Ensuring Patient-Centered Access to Cardiovascular Disease Medicines in Low-Income and Middle-Income Countries Through Health-System Strengthening

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KEYWORDS

• Patient-centered access • Cardiovascular disease medicines • Availability • Accountability • Adherence • Health-system strengthening • Low-income and middle-income countries • Falsified and substandard medicines

KEY POINTS

- Eighty percent of deaths due to cardiovascular disease (CVD) occur in low-income and middle-income countries (LMICs).
- Translating available CVD prevention and treatment guidelines into practice is hampered in LMICs by inadequate supply chain systems that limit access to lifesaving medicines.
- We propose 3 barriers ("3A" challenges) to patient-centered access to essential CVD medicines: dismal *availability* of medicines, lack of *accountability* in the supply chain, and poor medication *adherence*.
- Many challenges with CVD medication access relate to on-the-ground challenges. Pilot programs demonstrated improvement in CVD medication access by standardizing supply chain management, improving human resource efficiency, and extending supply chain considerations to improve patient adherence.
- Evaluating the health impact and cost-effectiveness of these existing solutions will be crucial for scaling up and ultimately providing patient-centered access to CVD medicines in LMICs.

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INTRODUCTION

Cardiovascular disease (CVD) is the leading cause of global mortality and is expected to reach 23 million deaths by 2030.[1,2] Eighty percent of CVD deaths occur in low-income and middle-income countries (LMICs) and predominantly affects a younger population compared with high-income countries (HICs), thus having a significant impact on the economic growth of LMICs.[1,3] The mortality burden from CVD is projected to increase in LMICs alongside the lifestyle-associated epidemiologic shift favoring noncommunicable disease development.[4] The associated economic losses are also expected to reach billions of dollars over the next decade, representing yet another barrier to development for LMICs.[3] Although CVD prevention and treatment guidelines are available, translating these into practice is hampered in LMICs by inadequate health care systems with limited access to potentially lifesaving medications.[5]

Enumerating the barriers to access to CVD medicines requires an examination of both the "policy-level" barriers and "on-the-ground" issues. At the policy level, limited national funding due to competing health priorities, slow incorporation of CVD drugs into the essential medicines list (EML), and structural and financial barriers all limit access to CVD drugs and have been discussed previously with recommendations proposed.[6,7] Advocacy to create awareness among policy makers on the threat of CVDs to LMIC populations' health and economic prosperity will increase funding and foster equitable access through inclusion of more CVD drugs into the EML. Overcoming legal barriers in patent law will expedite generic availability to increase affordability with streamlined global and local procurement practices further bringing down the cost of CVD drugs in the public sector. Finally, engaging the commercial sector so as to regulate markup on CVD drugs will minimize out-of-pocket expenses for patients.[6,7]

Despite the frequent emphasis on policy-level considerations for increasing CVD medication access, the rate-limiting steps rest within the health care system's supply chain. This is the focus of our review paper.[3,8] Dismal drug availability for medicines for the prevention and treatment of CVD in public facilities in LMICs forces patients to turn to private chemists, where costs of medication are often unaffordable.[9–11] Systemic deficiencies and inefficiencies in medicine regulation and distribution have led to a rampant counterfeit medicines burden in LMICs.[12] These deficiencies together contribute to the mortality and morbidity imposed on LMIC populations.[13]

In this review article, we describe the deficiencies in the current LMIC supply chains that limit access to effective CVD medicines, and discuss existing solutions that are translatable to other low-resource settings to address these deficiencies.

CHALLENGES

We identified 3 primary barriers ("3A" challenges) in the health care system supply chain that coexist to limit access to essential CVD medicines (**Fig. 1**) The challenges are dismal *availability of* medicines, lack of *accountability* in the supply chain, and poor medication *adherence*.

Availability

A reliable supply chain system is crucial to achieve consistent availability of essential medicines.[14] Patients with CVD, or at risk for CVD, often require lifelong medicines for the treatment and prevention of CVD events. Therefore, functional CVD medicine supply chains are crucial to improve global cardiovascular health. Unfortunately, several analyses demonstrated that availability of CVD medicines across many LMIC settings is suboptimal.[7] In 2007, a cross-sectional study investigating CVD medicines in 6 LMICs revealed a less than 7.5% availability of medicines in the public sector.[10] In 2011, World Health Organization/Health Action International data of 36 countries revealed that the overall availability of these medicines was still poor, representing a mean availability of 26% in the public sector.[15] Recently, the 2016 Prospective Urban Rural Epidemiology (PURE) study showed availability of CVD medications ranged from 3% to 73% and 25% to 80% in rural and urban LMIC settings, respectively.[16]

To understand the persistently low availability rates of CVD medicines in LMICs, we analyze practical challenges with a focus on the public sector's supply chains that lead to weak supply chain design, poor operating performance, and low access for patients who need these medicines.

Within the public sector of most LMICs, the government procures medications and distributes them to other health facilities using the government Central Medical Store (CMS).[17,18] The CMS is responsible for distributing medicines to district facilities, and they, in turn, supply medicines to the subdistrict clinics.[17,18] One of the challenges faced in these settings is the unnecessary complexity of supply chain design, because most LMICs include multiple tiers of stock management before medicines can reach the intended

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