10 Hypertension detection, treatment, and control in two middle income countries (HOPE-4) – Informing strategies in a high-income country

Summary

Hypertension is the leading cause of cardiovascular disease (CVD) worldwide,[180] and despite proven interventions, such as lifestyle changes and medication, it remains poorly controlled throughout the world. Therefore, simple scalable strategies are urgently needed to address the global disease burden.

The HOPE-4 study (2012-2017) was a randomised controlled trial funded by the Canadian Institutes of Health Research (CIHR), Canadian Stroke Network (CSN), Grand Challenges Canada (GCC), and International Development Research Centre (IDRC). It evaluated whether a community-based intervention package delivered by health workers (mostly non-physicians) could improve hypertension control and reduce overall CVD risk after one year. The study team spanned 4 countries – Canada, Colombia, the UK and Malaysia – with the primary research conducted in Colombia and Malaysia.

The HOPE-4 intervention substantially reduced cardiovascular risk and improved blood pressure and cholesterol levels as well as adherence to medication.[181] The intervention has also been successfully adapted and piloted in a high-income setting[182] – Canada – with promising results. This suggests that the intervention could be similarly adapted for other settings. With that consideration, **the HOPE-4 curriculum has been adapted for WHO's HEARTS Technical Package[183] policy document** which offers a set of effective and practical interventions to help manage cardiovascular risk factors in primary care. This inclusion is likely to encourage uptake of the HOPE4 package internationally, potentially contributing to decreasing the burden of hypertension and CVD worldwide.

10.1 Background

Hypertension is the leading cause of cardiovascular disease (CVD) worldwide.[180] Lowering blood pressure can help to reduce the risk of CVD and the associated morbidity and mortality. Even though lifestyle changes and medication such as statins have been proven to reduce hypertension, it remains poorly controlled throughout the world.

There are several barriers to improving control of hypertension and cardiovascular risk factors. For instance, patients may have conflicting information or beliefs about the best treatment, reducing adherence to prescribed evidence-based management plans. Health care providers may have limited resources, especially in terms of physician time, to address the burden of hypertension. Effective strategies, such as the combined use of antihypertensive medicines and statins, may not be being prescribed to all eligible patients. Further, health

[180] Schwalm JD, McCready T, Lopez-Jaramillo P, Yusoff K, Attaran A, Lamelas P, et al. A community-based comprehensive intervention to reduce cardiovascular risk in hypertension (HOPE 4): a cluster-randomised controlled trial. Lancet. 2019.

[181] Schwalm J. HOPE 4. In: HOPE 4: Heart Outcomes Prevention and Evaluation 4 Study. Paris: ESC Congress; 2019.

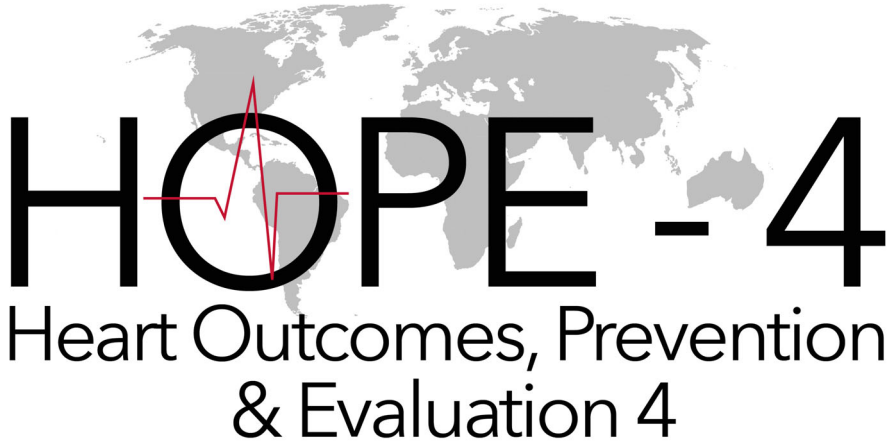
[182] Schwalm JD, McCready T, Lear SA, Lamelas P, Garis L, Musa H, et al. Exploring New Models for Cardiovascular Risk Reduction: The Heart Outcomes Prevention and Evaluation 4 (HOPE 4) Canada Pilot Study. CJC Open. 2021;

[183] WHO Hearts package: https://www.who.int/cardiovascular_diseases/hearts/Hearts_package.pdf

system-related barriers stemming from issues such as fragmented systems, low availability of medicines and poor patient access to care (because of costs and travel, for example) can also lower the capacity to address the burden of hypertension.

Simple scalable strategies are urgently needed to alleviate the burden of this condition on health care systems and patients. For such strategies to succeed, local barriers to effective diagnosis and management of hypertension must be understood.

10.2 The award



The HOPE-4 study was funded by the Canadian Institutes of Health Research (CIHR), Canadian Stroke Network (CSN), Grand Challenges Canada (GCC), and International Development Research Centre (IDRC) through the GACD from 2012 to 2017. It aimed to evaluate whether a community-based intervention package delivered by health workers (mostly non-physicians) could improve hypertension control and overall Framingham Risk Score[184] after one year. Identification of barriers at the patient, health care provider, and health system levels was critical to the development of the intervention.

The study team consisted of principal investigators and researchers from Canada, Colombia, the UK and Malaysia. The team included Jon-David Schwalm (Population Health Research Institute, Canada), Amir Attaran (University of Ottawa), Patricio Lopez-Jaramillo (Universidad de Santander), Martin McKee (London School of Hygiene and Tropical Medicine), Khalid Yusoff (Universiti Teknologi MARA, Malaysia), and Salim Yusuf (Population Health Research Institute & McMaster University, Canada).

HOPE-4 was a 12-month randomised controlled study conducted in both Colombia and Malaysia. The intervention, which was compared to 'usual care', was a community-based, comprehensive, and integrated intervention programme that took a three-pronged approach:[185]

1. Community screening, treatment and control of CVD risk factors using mobile health management algorithms and counselling programmes

[184] Framingham Risk Score is an algorithm used to estimate an individual's risk of cardiovascular disease

[185] Schwalm JDR, McCready T, Lamelas P, Musa H, Lopez-Jaramillo P, Yusoff K, et al. Rationale and design of a cluster randomized trial of a multifaceted intervention in people with hypertension: The Heart Outcomes Prevention and Evaluation 4 (HOPE-4) Study. Am Heart J. 2018;

2. Administration of medications to eligible participants to reduce hypertension and cholesterol
3. Involving family and friends of participants to increase adherence to medication and adoption and maintenance of a healthy lifestyle

Prior to implementation, the intervention was informed by an extensive review of the barriers (health system appraisal and systematic reviews) at the patient, health care provider and health system-level. 1,371 study participants from 30 urban and rural communities were split equally across Colombia and Malaysia.

10.3 Outputs, outcomes, impacts

The intervention trialled in the HOPE-4 project substantially reduced cardiovascular risk and improved blood pressure.[186] Results from the study were encouraging, with study participants who received the intervention improving on outcomes compared to 'usual care'. The primary outcome, the Framingham Risk score, was reduced on average 40% more in the intervention population. Blood pressure control and cholesterol levels also improved and adherence to medication (antihypertensives) was 50% higher in the intervention group.

The results demonstrated in the HOPE-4 study suggest that risk of CVD may be reduced through interventions that make use of non-physician healthcare workers.

Three main barriers to hypertension control were identified in Colombia. The first was the cost of transporting people from their homes to the community clinics where they would receive treatment. The second barrier was the prohibitive costs of the medication and the third was the long time required to travel to the community clinic and waiting times once at the clinic.

A total of 13 publications have emerged from the project to date. Furthermore, the results of the study were presented by Associate Professor Schwalm to the European Society of Cardiology in 2019.

10.4 Potential for future impact

The HOPE-4 intervention has been further piloted in Canada[187] with a slightly modified intervention package to fit the local context. The results of the pilot suggest that the intervention package, which is delivered by community health workers, could help to reduce CVD risk in a high-income setting as well, thus highlighting that **learning from implementation science undertaken in LMICs can inform implementation in other contexts**. These results further suggest that the HOPE-4 intervention could be applied to other settings after appropriate adaptation. In fact, the results of HOPE-4 are already supporting implementation of a project using similar strategies in Spain, Colombia, Chile and the Dominican Republic. This project is being supported by CYTED (Ibero-American Program for Science and Technology for Development) and the Science and Technology agencies of each country.

HOPE-4 has already had an impact on CVD policy. **The HOPE-4 curriculum has been adapted for WHO's HEARTS Technical Package[188] policy document which provides a set of effective and practical interventions to help manage cardiovascular risk factors in primary care**. The

[186] Schwalm J. HOPE 4. In: HOPE 4: Heart Outcomes Prevention and Evaluation 4 Study. Paris: ESC Congress; 2019.

[187] Schwalm JD, McCready T, Lear SA, Lamelas P, Garis L, Musa H, et al. Exploring New Models for Cardiovascular Risk Reduction: The Heart Outcomes Prevention and Evaluation 4 (HOPE 4) Canada Pilot Study. CJC Open. 2021;

[188] WHO Hearts package: https://www.who.int/cardiovascular_diseases/hearts/Hearts_package.pdf

package is intended to be used by national and subnational programme managers, physicians and other healthcare workers as a blueprint for CVD programmes. Given the wide-ranging audience intended for this document, the adapted HOPE-4 curriculum has the potential to be taken up widely across many different contexts, and thus could potentially contribute to decreasing the burden of hypertension and CVD worldwide.

Associate Professor Schwalm explains the significance of the project: *"Hypertension is the leading cause of cardiovascular disease and remains poorly controlled around the world. The HOPE 4 study demonstrates the benefits of a comprehensive model of care led by non-physician health workers in collaboration with family/friends, that can significantly decrease CVD risk. The HOPE-4 programme has the potential to make a significant impact on the global disease burden*."