

# CHALLENGES FOR THE MANAGEMENT OF HYPERTENSION IN LOW-RESOURCE SETTINGS

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Cardiovascular diseases (CVD) account for one third of the global mortality and one tenth of the global disease burden; however, if rates of hypertension, a cardiovascular risk factor, were controlled, the reduction of the CVD burden would follow. One of the major constraints for controlling hypertension is the limitation of resources for health care, particularly in low- and middle-income countries, which contribute to 80% of the global CVD burden. Hence, it is vital to use the scarce resources with maximum efficiency. In this context, it is important to note that the benefits and cost-effectiveness of managing hypertension are determined by the overall risk of CVD and not by blood pressure level alone. Using this concept demands a paradigm shift from a "single risk" factor to an "absolute risk" approach.

Unfortunately, the weak infrastructure of low-resource settings does not allow cardiovascular risk assessment using such variables as blood lipid measurements for risk stratification. Feasible risk assessment methods are needed and should use simple variables such as age, sex, smoking habits, history of premature cardiovascular disease in the family, and rates of diabetes and hypertension. To meet this need, a pragmatic CVD-Risk Management package has been developed by the World Health Organization (WHO) to facilitate cardiovascular risk assessment and management in low-resource settings.

Cost-effective healthcare interventions to reduce the cardiovascular burden can only be implemented if the health services policy environment and financing enable implementation. The success of this approach will also depend on the capacity of primary healthcare systems to deliver these interventions and serve the long-term needs of high-risk CVD patients.

For many countries, the individual management of large numbers of patients with low CVD risk will not be affordable. Yet, individuals at low risk, and not those at high risk, account for a greater share of the overall disease burden. Therefore, we must shift the distribution of CVD through population-wide strategies that address all major CVD risk factors, including hypertension. (*Ethn Dis.* 2003; 13[suppl2]:S2-67-S2-70)

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## INTRODUCTION

Hypertension is the most common cardiovascular disease (CVD) affecting about 20% of the adult population (an estimated 600 million people) in both developed and developing countries.<sup>1</sup> The *World Health Report 2002* estimates that 7 million premature deaths are attributable to hypertension.<sup>2</sup>

The effects of hypertension are devastating. If left untreated, hypertension causes stroke, myocardial infarction, cardiac failure, dementia, renal failure, and blindness. It places a severe financial burden on health systems and consumes often-limited resources. Every year, an estimated 32 million cases of stroke and heart attack occur worldwide, with 12 million cases being fatal.<sup>3</sup> Suboptimal blood pressure levels (defined as a systolic blood pressure [SBP] greater than 115 mm Hg) have been estimated to account for 62% of all cerebrovascular disease and 49% of all ischemic heart disease.

## MANAGING HYPERTENSION; REDUCING GLOBAL CARDIOVASCULAR MORBIDITY AND MORTALITY

Hypertension plays a major etiologic role in cardiovascular morbidity and mortality. Results of clinical trials have demonstrated that, by treating hypertension, the risk of stroke can be reduced by 35%–40% and the risk of myocardial infarction can be reduced by 20%–25%.<sup>4</sup>

Due to limited healthcare facilities and untreated cardiovascular risk factors, in sub-Saharan Africa and the Caribbean, case fatality rates from stroke are 2- to 3-fold higher, compared to

those found in a developed country.<sup>5</sup> It is also important to note that even in settings where advanced technology and facilities exist, the prognosis for those who suffer stroke is poor; 58% of these stroke victims either die or become dependent on their families and/or society.<sup>6</sup> Furthermore, in many settings 40%–75% of those who suffer a heart attack die before they reach a hospital to benefit from modern medical care.<sup>7,8</sup> Given these statistics, it becomes evident that the cardiovascular disease prevention, through the control of hypertension and other risk factors, should be given high priority. In developing countries, where resource-intensive care for these life-threatening conditions is not a feasible option, a prevention approach becomes even more critical.

Despite years of action, the detection and control of hypertension remains a challenge even in developed countries, with as many as 70% of hypertensive patients with uncontrolled rates of high blood pressure.<sup>9</sup> The problem is even more acute in developing countries and, for a variety of reasons, the strategies for detecting hypertension and the control programs used in developed nations are inappropriate in developing countries.

## OBSTACLES TO THE DETECTION AND CONTROL OF HYPERTENSION

There are many obstacles to the prevention and control of CVD. While low- and middle-income countries struggle with the double burden of disease, they continue to be overwhelmed by the AIDS epidemic. For some of these developing nations, expenditure on health care can be as low as 6 (USD) per capita,<sup>10</sup> with even more limited resources

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available for the detection and control of hypertension. Only inexpensive and affordable programs can be implemented and sustained in such settings.

Low literacy rates, inadequate access to basic health care, lack of human resources, high drug costs, and inadequate facilities in primary health care are other important barriers to the detection and control of hypertension. As a result of low literacy rates,<sup>11</sup> population-wide knowledge about the risks associated with high blood pressure and other CVD risk factors, as well as the benefits of programs for reducing such risks, is poor. Major health education initiatives are needed to remedy this situation.

In addition, large segments of the population in most low-income countries have poor access to healthcare services.<sup>12</sup> Often, facilities for the care of hypertensive patients at the primary healthcare level are lacking and there are shortages of both healthcare providers and medications. In some developing countries, the low physician-to-patient ratio (often as low as .05 per 1000 people) further aggravates the problem.<sup>10</sup> Furthermore, healthcare providers working in primary healthcare settings are often overwhelmed by maternity and infant health care and thus, unable to attend to other health concerns. Providers are either unable to devote time to the management of hypertension or lack the competence to do so.

The problem is further compounded by the poor economic status of many adults in developing countries. With low daily wages, many are unable to afford expensive medications, transportation to distant clinics, or the loss of a day's work to seek treatment.

Furthermore, systematic programs for the continuing education of physician and non-physician healthcare providers are not in place in most low- and middle-income countries. Often, the only "continuing medical education" that rural healthcare providers receive is from advertising and sales promotion activities of international pharmaceutical companies. It is not surprising, therefore, that physicians pay little regard to cost-effectiveness and affordability when prescribing drugs for hypertension; affordable generic drugs are often not prescribed. At times, physicians change patient treatment regimens to use free drug samples to satisfy the requests of pharmaceutical representatives who, in turn, are trying to meet drug sales quotas. With improved continuing medical education for healthcare providers, cost-effective pharmaceutical treatment options could be provided to achieve better health outcomes for patients in developing countries.

### **SIMPLIFYING PROCEDURES FOR THE MEASUREMENT OF BLOOD PRESSURE**

Blood pressure measurements are often inaccurate, even when carried out with reliable measuring devices by highly trained healthcare providers in developed countries. Observer bias, observer error, and other faults can explain this shortcoming. For low- and middle-income countries, the hiring and training of additional non-medical personnel to conduct blood pressure screening and measurement is hindered by limited resources and those who are recruited are given inadequate training. Because of this limitation, simplified techniques for measur-

ing blood pressure are required. In such settings, the use of inexpensive, but tested, semi-automated devices is likely to be more cost-effective than attempting to train non-medical personnel to perform the auscultatory method accurately.

Ideally, both SBP and diastolic blood pressure (DBP) measurements should be used to determine the type of treatment to prescribe to control hypertension. However, in settings where there are few resources and where semi-automated blood pressure measurement devices are unaffordable, it may be difficult to obtain accurate measurements of DBP. On the other hand, SBP provides an accurate indication of hypertension in 90% of cases and often SBP can provide better predictions than DBP (except in the young and middle-aged).<sup>13</sup> For developing countries whose non-medical healthcare providers may lack sufficient auscultatory skills, use of SBP measurement alone may be the only choice for determining treatment options.

### **IMPORTANCE OF EVALUATING CARDIOVASCULAR RISK**

The benefits and cost-effectiveness of managing hypertension is determined by the overall risk of CVD and not by blood pressure alone. In this context, there is a need to develop and test context-specific risk stratification systems that take into account the availability of resources. With this approach, best use can be made of existing means for treating patients, as well as carrying out follow-up treatment for high-risk patients.

Risk stratification using the Framingham Function presents certain difficulties. First, depending on the countries in which it is used, the Framingham Function is an inaccurate measure of absolute risk. Furthermore, the measurement of certain important variables (eg, cholesterol and high density lipoprotein cholesterol) may not be avail-

able. Thus, there is a need for feasible risk assessment methods that use simple variables such as age, sex, smoking habits, history of premature cardiovascular disease in the family, presence or absence of diabetes and hypertension.

Antihypertensive drug treatment is thought to be cost-effective in middle-aged and older patients who have DBP  $\geq 90$  mm Hg, especially for patient care in developing countries. Cost effectiveness diminishes when treating younger people, females, and individuals whose DBP was lower than 90 mm Hg prior to treatment. In addition, for healthcare systems in developing countries, cost-effectiveness of antihypertensive treatment may be unattractive compared with other activities that achieve greater health gains per dollar spent.

If drug therapy is selected in settings with limited resources, the most cost-effective treatment would be low-dose thiazide therapy, followed by use of beta-blockers, angiotensin-converting enzyme inhibitors, and finally calcium channel blockers. As the safety and efficacy of these 4 major drug classes are similar, the most cost-effective option would be to use the cheapest class unless there is a compelling indication for another.

Healthcare systems in low-income countries do not have sufficient financial resources to provide free individual long-term care to all hypertensive patients. Drug treatment can be made effective and efficient in settings with few resources by applying a risk stratification approach discussed earlier and by giving the greatest priority to those at highest risk.

### THE NEED FOR AFFORDABLE TREATMENT

Regular physical activity, as well as the reduction of salt, alcohol consumption, and weight have been demonstrated to lower blood pressure in hypertensives.<sup>14-18</sup> For example, in combination with sodium reduction, a diet rich in vegetables, fruits, and low-fat dairy

products can lower SBP by 11.5 mm Hg in hypertensives.<sup>18</sup> This reduction is equal to that obtained with an antihypertensive agent. Even modest, achievable reductions in weight of 5%–10% of body weight can be effective at lowering SBP and DBP in the range of 4–7 and 3–6 mm Hg, respectively.<sup>14</sup>

Innovative and flexible protocols and trained personnel are required to counsel hypertensive patients in low-resource settings on these effective and relatively inexpensive non-pharmacological interventions.

### OVERCOMING BARRIERS: THE WHO CVD-RISK MANAGEMENT PACKAGE

To overcome some of the barriers to cardiovascular risk management and to inform policy makers of the need and feasibility of managing cardiovascular risk in settings with few resources, the World Health Organization (WHO) has developed a CVD-risk management package.<sup>19,20</sup> The package can be implemented in a range of healthcare facilities in low- and medium-resource settings, and for this reason it has been designed for 3 scenarios that reflect the commonly encountered resource availability. The package is primarily for the management of cardiovascular risk in individuals detected to have hypertension through opportunistic screening. However, it could be adapted for use in controlling diabetes or smoking habits.

The protocols of this program can be implemented in settings with few resources and are designed for use by non-medical personnel. A short training course provides basic, easy-to-follow instruction.

Through simple and pragmatic protocols using basic clinical indicators that can be measured in settings with minimal resources, the CVD-risk management package allows healthcare providers to rank patients with mild hypertension into low-risk and high-risk groups.

The package also promotes evidence-based, non-pharmacological treatment, and the use of cost-effective generic drugs for managing cardiovascular risk.

The protocols are flexible and can be adapted to suit local and national conditions such as financial resources and availability of personnel. Several demonstration sites are currently piloting this CVD-risk assessment tool.

### IMPROVING COMMUNITY-WIDE EFFECTIVENESS

In order to ensure the implementation of effective interventions addressing cardiovascular risk, health policy and financing must be in place. In addition, community-wide effectiveness of these interventions is determined by other factors such as: population outreach, patient adherence, and professional compliance. Community-wide effectiveness can be improved by strengthening the primary healthcare systems with appropriate mechanisms for managing chronic diseases and developing partnerships between healthcare providers, patients, families, and communities.

### POPULATION-WIDE STRATEGIES TO REDUCE CARDIOVASCULAR DISEASE BURDEN

As in many fields of public health, individuals at low-risk for CVD account for a greater share of the overall disease burden than those at high risk for CVD. All attempts must be made to manage those with low risk for CVD by implementing population-wide strategies that might emphasize the promotion of healthy dietary habits, including lower salt consumption. As highlighted in WHR 2002, a 15% reduction in sodium intake and a corresponding reduction in blood pressure levels can be achieved if government would mandate, and food manufacturers comply, with

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Bold health policy, as well as fiscal and regulatory measures, must be taken by governments in developed and developing countries to create environments conducive for patients to follow lifestyle advice related to physical activity, fruit and vegetable intake, healthy diet, and tobacco cessation. Unless high-risk strategies for the management of cardiovascular risk factors, including hypertension, are complemented by population-wide strategies to address systemic change, tangible reductions in cardiovascular disease burden in low- and middle-income countries will be unlikely.

### NEED FOR STRENGTHENING THE SCIENTIFIC EVIDENCE BASE

Many aspects of the scientific evidence base related to cardiovascular risk assessment and management need strengthening. Research is required to determine if lessons learned in industrialized countries are applicable to developing countries. Such studies should evaluate the effectiveness and costs of

varying combinations of interventions and pragmatic approaches to comprehensive management of cardiovascular risk, particularly in low-resource settings.

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