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Integrating hypertension and diabetes management in primary health care settings: HEARTS as a tool

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ABSTRACT   Hypertension and diabetes are modifiable cardiovascular disease (CVD) risk factors that contribute to nearly one-third of all deaths in the Americas Region each year (2.3 million deaths). Despite advances in the detection and clinical management of hypertension and diabetes, there are substantial gaps in their implementation globally and in the Region. The considerable overlap in risk factors, prognosis, and treatment of hypertension and diabetes creates a unique opportunity for a unified implementation model for management at the population level. This report highlights one such high-profile effort, the Pan American Health Organization's "HEARTS in the Americas" program, based on the World Health Organization's HEARTS Technical Package for Cardiovascular Disease Management in Primary Health Care. The HEARTS program aims to improve the implementation of preventive CVD care in primary health systems using six evidence-based, pragmatic components: **H**ealthy-lifestyle counseling, **E**vidence-based protocols, **A**ccess to essential medicines and technology, **R**isk-based CVD management, **T**eam-based care, and **S**ystems for monitoring. To date, HEARTS implementation projects have focused primarily on hypertension given that it is the leading modifiable CVD risk factor and can be treated cost-effectively. The objective of this report is to describe opportunities for integration of diabetes clinical care and policy within the HEARTS hypertension framework. A substantial global burden of disease could be averted with integrated primary care management of these conditions. Thus, there is an urgency in applying lessons from HEARTS to close these implementation gaps and improve the integrated detection, treatment, and control of diabetes and hypertension.

Keywords   Diabetes mellitus; cardiovascular diseases; delivery of health care; Americas.

Cardiovascular disease (CVD) is the leading cause of death and disability worldwide. In the Region of the Americas, there were 7.3 million CVD cases and 2.1 million CVD deaths in 2019 (1). Hypertension and diabetes are two important modifiable CVD risk factors with shared pathophysiology and clinical approaches. Adequate diagnosis, treatment, and control of hypertension and diabetes can mitigate a substantial portion of death and disability. There is a need to scale up evidence-based care for hypertension and diabetes within primary health systems throughout the Americas. This report highlights one such high-profile effort, the Pan American Health Organization (PAHO) "HEARTS in the Americas" initiative, which targets

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prevention of CVD in primary health systems in the Americas. To date, HEARTS implementation projects globally and in the Region have primarily focused on hypertension given that it is the most epidemiologically significant modifiable CVD risk factor (2).

The objective of this report is to describe opportunities for integration of diabetes clinical care and policy within the HEARTS hypertension framework. We focus on type 2 diabetes given that type 1 diabetes is much less prevalent and generally managed in specialty rather than primary care settings in the Region.

CONTRIBUTION OF HYPERTENSION AND DIABETES TO CVD AND THE TOTAL BURDEN OF DISEASE

CVD refers to several diseases mediated by atherosclerosis and vascular injury. Many risk factors that predispose individuals to CVD can be controlled through pharmacologic and non-pharmacologic interventions. The Prospective Urban Rural Epidemiology (PURE) study in 21 low-, middle-, and high-income countries found that most CVD cases and deaths are attributable to a small number of modifiable CVD risk factors (3). This report focuses on the modifiable CVD risk factors of hypertension and diabetes.

The number of adults with hypertension and diabetes is rising across the world. In the Americas, the age-standardized hypertension prevalence appears to be declining though the absolute number with hypertension is increasing due to aging and population growth (4). There also have been sharp increases both in age-standardized and crude diabetes prevalence in the Region. Epidemiologic cohorts in the Region show a substantially increased risk of both cardiovascular and renal death among people with diabetes or hypertension (5). These cohorts also suggest that individuals with both hypertension and diabetes, occurring together in about one-third of cases with diabetes (6), have a higher risk of death than individuals with either condition alone. The Global Burden of Disease study estimates that elevated blood pressure and elevated blood glucose accounted for 16.9% and 14.7%, respectively, of the population-attributable percentage of deaths in the Region in 2019, amounting to a total of 2.3 million annual deaths (Table 1) (1).

Evidence-based clinical management of hypertension and diabetes in primary care includes pharmacologic interventions

(e.g., antihypertensive, glucose-lowering, and statin therapies) and non-pharmacologic interventions (e.g., healthy lifestyle counseling) (7,8). Widespread adoption of these interventions in some settings has reduced population-level mortality from CVD and diabetes. However, there are "implementation gaps" in the delivery of hypertension and diabetes care: in the case of hypertension, approximately 35% of women and 23% of men in Latin America and the Caribbean control blood pressure under 140/90 mmHg (9). Studies including data from several countries in the Americas report that approximately 30% of people with diabetes achieve glycemic control, only 20% take statins, and 50% or fewer receive recommended lifestyle counseling on diet or physical activity (6). There is an urgent need for population-based initiatives to address these implementation gaps and improve the population-level management of hypertension and diabetes.

HYPERTENSION AND DIABETES: THE NEED FOR AN INTEGRATED APPROACH

Hypertension and diabetes have overlapping risk factors that lead to common pathways of complications, resulting in premature morbidity and mortality (Figure 1) (10). Elevated glucose and blood pressure accelerate atherosclerosis, endothelial dysfunction, and vascular injury. These mechanisms give rise to macrovascular disease in the form of ischemic heart disease, stroke, aortic disease, and peripheral arterial disease. These pathologic processes also predispose individuals to microvascular disease in the form of kidney disease, neuropathy (and risk of limb amputations), and vision loss (from retinopathy and cataracts). Other complications partially driven by hypertension and diabetes include dementia, atrial fibrillation, and heart failure. To compound the urgency, hypertension independently increases diabetes risk, and diabetes independently increases hypertension risk.

Evidence-based clinical management of hypertension and diabetes addresses these shared risk factors through lifestyle modifications to improve diet, increased physical activity, smoking cessation, and weight loss. These lifestyle modifications must accompany pharmacologic and non-pharmacologic interventions to control blood sugar, blood pressure, and lipids. The overlap in the management of hypertension and diabetes creates an opportunity for a unified model for detection and management at the population level.

TABLE 1. Deaths attributable to modifiable risk factors in the Americas

	Leading risks 1990	Percentage of deaths 1990		Leading risks 2019	Percentage of deaths 2019	Total deaths 2019 (thousands)
1	Tobacco	18.8	1	High systolic blood pressure	16.9	1 230
2	High systolic blood pressure	18.0	2	High fasting plasma glucose	14.7	1 064
3	Dietary risks	14.5	3	Tobacco	14.4	1 043
4	High LDL cholesterol	10.9	4	High body-mass index	13.0	940
5	High fasting plasma glucose	10.4	5	Dietary risks	12.6	916
6	High body-mass index	8.9	6	Kidney dysfunction	7.6	550
7	Child and maternal malnutrition	7.9	7	High LDL cholesterol	7.3	528
8	Air pollution	7.0	8	Alcohol use	5.1	370
9	Kidney dysfunction	5.2	9	Air pollution	4.1	298
10	Alcohol use	4.5	10	Non-optimal temperature	3.1	225

Source: Prepared by the authors using estimates from the Global Burden of Disease study (1).
Note: The arrows refer to changes in order ranking for high systolic blood pressure and high fasting plasma glucose from 1990 to 2019.

FIGURE 1. Overlapping risk factors and management of hypertension and diabetes
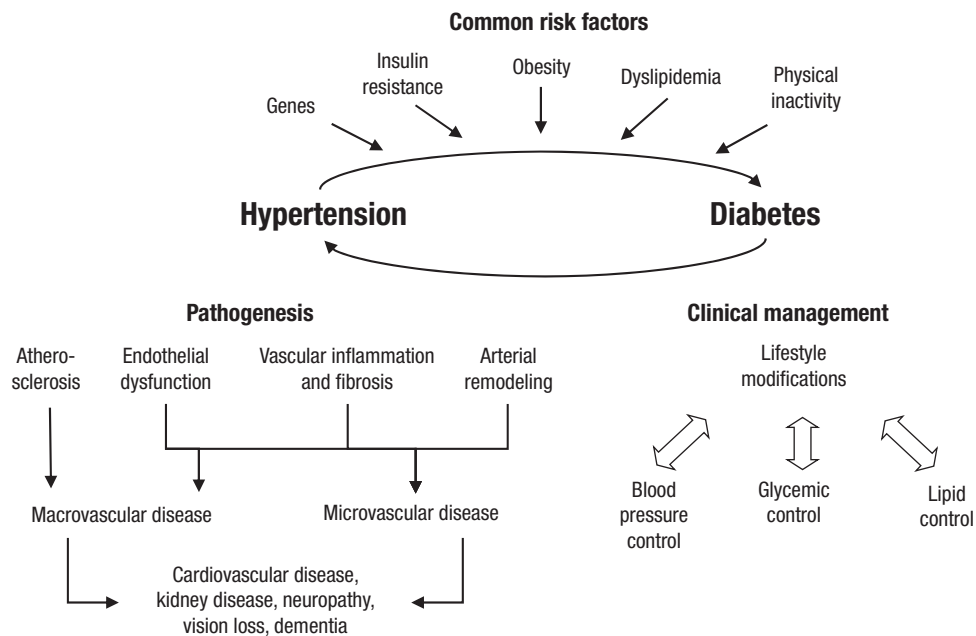
Source: Adapted by the authors with permission from Petrie et al (10).

HEARTS AS A UNIFYING IMPLEMENTATION MODEL FOR HYPERTENSION AND DIABETES MANAGEMENT IN PRIMARY CARE

The World Health Organization (WHO) has spearheaded development of models and tools to decrease CVD through its Global Hearts initiative. Within this initiative, the HEARTS Technical Package for Cardiovascular Disease Management in Primary Health Care provides a population-based approach to prevent CVD (11). The HEARTS model consists of six evidence-based modules: **H**ealthy-lifestyle counseling, **E**vidence-based protocols, **A**ccess to essential medicines and technology, **R**isk-based CVD management, **T**eam-based care, and **S**ystems for monitoring (Table 2). The HEARTS initiative seeks to integrate these strategies into existing health systems with an emphasis on prevention of CVD at the primary care level.

In the Americas, PAHO aims to make HEARTS the model for the prevention of CVD in primary care within health systems across the Region by 2025. The first cohort of four countries implemented the HEARTS program beginning in 2015-2017 (Barbados, Colombia, Chile, and Cuba). To date, Ministries of Health in 22 countries in the Region have signed on to implement HEARTS, and more are in the process of joining.

INTEGRATION OF HYPERTENSION AND DIABETES CARE WITHIN HEARTS

The HEARTS Technical Package addresses multiple modifiable CVD risk factors including hypertension, diabetes, dyslipidemia, and tobacco use (11). In the Americas, PAHO has assisted countries in the practical aspects of implementing HEARTS by providing detailed guidance on implementation barriers, standardized hypertension treatment

TABLE 2. Components of the HEARTS Technical Package

Component	Description
Healthy lifestyle counseling	Counseling on diet, physical activity, disease self-care
Evidence-based protocols	Simplified and standardized drug treatment algorithms
Access to essential medicines and technologies	Procurement, distribution, and handling of essential supplies
Risk-based CVD management	Treatment using cardiovascular risk assessment
Team-based care:	Shifting and sharing tasks among health workers in a team
Systems for monitoring	Using data to monitor and improve the quality of care

Source: Prepared by the authors based on the information in the HEARTS Technical Package for Cardiovascular Disease Management in Primary Health Care (11).
CVD, cardiovascular disease.

protocols, fixed-dose combination antihypertensive therapy, and validated blood pressure-measuring device use.

In the case of diabetes, the "HEARTS-D" module (12) focuses on clinical diabetes recommendations aligned with the WHO Package of Essential Noncommunicable Disease Interventions in Primary Health Care (WHO PEN) (7). However, there is a need for practical guidance—or "implementation strategies"—to integrate management of diabetes into the HEARTS platform. The remainder of this paper focuses on considerations for integrating hypertension and diabetes care within the unified HEARTS framework (Table 3).

TABLE 3. Key considerations for the integration of hypertension and diabetes primary care management within the HEARTS framework

HEARTS component	Key considerations
Healthy-lifestyle counseling	• Lifestyle counseling is a foundational element of hypertension and diabetes management in primary care. • Strategies to reduce implementation costs of intensive lifestyle interventions may include mobile health tools, team-based care, group-based formats, and enrolling high-risk individuals. • Peers and community health workers can deliver culturally sensitive counseling, potentially also at lower cost.
Evidence-based protocols	• Routine primary care workflows can facilitate detection of both hypertension and diabetes, as well as chronic kidney disease. • Multifactorial treatment to reduce CVD risk is a cornerstone of both hypertension and diabetes care. • Simple, standardized protocols for glucose-lowering treatment should be implemented to minimize the population of patients with poor glycemic control.
Access to essential medicines and technology	• A key challenge with diabetes compared to hypertension management is the greater need for laboratory equipment and consumables. • Efforts to ensure access to essential hypertension medicines including fixed-dose combinations is critical to improving population diabetes outcomes. • Mechanisms to incorporate new diabetes medicines into national formularies should be investigated, as prices permit.
Risk-based CVD management	• Risk-guided CVD prevention is applicable in both hypertension and diabetes. • Strategies to improve implementation of CVD risk scores include assessments by non-physician health workers and electronic tools. • Diabetes-specific equations incorporating microvascular outcomes represent an opportunity to apply a risk-based approach to glucose-lowering treatment.
Team-based care	• Team-based care is an evidence-based strategy for the pharmacologic and non-pharmacologic management of both hypertension and diabetes. • Non-physician health workers can deliver healthy lifestyle counseling, manage pharmacologic treatment protocols, and assess CVD risk. • Team-based care for diabetes requires teams to operate at different levels of the health care system.
Systems for monitoring	• PAHO's hypertension monitoring framework is a template for use in diabetes programs. • There is a need to expand on the HEARTS monitoring framework and to develop supplementary diabetes-specific monitoring indicators. • Diabetes outcome indicators should align with the WHO's population-level diabetes targets.

Source: Prepared by the authors.
CVD, cardiovascular disease; PAHO, Pan American Health Organization; WHO, World Health Organization.

Healthy lifestyle counseling

This HEARTS module focuses on behavioral changes and motivational interviewing to improve diets, increase physical activity, reduce tobacco use, and limit harmful alcohol use. As described above, lifestyle counseling is a foundational element of the clinical management of both hypertension and diabetes.

While this report does not primarily emphasize the prevention of diabetes, intensive lifestyle interventions are effective in preventing diabetes onset among high-risk individuals (e.g., prediabetes and obesity), including in real-world settings outside of clinical trials (13). Intensive lifestyle interventions to

prevent diabetes are cost effective, but they also are perceived as infeasible in many countries given the resources required to implement and sustain them (13). Thus, health systems should consider innovative strategies to reduce the cost of diabetes prevention services within the HEARTS framework such as mobile health tools, delivery by non-physician workers, group classes, and prioritizing individuals most likely to benefit.

Among people with diabetes, high-quality counseling goes beyond straightforward messages on diet and physical activity. Diabetes self-management education and support (DSMES) addresses the clinical, psychological, and social needs of people living with diabetes (14). Key components of DSMES include developing coping skills, eating a healthy diet, promoting physical activity, taking medication, monitoring disease, reducing modifiable risks, and solving problems. The American Diabetes Association recommends DSMES at diagnosis, at least annually or when not meeting treatment targets, upon the development of diabetes complications, and during important changes in care—each of which are junctures in which hypertension education is also important (14).

It is important to consider the evidence underlying the effectiveness of diabetes behavioral interventions. One large trial of intensive lifestyle counseling found no reduction in mortality or CVD events over approximately 10 years of follow up, though other benefits were observed including improvements in blood pressure and reduced need for antihypertensive medications (15). Another large trial of intensive weight management found that an intensive weight-loss intervention could lead to remission in nearly one-third of people with diabetes not using insulin at 24 months and also improve blood pressure (16). A meta-analysis of 132 randomized trials of behavioral programs for type 2 diabetes concluded that the level of contact intensity plays a role in the effectiveness of a given DSMES program, and programs delivering fewer than 10 contact hours confer minimal benefit (17).

Given this evidence, as in the case of diabetes prevention, health systems choosing to invest in DSMES within the HEARTS framework may wish to consider innovative, low-cost delivery strategies to lower cost and maintain high intervention intensity. One team-based approach that has improved glycemic status and blood pressure among people with diabetes is the delivery of DSMES by peers with diabetes or community health workers (13). Such delivery models also may tailor messages to local communities, an important consideration given the cultural and linguistic diversity of populations across the Region.

Evidence-based protocols

Complementing the Healthy Lifestyle Counseling module, this module focuses on standardized protocols for pharmacological treatment, coupled with a small formulary of effective, safe, and affordable medications. HEARTS recommends protocols that are simple and standardized, meaning that they (a) can be implemented by both physicians and non-physician health workers under supervision at the primary care level, (b) include specific drugs and dosages for titration, and (c) are applicable to most patients in primary care. The use of simple, standardized treatment protocols is synergistic with the HEARTS modules of Access to Essential Medicines and Technologies and Team-Based Care. In its prior efforts, PAHO has expanded on the

HEARTS framework by providing detailed guidance on hypertension protocols, including the use of two anti-hypertensive medications in the initial treatment step of the newly diagnosed individual with hypertension, either as two separate pills or preferably in a single, fixed-dose combination pill (18). Building on PAHO's experience and the HEARTS-D module, we highlight three opportunities for the integration of hypertension and diabetes treatment protocols. Of note, a discussion of the effectiveness, feasibility, and cost-effectiveness of pharmacologic therapies such as metformin for the prevention of diabetes is beyond the scope of this manuscript.

One opportunity is to construct routine primary care clinical pathways to improve the detection and treatment of hypertension and diabetes. The WHO-PEN guidelines recommend that blood pressure be assessed in adults during all primary care visits and that diabetes screening be performed among high-risk individuals, specifically those who are age 40 years or older and with a body-mass index of 25 kg/m^2 or greater (7). This diabetes screening recommendation is consistent with Latin American Diabetes Association (ALAD) guidelines (19). Among individuals diagnosed with either hypertension or diabetes, routine testing for the other condition is particularly important (e.g., detecting hypertension among individuals with diabetes and vice versa) given the shared risk factors and frequent co-occurrence described above. A similar approach must be used for the detection of chronic kidney disease among people with diabetes and hypertension.

Within this integrated approach to detection, making a diagnosis of hypertension or detecting kidney involvement such as proteinuria and/or chronic kidney disease is particularly important given that treatment with renin-angiotensin system inhibitors such as angiotensin-converting enzyme inhibitors or angiotensin II receptor blockers can reduce the progression of diabetic kidney disease and also play a role in preventing diabetes (20). Integrated approaches to improve the detection of hypertension and diabetes might include work- or community-based outreach programs (2), use of validated measurement devices and protocols, and subsidized screening in other health facilities such as dental offices or pharmacies. In the case of diabetes, one approach to improve detection is to implement routine clinic screening among high-risk individuals, in line with WHO-PEN guidelines (7). The efficiency of routine screening might be improved by implementing testing protocols that incorporate point-of-care random capillary glucose measurements, which are less costly than hemoglobin A1c (HbA1c) and more convenient than venous or fasting glucose.

The most critical opportunity to integrate hypertension and diabetes treatment is to emphasize the role of multifactorial approaches to reduce CVD risk. In the case of diabetes, pharmacologic treatment must not only address hyperglycemia, but also address CVD risk factors including hypertension and dyslipidemia. Put simply, hypertension and lipid control are cornerstones of diabetes management (21). A modeling study of multifactorial treatment among people with diabetes in 67 low- and middle-income countries found that scaling up treatment with antihypertensive and statin medications would provide greater population benefit than treatment focusing on glycemic control (22). While management of dyslipidemia is not the focus of this report, statin treatment is a core management strategy to prevent CVD among people with hypertension and/or diabetes. WHO PEN recommends statins for the primary prevention

of CVD for people with diabetes who are ≥40 years of age and for people without diabetes who have CVD risk >20% (7). Yet across low- and middle-income countries, including countries in the Region of the Americas, only 10% of people who are eligible for statin therapy for primary prevention receive treatment (6,23). Pragmatic strategies in the HEARTS framework to improve statin use among eligible people with hypertension and/or diabetes include simplified statin treatment protocols that may limit routine cholesterol measurements, use of "polypills" containing both antihypertensive and statin agents, addition of other statins beyond simvastatin (e.g., atorvastatin) to national formularies via the PAHO Strategic Fund, and task sharing with non-physician health workers to routinely calculate CVD risk (24) (complementing the Team-Based Care module below).

Another opportunity for the integration of diabetes treatment protocols into the HEARTS framework relates to the role of glucose-lowering medication treatment and glycemic targets (12). A few points are key. First, at the population level, prioritization achievement of strict glycemic control will have less benefit than prioritization of hypertension and statin management (22,25). While many international guidelines recommend strict glycemic targets of HbA1c <7% among most people with diabetes (7,19), the population-level effectiveness, safety, cost-effectiveness, and feasibility of this recommendation in resource-constrained health systems merits considerable scrutiny. Second, there is a need to develop simple, standardized protocols for glucose-lowering treatment to minimize the population of patients with poor glycemic control, as diabetes-related mortality rises sharply when HbA1c increases above approximately 8% (26). HEARTS-aligned strategies to improve glucose-lowering treatment protocols could include simplified titration algorithms for use by non-physician health workers under protocol, preference for certain drugs within drug classes (e.g., sulfonylureas with lower risk for hypoglycemia), using fixed-dose combination medications (e.g., combinations of metformin and sulfonylureas), reducing refill frequency among patients with adequate glycemic control, and reserving insulin for symptomatic or uncontrolled patients most likely to benefit. Finally, future efforts to unify hypertension and diabetes protocols under the HEARTS framework should consider the role of newer diabetes medicines, in particular sodium-glucose co-transporter-2 (SGTL-2) inhibitors. These drugs are effective in improving cardiovascular and kidney outcomes among people with diabetes, though the current evidence is stronger for secondary prevention than primary prevention of CVD (27). The implementation of SGLT-2 inhibitors into practice in low- and middle-income countries has the potential to improve population-level diabetes outcomes and prevent downstream health care costs, such as hospital admissions for heart attacks or heart failure and dialysis for end-stage kidney disease (28). Issues of access to these drugs are discussed in the next section.

Access to essential medicines and technology

This HEARTS module describes the procurement, distribution, and handling of essential medicines and technology in primary care. Given the importance of blood pressure control in the management of diabetes, PAHO's ongoing efforts to ensure access to essential hypertension medicines including fixed-dose combinations within the PAHO Strategic Fund is critical to

improving population diabetes outcomes (18). Fixed-dose combination anti-hypertensive agents have recently been included in the WHO Essential Medication List. In addition, the initiation of two anti-hypertensive medications each at half-maximal doses, preferably in a single-pill, fixed dose combination, in the newly diagnosed individual with hypertension was supported by the 2021 WHO Guideline for the Pharmacological Treatment of Hypertension in Adults (8).

A key challenge with diabetes compared to hypertension management is the greater need for laboratory equipment and consumables to monitor blood glucose, HbA1c, cholesterol, creatinine, urine albumin, and urine ketones. The WHO Model List of Essential Diagnostics recommends these technologies in primary care, but there is inadequate availability in many countries. Opportunities within the HEARTS framework to improve access to diabetes laboratory technologies might include standardization of glucometer models to ensure glucose strip compatibility, the addition of validated and low-cost devices to the PAHO Strategic Fund, point-of-care HbA1c testing, and novel monitoring algorithms that incorporate both glucose and HbA1c testing.

SGLT-2 inhibitors and insulin glargine were added to the WHO Essential Medicine List in 2021. Given evidence of the effectiveness for SGLT-2 inhibitors and presence in ALAD guidelines (19), health systems may wish to investigate incorporating these drugs into national formularies as prices permit (28). In some countries like India, the entry of generic SGLT-2 inhibitors into the market has substantially decreased prices (29). With respect to insulin, analog insulins (e.g., insulin glargine) confer limited clinical benefit above human insulins (e.g., NPH insulin) for most people with type 2 diabetes (30), and NPH insulin is preferred for this population in ALAD guidelines (19). Given the complexity of the topic of insulin access, including issues of procurement, distribution, and storage, we refer interested readers to a recent WHO report for details (31). Finally, glucagon-like peptide-1 (GLP-1) receptor agonists have proven CVD benefit and are featured in ALAD guidelines (19), but achieving population level cost effectiveness across low- to middle-income countries would require a 95% cost reduction (28).

Risk-based CVD management

This HEARTS module focuses on using estimated CVD risk to guide clinical management to prevent CVD. In the case of diabetes, WHO guidelines recommend that all people with type 2 diabetes ≥40 years receive statins (7) and target a blood pressure of <130/80 mmHg (8). However, these recommendations may not be feasible in all settings. The HEARTS-D module suggests using CVD risk prediction tools to identify diabetes patients who would have greatest benefit from statins for primary prevention of CVD (32). A similar risk-based approach could guide the intensity of blood pressure treatment or lifestyle interventions among people with diabetes. Note that all people with diabetes and CVD are at high risk and should receive statins irrespective of predicted risk (7).

There are practical challenges to implementing a CVD-risk approach in primary care settings, including limited staffing capacity to generate CVD risk assessments and the lack of laboratory capacity to generate required input data. PAHO has developed electronic tools to facilitate implementation of the 2019 region-specific WHO CVD risk scores into routine

primary care (33). An evidence-based strategy for the staffing challenge is the use of non-physician health workers to calculate CVD risk scores; this approach aligns with the Team-Based Care module of HEARTS. In primary care settings with limited access to clinical laboratories, the WHO also has constructed non-laboratory-based CVD risk equations that do not require total cholesterol measurements. However, it should be noted non-laboratory-based CVD risk equations are less accurate in people with diabetes (32).

Researchers also have developed diabetes-specific equations to estimate the risk of microvascular complications including nephropathy, retinopathy, and neuropathy (34). These equations allow the application of a risk-based approach, as advocated in HEARTS, to glucose-lowering treatment protocols. At the population level, risk-guided diabetes treatment strategies hold promise in improving treatments while reducing harms (35). Yet diabetes-focused risk equations must be validated across populations before implementation.

Team-based care

This HEARTS module focuses on the use of multidisciplinary teams to prevent CVD. Team-based care can refer to task shifting (i.e., reassignment of clinical tasks) or task sharing (i.e., shared responsibility of clinical tasks). As discussed above in complementary HEARTS modules, non-physician health workers can effectively counsel on healthy lifestyles, manage pharmacologic treatment protocols, and assess CVD risk. Team-based care is an evidence-based strategy to improve the coverage and quality of both hypertension and diabetes care and is associated with reductions in HbA1c of 0.5-1.0% (36,37).

Within the HEARTS framework, team-based care integration can be either horizontal or vertical. Horizontal care teams operate across the same primary health facility. Examples of members of horizontal care teams for both hypertension and diabetes include primary care physicians, nurses, pharmacists, nutritionists, social workers, and community health workers. One crucial difference between team-based care for diabetes versus hypertension is the greater role for vertical teams, which are teams that operate at different levels of the health care system, in particular primary care in the community and specialized referral care at secondary or tertiary health facilities. Team-based care for diabetes must be vertical to prevent common chronic complications (e.g., retinopathy or kidney disease) and to manage common acute complications (e.g., hyperglycemic crises or diabetic foot infections). Vertical teams for diabetes must thus comprise both outpatient specialists (e.g., endocrinologists, ophthalmologists, nephrologists) and acute care physicians. As with pharmacologic treatment, the new WHO guideline on hypertension supports team-based care to include non-physicians prescribing anti-hypertensive medications under certain conditions such as established evidence-based protocols, supervision by a physician, and compliance with regulatory requirements.

Systems for monitoring

This HEARTS module focuses on monitoring and improving the quality of health care to prevent CVD at primary health facilities. In the case of hypertension, PAHO has expanded the HEARTS monitoring framework to recommend a total of

six core indicators and many other optional indicators. These indicators evaluate the three major components of health care quality—structure, process, and outcome—at different levels of the health system and in the population (38). In the case of diabetes, there is a need to expand on the existing HEARTS monitoring framework and to develop supplementary diabetes-specific monitoring indicators, especially in the domains of structure and process. At the system level, PAHO's hypertension monitoring framework could provide a template for diabetes as it provides structure and process indicators relating to program development, stakeholder support, financing, operational planning, and other goals (38). At the health facility level, potential structure and process indicators include completion of important clinical tasks such as retinopathy screening, use of preferred classes of glucose-lowering medications, frequency of follow-up visits, or specific task-sharing processes such as a visit with a diabetes educator (39). Diabetes outcome indicators should align with four population-level diabetes targets put forth by the WHO (40). These WHO targets are that at least 80% of people with diabetes are aware of their diagnosis, and among those diagnosed, at least 80% achieve glycemic control (HbA1c <8.0%), at least 80% achieve blood pressure control (<140/90 mmHg), and at least 60% use a statin (40).

Conclusion

Management of hypertension and diabetes in primary care is effective at preventing morbidity and mortality from CVD. However, there is a critical need for knowledge on how to close the implementation gap in primary health systems. The HEARTS model has been successfully implemented in 22 countries, covering treatment for more than 3 million patients. This report leverages these successful implementation experiences to suggest opportunities to scale up integrated hypertension and diabetes management in primary care using the HEARTS framework. Given the substantial burden of preventable disease that could be averted with improved management of hypertension and diabetes, there is an urgency in applying lessons from HEARTS to close these implementation gaps.

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Integración del manejo de la hipertensión y la diabetes en entornos de atención primaria de salud: HEARTS como herramienta

RESUMEN   La hipertensión y la diabetes son los factores de riesgo modificables de las enfermedades cardiovasculares asociados a casi un tercio de todas las muertes en la Región de las Américas cada año (2,3 millones). A pesar de los avances en la detección y el manejo clínico de la hipertensión y la diabetes, existen brechas sustanciales en la implementación a nivel regional y mundial. El considerable solapamiento en los factores de riesgo, el pronóstico y el tratamiento de la hipertensión y la diabetes crea una oportunidad única para un modelo unificado de implementación para el manejo a nivel poblacional. En este informe se pone de relieve una iniciativa importante de este tipo, el programa HEARTS en las Américas de la Organización Panamericana de la Salud, basado en el paquete técnico HEARTS para el manejo de las enfermedades cardiovasculares en la atención primaria de salud. El programa HEARTS tiene como objetivo mejorar la implementación de la atención preventiva de las enfermedades cardiovasculares en los sistemas de atención primaria de salud mediante seis componentes pragmáticos basados en la evidencia: **H**ábitos y estilos de vida saludables: asesoramiento para los pacientes; **E**videncia: protocolos basados en la evidencia; **A**cceso a medicamentos y tecnologías esenciales; **R**iesgo cardiovascular: manejo de las enfermedades cardiovasculares basado en el riesgo; **T**rabajo en equipos; y **S**istemas de monitoreo. Hasta la fecha, los proyectos de implementación de HEARTS se han centrado principalmente en la hipertensión, dado que es el principal factor de riesgo modificable de las enfermedades cardiovasculares y puede tratarse de una manera costo-eficaz. El objetivo de este informe es describir las oportunidades para la integración de la política y la atención clínica en el marco HEARTS para la hipertensión. Se podría evitar una significativa carga mundial de enfermedad con un manejo integrado de la atención primaria de estos problemas de salud. Por lo tanto, existe una urgencia en la aplicación de las enseñanzas de HEARTS para salvar estas brechas en la implementación y mejorar la detección, el tratamiento y el control integrados de la diabetes y la hipertensión.

Palabras clave   Diabetes mellitus; enfermedades cardiovasculares; atención a la salud; Américas.

Integrando o manejo da hipertensão e do diabetes na atenção primária à saúde: uso do HEARTS como instrumento

RESUMO   Hipertensão e diabetes são fatores de risco modificáveis para doenças cardiovasculares (DCV) que contribuem para quase um terço de todas as mortes na Região das Américas a cada ano (2,3 milhões de mortes). Apesar dos avanços na detecção e no manejo clínico da hipertensão e do diabetes, existem lacunas importantes em sua implementação mundialmente e na região. A sobreposição considerável de fatores de risco, prognóstico e tratamento da hipertensão e do diabetes cria uma oportunidade única para um modelo de implementação unificado para o manejo dessas doenças em nível populacional. Este relatório destaca um desses esforços de alto nível, o programa "HEARTS nas Américas" da Organização Pan-Americana da Saúde, baseado no Pacote Técnico HEARTS da Organização Mundial da Saúde para o manejo de DCV na atenção primária à saúde. O programa HEARTS visa melhorar a implementação de cuidados preventivos de DCV nos sistemas de atenção primária utilizando seis componentes pragmáticos e baseados em evidências: **H**ábitos saudáveis (aconselhamento a pacientes), protocolos baseados em **E**vidências, **A**cesso a medicamentos e tecnologias essenciais, manejo das DCV baseado em **R**isco, **T**rabalho de equipe como base para a atenção e **S**istemas de monitoramento. Até hoje, os projetos de implementação do HEARTS têm se concentrado principalmente na hipertensão, considerando que é o principal fator de risco modificável de DCV e pode ser tratada de forma custo-efetiva. O objetivo deste relatório é descrever as oportunidades de integração do manejo clínico e de políticas para o diabetes dentro da estrutura HEARTS de manejo da hipertensão. Uma importante carga global de doença poderia ser evitada com o manejo integrado dessas duas afecções na atenção primária. Assim, há uma urgência na aplicação das lições de HEARTS para fechar estas lacunas de implementação e melhorar a detecção, o tratamento e o controle integrados do diabetes e da hipertensão.

Palavras-chave   Diabetes mellitus; doenças cardiovasculares; atenção à saúde; América.