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Progress in national and regional guidelines development and deployment for the clinical prevention and control of CVD and diabetes in Africa

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Abstract

Successful efforts to reduce cardiovascular disease in many countries have come as a result of both population based interventions and individually guided interventions. Guidelines serve two purposes directed at the promotion of the individually guided interventions. First, they serve as a method to summarize approved and successful life-style and medical interventions to reduce the burden of cardiovascular disease. Second, they guide health providers on how to identify those at high risk for cardiovascular disease and who might benefit from the available interventions. However, guidelines have been increasingly complex and at times contradictory from one body to another or they may not exist at all in certain countries. This paper will review the current status of guidelines for the region as well as for individual countries. Guidelines for the prevention of CVD as a whole will be evaluated as well as guidelines for individual risk factors such as hypertension, cholesterol, and diabetes. Finally, this paper will address the pitfalls of individual risk factor based guidelines as opposed to the absolute risk approach integrating multiple risk factors into one comprehensive set of guidelines.

Keywords

Standard treatment guidelines; cardiovascular disease; hypertension; diabetes mellitus; tobacco; dyslipidemia; Sub-Saharan Africa

Background

Cardiovascular disease (CVD) is the leading cause of death globally, accounting for 30 percent of all deaths in the world.¹ Nonetheless, we have made great strides in many high-income countries over the last four decades in reducing age-adjusted death rates from CVD. While public health measures such as smoking cessation campaigns and advances in acute

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care are likely responsible for a large portion of the decline, much of this gain has been accomplished by identifying individuals at high probability of developing CVD through many identifiable risk factors and implementing targeted interventions to lower risk. Much of this success has been the result of the development of single risk factor screening and treatment guidelines for smoking, hypertension, diabetes and cholesterol. For example, the number of people with elevated blood pressure who are aware, treated or controlled has increased over the last 25 years of the last century in the United States according to NHANES data.² Smoking rates have declined by nearly a third in the same time period.³ Over this same time period, age-adjusted mortality for CHD has dropped by nearly 50% and much of that can be attributable to changes in these risk factors.⁴

Guidelines also help improve quality of care.^{5,6} They can also help establish screening practices that can have significant impact on primary prevention through both population-based and personally-guided interventions. The significance of guidelines is even greater in resource-poor settings of low- and middle-income countries (LMICs). The World Health Organization (WHO) recommends the use of essential medicines lists (EMLs) and standard treatment guidelines (STGs).⁷ These documents can help ensure efficient and effective care in LMICs by promoting rational prescribing behavior and improving primary prevention efforts.⁸

In this paper, we review guidelines in Sub-Saharan Africa for CVD for four related risk factors: hypertension (HTN), diabetes, cholesterol, and tobacco. Guidelines were assessed using four different criteria: availability, dissemination, organization, and source. In addition, CVD guidelines were evaluated to determine the method of CVD risk factor assessment, which can be based on either individual risk factors (CVD risk assessment based on a single risk factor, such as hypertension), or an absolute risk factor (such as the Framingham risk function, which accounts for the combined effects of multiple risk factors on absolute CVD risk).

Methods

Forty-nine countries were included in the review (Table 1). Guidelines were drawn from three sources: Ministries of Health (MOH), the WHO report on non-communicable diseases (NCDs),⁹ and websites of professional organizations in each country. All three sources were referenced in order to ensure that the most recent guidelines were gathered. The search for professional organizations was driven by umbrella organizations such as the Pan African Society of Cardiology, and the International Society of Hypertension. When needed, contact was made with designated representative of the Ministry of Health or independent organization.

In the absence of guidelines from the three primary sources, general searches were also conducted in Google and Google Scholar. Two search terms were used for each country: “[country name] AND (standard treatment guidelines OR clinical guidelines),” and “[country name] ~cardiovascular disease “guidelines””. The second search term was repeated for every risk factor (for example, “[country name] ~diabetes “guidelines””). Search results from Google Scholar were mined for any relevant references. All guidelines were included in analysis regardless of the year of their development.

Data was also derived from the WHO NCD country capacity surveys (CCS).⁹ The CCS survey was conducted between 2009 and 2010 in all WHO member states. Questionnaires were filled out by individuals designated as focal points for the prevention and control of NCDs in each country, or affiliated colleagues in the MOH.⁹

Guidelines were considered available if: (1) a copy of the guidelines was retrieved, (2) the MOH indicated that a guideline had been developed on their website, through personal correspondence, or on the WHO NCD CCS. Since country-level details regarding the level of dissemination were frequently not available, a country was said to have disseminated guidelines if a copy was made available on the MOH website, or through the WHO depository of its member states' guidelines. Organization was also evaluated to determine whether guidelines were part of the country's STGs, or developed separately to target a specific morbidity. Where applicable, source material was also assessed in order to evaluate the driving forces behind guideline development. Finally, CVD guidelines were evaluated for their method of CVD risk assessment. Risk assessment could be based on either absolute risk factor or individual risk factors.

Tobacco policy data was collated from a comprehensive WHO report on tobacco-related policies of member states, which assessing member states using the MPOWER criteria.^{10,11} Detailed methodology for the WHO's review has been published previously.¹⁰ In brief, two independent, expert staff reviewed data collected from member states. When appropriate, original text from legislation was used to validate data as provided by member states.

Results

All countries in the region except Comoros and Equatorial Guinea have EMLs readily available as defined in the methods section.¹²⁻⁵⁷ EMLs are government-approved lists of medicines for national reimbursement that are comprised of medicines that serve priority health care needs of the population. Medicines are selected with regard to disease prevalence, and drug efficacy, safety, and cost-effectiveness. The WHO recommends that drugs listed in the EMLs be available at adequate amounts throughout the health system and priced at rates affordable to the community.⁵⁸ Mauritius and Mozambique do not have EMLs but have developed country-specific formularies in line with the WHO guidelines for EMLs.⁴⁴ In 32 countries where both EMLs and standard treatment guidelines (STGs) exist, the documents have been synchronized to reflect a unified set of recommendations.

Availability of treatment guidelines vary for CVD and its risk factors. CVD and HTN guidelines are most prevalent, with guidelines available in 65 and 69 percent of the countries in the region, respectively (Table 2). Twenty-six countries, or 53 percent of the region, have guidelines specific to diabetes. Cholesterol guidelines are the most lacking: only five countries have any treatment guidelines to address dyslipidemia (Table 2).

Of the 32 countries with CVD guidelines, twenty (63 percent) have disseminated the guidelines and made them readily available as detailed by the methods section (Table 3).^{12,16,43,53-56,59-75} The majority of CVD guidelines (88 percent) are part of the country's STGs; four countries—Rwanda,⁶⁹ Mauritius,^{65,66} South Africa,⁷⁶ and South Sudan⁷⁷—have separate guidelines specifically targeting CVD. Seychelles, South Africa, and Rwanda cited a combination of international sources in their guideline development process, including the European Society of Cardiology; the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7); and the Canadian Society of Cardiology.^{54,69,71} Furthermore, Mauritius, Seychelles, and South Africa promote assessment of an individuals' global or absolute risk for CVD. The remaining guidelines are based on individual risk factors (Table 4).

Only ten of the 33 countries with HTN guidelines have not disseminated their policies (Table 3).^{16,21,37,43,53-55,61-63,67,68,70,71,73,74,77-80} While nearly 80 percent are part of the country's STGs, four (Mauritius,⁷⁸ Rwanda,⁶⁹ Sudan,⁷⁷ and Nigeria⁸⁰) are separate guidelines specific to the treatment and management of HTN (Table 4). These four countries

also cited international sources in the development of their guidelines, including the British Hypertension Society, and European Society of Hypertension.

Although fewer countries have guidelines for diabetes, a greater portion of them (77 percent) have disseminated diabetes treatment protocols and made them readily available (Table 3).^{16,21,43,53-55,61-64,68-74,80-82} Three countries—Mauritius,⁸¹ South Africa,⁸² and Nigeria⁸³—have standalone, diabetes-specific guidelines. South Africa's guidelines were created by the Society for Endocrinology, Metabolism and Diabetes of South Africa while the Mauritius guidelines were issued by the MOH. They reference international sources, including the Canadian Diabetes Association and the American Diabetes Association. Nigeria's guidelines were created by the Diabetes Association of Nigeria, and were adapted from guidelines developed by the International Diabetes Federation.⁸³

Cholesterol guidelines were least prevalent. Only five countries—Mauritius,⁶⁵ Seychelles,⁷¹ Namibia,⁶⁸ South Africa,⁸⁴ and Ghana⁶²—have guidelines specific to cholesterol, all of which have been disseminated. Of these, South Africa has standalone guidelines specific to the prevention and management of dyslipidemia. These guidelines, developed by the South African Heart Association and the Lipid and Atherosclerosis Society of South Africa are adapted from the 2011 guidelines released by the European Society of Cardiology and European Atherosclerosis Society.

There is no generic formula for STGs, and as such, they vary greatly between countries. In countries like South Africa, for example, guidelines issued by professional organizations include protocols for diagnosis and lifestyle recommendations. These guidelines are specific to each disease, including ischemic stroke, diabetes, dyslipidemia and hypertension. In contrast, Namibia and Lesotho have simple algorithms for an exhaustive list of diseases that affect their local populations.

Tobacco control in Sub-Saharan Africa varies significantly (Figure 1). A majority of countries have only minimal smoke-free policies, suggesting that a significant portion of the population is still exposed to second-hand smoke in public places. Policies to disseminate the negative health effects of tobacco are also limited. Seventy percent of the countries in Sub-Saharan Africa have only minimal warning label requirements, and 71 percent have not conducted anti-tobacco mass media campaigns in recent years. Taxation was more prevalent in the region, with the majority of countries taxing more than 25 percent of retail price. Rates of taxation varied dramatically, ranging from only 11 percent of retail price in Sao Tome and Principe to 76 percent of retail price in Madagascar.

Discussion

Clinical guidelines in Sub-Saharan Africa are prevalent, due in large part to the efforts to create STGs by ministries of health. However, there are significant variations among guidelines. Most countries have established essential medication lists. CVD and hypertension guidelines are prevalent in two-thirds of the region, but cholesterol guidelines are lacking in 90 percent of the region. Furthermore, dissemination varies by country. Further there is variation in the rate of dissemination of the guidelines that have been produced with only two-thirds of the guidelines for CVD having been reasonably disseminated by a very low standard. It is less clear how widely the guidelines are actually available to clinicians let alone used by them. Efforts to implement guidelines for tobacco control remain limited.

Current guidelines for CVD and its associated risk factors are largely limited to STGs. Focused guidelines for prevention and management are not yet widely in use. Although recognized as one of the most effective prevention strategies for CVD, tobacco control

policies still needs investment in the region. A comprehensive review of CVD and CVD risk factor guidelines has not been conducted in Sub-Saharan Africa or the best of our knowledge in other low and middle-income regions. Rather, monitoring of guideline development and implementation in the region has been focused on communicable diseases such as HIV/AIDS.^{85,86} How widespread the actual use and implementation of CVD and risk-factor based guidelines is needs to be assessed in greater detail.

Where guidelines for CVD have been developed, many aspects of their content are relatively behind current standards. For instance, the WHO guidelines for Prevention of Cardiovascular Disease recommend absolute or total risk assessment to identify those likely to benefit most from various lifestyle and pharmacological interventions and other clinical decisions.⁸⁷ However, only 10% of the countries with CVD guidelines recommended using some sort of global risk assessment tool such as that provided in the WHO guidelines and 40% relied on individual risk factors for the CVD risk assessment. The remaining half of the countries had no method for identify CVD risk systematically in their CVD guidelines. This is unfortunate as up to 90 percent of the reductions in coronary heart disease mortality for high risk populations can come from interventions carried out over the 10 years following the identification of high risk status.⁸⁷

There are several limitations to this review. Due to lack of country-level data, the review relied on guideline availability as a measure of dissemination. Although the methods used in this review provide an initial measurement of dissemination effort, a more accurate measurement of dissemination would include use of guidelines and access in clinical settings. Although these measurements have been conducted at the country-level, there is no clear picture of the level of dissemination at a regional level.¹² This review also does not measure the level of guideline implementation, or assess each individual guideline for the quality and detail of its recommendations. Since documentation in STGs is often limited, source material that drives guideline development may not have been captured adequately in this review. As a result, only guidelines that explicitly state adaptation from outside sources have been noted in this review.

While guideline development and implementation are important first steps, follow-up to assess guideline adherence is needed. Assessing the validity and effectiveness of guidelines are critical. As guidelines are standardized, they can also be expanded to include more comprehensive and specific protocols in the management and prevention of CVD and its related risk factors. As guidelines are further developed and updated, research will be required to assess all aspects of guideline development and use in the region to improve the quality of CVD diagnosis, management and care.

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Abbreviations

CCS	Country capacity survey
CVD	Cardiovascular disease
EMLs	Essential medicines lists
HTN	Hypertension
LMICs	Low- and middle-income countries
MOH	Ministry of Health
NCDs	Non-communicable diseases
STGs	Standard treatment guidelines
WHO	World Health Organization

Figure 1. MPOWER measures in Sub-Saharan Africa*

*Missing data from Djibouti, Somalia, and Sudan

Advertising bans: Minimal = No ban, or ban that does not cover national television, radio and print; Moderate = Ban on national television, radio and print and/or some forms of direct or indirect advertising; Complete = Ban on all forms of direct and indirect advertising.

Mass media campaigns: Minimal = no campaign between Jan 2009 and Aug 2010;

Moderate = campaign conducted with 1-6 appropriate characteristics; Complete= campaign conducted with all appropriate characteristics

Warning labels: Minimal = Small warnings; Moderate = Medium-size warnings or large warnings missing some appropriate characteristics; Complete = Large warnings with all appropriate characteristics

Smoke free policies: Minimal = Up to 2 public places smoke-free; Moderate = 3 to 7 public places smoke-free; Complete = All public places smoke free, or at least 90% of population covered by subnational smoke-free legislation. **Cessation programs:** Moderate = Nicotine

replacement therapy (NRT) and/or some cessation services; Extensive = National quit line, and both NRT and some cessation services cost-covered.

Table 1
Countries included in review

Region	Countries
Central Africa	Angola, Central African Republic, Congo, Democratic Republic of Congo, Equatorial Guinea, Gabon
East Africa	Burundi, Comoros, Djibouti, Eritrea, Ethiopia, Kenya, Madagascar, Malawi, Mauritius, Mozambique, Rwanda, Seychelles, Somalia, Southern Sudan, Sudan, Uganda, United Republic of Tanzania, Zambia
Southern Africa	Botswana, Lesotho, Namibia, South Africa, Swaziland, Zimbabwe
West Africa	Benin, Burkina Faso, Cameroon, Cape Verde, Chad, Cote d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, Sao Tome and Principe, Togo

Table 2
Essential medicines list and guideline availability in Sub-Saharan Africa

	Countries (%)	Country List
EMLs	47 (96%)	Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Congo, Cote d'Ivoire, Democratic Republic of the Congo, Djibouti, Eritrea, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, South Sudan, Sudan, Swaziland, Togo, Uganda, United Republic of Tanzania, Zambia, Zimbabwe
Guidelines		
CVD	32 (65%)	Benin, Botswana, Cameroon, Cape Verde, Chad, Congo, Cote d'Ivoire, Democratic Republic of the Congo, Ethiopia, Gabon, Gambia, Ghana, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Nigeria, Rwanda, Senegal, Seychelles, Sierra Leone, South Africa, South Sudan, Swaziland, Uganda, United Republic of Tanzania, Zambia, Zimbabwe
HTN	33 (67%)	Benin, Botswana, Cameroon, Cape Verde, Chad, Congo, Cote d'Ivoire, Democratic Republic of the Congo, Ethiopia, Gabon, Gambia, Ghana, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Nigeria, Rwanda, Senegal, Seychelles, Sierra Leone, South Africa, South Sudan, Sudan, Swaziland, Uganda, United Republic of Tanzania, Zambia, Zimbabwe
Diabetes	26 (53%)	Benin, Botswana, Cape Verde, Chad, Congo, Ethiopia, Gabon, Ghana, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Nigeria, Rwanda, Senegal, Seychelles, South Africa, Swaziland, Uganda, United Republic of Tanzania, Zambia, Zimbabwe
Cholesterol	5 (10%)	Ghana, Mauritius, Namibia, Seychelles, South Africa

EMLs = Essential medicines list; CVD = Cardiovascular disease; HTN = Hypertension

Table 3

Guideline dissemination in Sub-Saharan Africa

	Countries (%)	Country List
CVD (n=32)	20 (63%)	Botswana, Chad, Ethiopia, Ghana, Kenya, Lesotho, Liberia, Malawi, Mauritius, Namibia, Nigeria, Rwanda, Senegal, Seychelles, South Africa, South Sudan, Swaziland, Uganda, United Republic of Tanzania, Zimbabwe
HTN (n=33)	23 (70%)	Botswana, Cameroon, Chad, Ethiopia, Ghana, Kenya, Lesotho, Liberia, Malawi, Mauritius, Namibia, Nigeria, Rwanda, Senegal, Seychelles, South Africa, South Sudan, Swaziland, Uganda, United Republic of Tanzania, Zambia, Zimbabwe
Diabetes (n=26)	20 (79%)	Botswana, Chad, Ethiopia, Ghana, Kenya, Lesotho, Liberia, Malawi, Mauritius, Namibia, Nigeria, Rwanda, Senegal, Seychelles, South Africa, Swaziland, Uganda, United Republic of Tanzania, Zambia, Zimbabwe
Cholesterol (n=5)	5 (100%)	Ghana, Mauritius, Namibia, Seychelles, South Africa

EMLs = Essential medicines list; CVD = Cardiovascular disease; HTN = Hypertension

Table 4
CVD and risk factor guideline characteristics (n = 32)

	Countries (%)
CVD (n=32)	
Dissemination	
Readily available	20 (63%)
Unavailable	12 (37%)
Organization	
Part of STGs	28 (88%)
Standalone guidelines	4 (12%)
CVD risk evaluation	
Absolute (or global) risk	3 (9%)
Individual risk factors	17 (53%)
Guideline unavailable	12 (38%)
Hypertension (n = 33)	
Dissemination	
Readily available	23 (70%)
Could not locate	10 (30%)
Organization	
Part of STGs	29 (88%)
Standalone guidelines	4 (12%)
Diabetes (n=26)	
Dissemination	
Readily available	20 (77%)
Could not locate	6 (23%)
Organization	
Part of STGs	23 (88%)
Standalone guidelines	3 (12%)

CVD = Cardiovascular disease; STGs = Standard treatment guidelines