

# Cardiac rehabilitation in low-resource settings and beyond: the art of the possible

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Cardiovascular disease (CVD) is the largest epidemic that humankind has confronted. Annually CVD is responsible for one-third of all deaths worldwide (17.2 out of 54.8 million deaths). Eighty per cent of deaths due to CVD are caused by two atherosclerotic conditions: ischaemic heart disease (8.1 million) and cerebrovascular disease (6.4 million). They in turn are the first and third causes, respectively, of global years of life lost.<sup>1</sup> The severity of the CVD epidemic in terms of lives lost and economic cost worldwide is paralleled by the enormous challenges (quality of life, disabilities, family impact, economic burden) faced by those who survive an acute cardiovascular event. The scenario is even more dire in low- and middle-income countries (LMIC) accounting for >80% of the CVD global burden<sup>1</sup> and where the care gap, between the evidence-based guidelines and the implementation, is enormous.

The efficacy of cardiac rehabilitation (CR) in atherosclerotic CVD secondary prevention is well established. The objective of CR is to stabilise, slow or even reverse the progression of CVD, which in turn reduces the risk of a future cardiac event. CR is an ambitious and comprehensive set of interventions that include patient assessment, nutritional and physical activity counselling, intensive management of lipids, hypertension, weight and diabetes mellitus, tobacco cessation, psychosocial management and exercise training.<sup>2</sup> Undoubtedly, CR, always part of the cardiology conversation, can play a central role in the mitigation of the CVD epidemic worldwide.

Given the documented benefits of CR and its low accessibility in LMIC, proposing a feasible model of CR delivery and implementation in resource-constrained settings becomes a pressing public health issue. In fact, since the 1993 WHO publication of its visionary report on *Rehabilitation after Cardiovascular Diseases, with Special Emphasis on Developing Countries*,<sup>3</sup> no

updated statement on the appropriate CR model for resource-constrained settings has been published. To fill this knowledge gap, and after reviewing the existent evidence, an expert panel is advocating for expanding and tailoring CR services for low-resource settings. The panel's consensus statement can be found on the *Heart* website.<sup>4</sup>

The panel evaluated CR components<sup>4</sup> clustered in 10 domains (exercise, diet, tobacco, body weight, education, mental health, return to work, lipids, hypertension control, cardioprotective therapies). Furthermore, the panel proposed 49 recommendations with their respective levels of evidence for delivery of the core components of CR in low-resource settings, using the modified evidence-grading approach: Grading of Recommendations Assessment Development. Due to the lack of a robust body of evidence, a high proportion of recommendations resulted from expert consensus (18/49) and only 7 of the 49 came from studies actually conducted in LMIC, confirming the large research gap in those countries. Even though three of the five recommendations on exercise were based on consensus, the panel issued five recommendations on this component and highlighted the prominence of exercise-based CR. The majority of recommendations regarding mental health, return to work and education were also adopted by consensus. The report confirmed what is already known about smoking cessation, lipids, hypertension and cardioprotective therapies and their favourable impact on CVD risk reduction. Additionally, authors also concurred that the cost of CR delivery based on current standards applied in high-income countries (HIC) is not feasible in resource-constrained settings and recommend that CR be adapted to be delivered by non-physician healthcare workers in non-clinical settings.

There are enormous challenges in implementing CR in LMIC. A perspective that could complement the study of such challenges is a thorough examination of the causes of poor performance of CR in HIC. This poor performance is not a result of lack of evidence-based guidelines—or their quality—and metric. There are, for

instance, class 1A recommendations from the American Heart Association/American College of Cardiology management guidelines and performance measures; however, studies show that <30% of eligible patients are participating in these programmes in the USA. Furthermore, the rate of participation is even lower among women, non-whites, elderly, low-income and rural populations. In addition to the high cost of CR and health insurance coverage schemes, additional barriers to participation include, among others, lack of standardised referral forms, lack of discharge communication and unfamiliarity with CR site location.<sup>5</sup> This situation has generated a controversy in which some argue that given the low level of participation the current CR model is neither viable nor sustainable from a financial standpoint. Therefore, it is necessary to propose a more patient-centred model that addresses individuals' specific needs and is integrated in a secondary prevention delivery framework of easier access that emphasises CR in terms of health outcomes and cost-effectiveness.<sup>2</sup> Keeping the pulse on CR implementation in HIC is as important as evaluating current available evidence, and it is essential when formulating viable, affordable and sustainable models for LMIC.

The enthusiasm for reducing premature mortality in the context of global commitments to tackle non-communicable diseases by 2025 contrasts sharply with the PURE study findings, which have revealed the striking disadvantage of populations living in LMIC in terms of prevention and management of CVD.<sup>6</sup> In fact, hypertension management and secondary CVD prevention is suboptimal worldwide, but remains especially limited in many LMIC. Instead, >75% of PURE study participants from low-income countries with previous ischaemic heart disease or stroke were not taking any kind of medications for CVD secondary prevention compared with <10% from HIC participants. This is consistent with evidence that shows that medications for secondary prevention are neither available nor affordable for many in LMIC. Moreover, to the above-mentioned barriers, issues of access, quality of healthcare and lack of qualified human resources compound the obstacles to tackle this epidemic. Even in the most promising scenarios, these barriers will not be overcome immediately. Therefore, a more audacious and innovative approach needs to be implemented to address the multiple barriers (at the patient, healthcare provider and health system levels) that are operating in specific contexts and that are currently hindering the expansion of CVD

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prevention and management, including secondary prevention.<sup>7</sup>

In light of these findings and to simplify and create a feasible CR model proposal or preventive cardiology programme, it is important to support innovative initiatives such as the Global Road Map for Secondary Prevention launched by the World Heart Federation.<sup>8</sup> This initiative promotes the expansion of a simplified model of secondary prevention for patients with known atherosclerotic CVD, including coronary artery disease, cerebrovascular artery disease, peripheral artery disease and atherosclerotic aortic disease. This approach prioritises the use of four cardioprotective-proven medications (aspirin, ACE inhibitors (or angiotensin receptor blockers if ACE inhibitors are not tolerated),  $\beta$ -blockers and statins), as well as smoking cessation, physical activity and healthy diet. Moreover, this model emphasises having availability and affordability of simplified and cost-effective treatment regimens including combination CVD preventive drug therapy, simplified delivery of healthcare through task-sharing and optimising self-management. Accordingly, treatment with four proven medications and smoking cessation will prevent or postpone as many as 75–80% of recurrent vascular events and their complications, including death and disability.<sup>8</sup> This approach is consistent with the WHO priorities to reduce the burden of CVD through a comprehensive cardiovascular risk reduction strategy.

The high prevalence of well-known risk factors (tobacco, unhealthy diet, lack of physical activity, harmful use of alcohol) illustrates that the global CVD epidemic has structural origins and is inherently related to development and economic models. Clearly, neither CR nor other similar inter-

ventions will completely stop the CVD epidemic, but they can contribute to mitigating its consequences and thus saving many lives. In this light, the proposal, which *Heart* has published is not about which approach is superior, it attempts to define how to make CR—or simplified CVD secondary prevention—possible in resource-constrained settings, as well as marginalised and disenfranchised populations in affluent countries. Even when we concur about the reach and comprehensiveness of CR as proposed in its foundational principles, we know that implementation in its original formulation is difficult, and many times unnecessarily complex and unaffordable. To insist on the same approach, despite the evidence that it does not work, may seriously compromise what is truly possible. With a dash of realism and practicality, we can concentrate on what can be sufficiently good—not perfect—and that would allow us to advance further. In this practical and realistic realm, we find interventions that, besides being evidence-based, prioritise primary care, are affordable, are safe, are simple in their delivery and achieve high impact on health outcomes. Let's make CR—and simplified secondary prevention—the art of the possible.

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## REFERENCES

- 1 GBD 2013 Mortality and Causes of Death Collaborators. Global, regional, and national age–sex specific all-cause and cause-specific mortality for 240 causes of death, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. *Lancet* 2015;385:117–71.
- 2 Sandesara PB, Lambert CT, Gordon NF, *et al.*, Cardiac Rehabilitation and Risk Reduction. Time to “Rebrand and Reinvigorate”. *J Am Coll Cardiol* 2015;65:389–95.
- 3 World Health Organization. *Rehabilitation after cardiovascular diseases, with special emphasis on developing countries: report of a WHO committee*. Geneva: WHO, 1993.
- 4 Grace SL, Turk-Adawi KI, Contractor A, *et al.* Cardiac rehabilitation delivery model for low-resource settings. *Heart* Published Online First: 15 May 2016 doi:10.1136/heartjnl-2015-309209
- 5 Menezes AR, Lavie CJ, Milani RV, *et al.* Cardiac rehabilitation in the United States. *Cardiovasc Dis* 2014;56:522–9.
- 6 Yusuf S, Rangarajan S, Teo K, *et al.*, PURE Investigators. Cardiovascular risk and events in 17 low-, middle-, and high-income countries. *N Engl J Med* 2014;371:818–27.
- 7 Schwalm JD, McKee M, Huffman MD, *et al.* Resource effective strategies to prevent and treat cardiovascular disease. *Circulation* 2016;133:742–55.
- 8 Perel P, Avezum A, Huffman M, *et al.* Reducing premature cardiovascular morbidity and mortality in people with atherosclerotic vascular disease: the world heart federation roadmap for secondary prevention of cardiovascular disease. *Glob Heart* 2015;10:99–110.

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