascular services.

BUILDING DIAGNOSTIC, HUMAN, AND TECHNICAL CAPACITY

Precise cardiac diagnosis is essential for quality patient care and prognostication. Echocardiography and electrocardiography are the standard initial diagnostic tools for cardiac evaluation, but they are not widely available. Access to echocardiography is particularly limited to specialized laboratories within established hospitals, not only owing to the high cost of the equipment, but also the extensive training in image acquisition and interpretation required for its application. As previously described in a recent publication, to fill these gaps, Duke University (North Carolina) and Moi University partnered to jumpstart a specialized and sustainable cardiac care program in Eldoret, Kenya.[11] A cardiology fellowship program was jointly started after the creation of a National Heart, Lung and Blood Institute–supported Center of Excellence in cardiovascular and pulmonary disease in Eldoret and ran for 5 years starting in 2009 with the support for clinical capacity building from the Hubert-Yeargan Center for Global Health at Duke University. This Center of Excellence program was a public–private partnership created with the overall goal of contributing to the reduction of cardiovascular and pulmonary disease burdens by catalyzing in-country research institutions to develop a global network of biomedical research centers that conduct collaborative research, train researchers, and advise on policy across 11 centers globally.[12,13] Senior cardiologists and an experienced ultrasonographer accompanied by echocardiogram machines (Philips CX50, Los Angeles, CA) were posted to train both the Kenyan echocardiography technicians and fellows. During this training period, the knowledge base and skills of existing technicians was greatly enhanced and the volume of echocardiogram studies doubled from about 15 to more than 30 per day as more patients and clinicians were drawn to the quality cardiac diagnostic services. Because there is no formal echocardiography training program in sub-Saharan Africa, this cardiac diagnostic unit has transformed itself into a training center in echocardiography for medical personnel from both government and missionary hospitals around the country with an increasing need for echocardiography services.

Another innovative approach of filling the needs of clinical practice in LMIC settings is the use of handheld ultrasound devices. Studies from both HICs and LIMCs support the ability of focused cardiac ultrasound imaging to provide accurate and clinically meaningful information compared with physical examination alone in intensive care units, at the bedside, and in the community.[14–16] One such device (V-scan, General Electric, Crotonville, NY) is available at MTRH for provision of point of care diagnostic value. The technology has also been found very useful in Tanzania especially in rural areas without electricity and Fiji, where school nurses have used the device for mass screening