Improving Hypertension Outcome Measurement in Low- and Middle-Income Countries

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Abstract—High blood pressure is the leading modifiable risk factor for mortality, accounting for nearly 1 in 5 deaths worldwide and 1 in 11 in low-income countries. Hypertension control remains a challenge, especially in low-resource settings. One approach to improvement is the prioritization of patient-centered care. However, consensus on the outcomes that matter most to patients is lacking. We aimed to define a standard set of patient-centered outcomes for evaluating hypertension management in low- and middle-income countries. The International Consortium for Health Outcomes Measurement convened a Working Group of 18 experts and patients representing 15 countries. We used a modified Delphi process to reach consensus on a set of outcomes, case-mix variables, and a timeline to guide data collection. Literature reviews, patient interviews, a patient validation survey, and an open review by hypertension experts informed the set. The set contains 18 clinical and patient-reported outcomes that reflect patient priorities and evidence-based hypertension management and case-mix variables to allow comparisons between providers. The domains included are hypertension control, cardiovascular complications, health-related quality of life, financial burden of care, medication burden, satisfaction with care, health literacy, and health behaviors. We present a core list of outcomes for evaluating hypertension care. They account for the unique challenges healthcare providers and patients face in low- and middle-income countries, yet are relevant to all settings. We believe that it is a vital step toward international benchmarking in hypertension care and, ultimately, value-based hypertension management. **(*Hypertension*. 2019;73:990-997. DOI: 10.1161/HYPERTENSIONAHA.118.11916.)** ● **Online Data Supplement**

Key Words: hypertension ■ patient-centered care ■ quality of life

High blood pressure (BP), the leading modifiable risk factor for mortality, accounts for 19% of deaths worldwide or 10.5 million deaths per year.[1,2] Nine percent of deaths in low-income countries, 21% in middle-income countries (MICs), and 18% in high-income countries (HICs) are attributable to high BP.[2] The number of people living with hypertension has nearly doubled over the past 40 years from 594 million to 1.13 billion[3] and their treatment is estimated to constitute 10% of global healthcare expenditures.[4] As the number of people living with hypertension continues to grow, so will the economic burden on healthcare systems and governments.

Although behavior change and pharmacotherapy are effective treatments for hypertension, among those diagnosed with hypertension, only 20% achieve BP control in low- and middle-income countries (LMICs) compared with 42% in HICs.[5] With three-quarters of the world's hypertensive population residing in LMICs, the need to identify management approaches that result in the best patient outcomes is evident.[5]

Researchers, practitioners, and policymakers have called for standardized measures to assess healthcare,[6] and cardiovascular disease[7] care more specifically, from the patient perspective. Proposals of indicators have been made; however, these do not emphasize the patient perspective.[8,9] To our knowledge, hypertension registries also neglect patient-reported outcomes. Despite the current lack of patient-centered hypertension research, where patient-centeredness refers to the meaningful engagement of patients in their care and ensuring their priorities are taken into consideration, the global health community is increasingly aware of considering the patient perspective when measuring quality of care.[10]

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The International Consortium for Health Outcomes Measurement (ICHOM) is a nonprofit organization that was founded in 2012 with the aim of encouraging the healthcare community to focus on value for the patient, where value is defined as the health outcomes achieved relative to the cost of achieving these outcomes.[11] ICHOM achieves this aim by focusing on 3 areas: developing condition-specific Standard Sets with a focus on priorities of care identified by patients, supporting the implementation of these Sets, and enabling the benchmarking of outcomes between providers at a global level. To date, ICHOM has published 24 Standard Sets,[12] including 3 focused on cardiovascular disease (stroke,[13] heart failure [publication pending], and coronary artery disease[14]). Currently, ICHOM is piloting the feasibility of collecting data from multiple international institutions with the aim of understanding outcome variation to improve care for patients.[15]

Here, we describe the process and results of convening an international Working Group (WG) to create a consensus-driven set of patient-centered outcomes for adults seeking care for primary arterial hypertension. Special emphasis was placed on ensuring relevance for patients in LMICs.

Methods

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Standard Set Scope

The WG, convened by ICHOM, aimed to develop a minimum set of patient-centered outcome and case-mix variables to evaluate the care provided to adults (aged ≥18) with primary hypertension (BP ≥140/90 mm Hg) living in LMICs. Outcomes specific to pediatric populations, hypertension in pregnancy, and secondary hypertension were excluded as these may require the assessment of outcomes not core to primary hypertension. The standard set is registered with the Core Outcome Measures in Effectiveness Trials core outcome set database at http://www.comet-initiative.org.

The ICHOM Hypertension in LMICs Working Group

ICHOM invited individuals to the WG based on their expertise in hypertension management, experience with healthcare delivery in LMICs or, in the case of patient representatives, their personal experience of living with hypertension. We identified WG members through their published work or recommendations from other WG members. The WG comprised 2 patients and 16 professionals, representing 15 countries from North America, South America, Africa, Asia, and Europe. All professionals were involved in research and 14 of 16 were practicing clinicians. Eleven WG members, including the 2 patient representatives, lived in LMICs at the time the WG was meeting. The rest were living in HICs. Those in HICs were included because of their experience treating patients or conducting research in LMICs or underserved populations in HICs (Table S1 in the online-only Data Supplement). A smaller project team (P. Lamptey, R. Zack, O. Okunade, E. Olson, M. Salt) managed the WG and supported content development.

Selection of Outcome and Case-Mix Domains

A PubMed literature review to identify outcomes reported in hypertension studies resulted in 2543 articles (Table S2). We excluded 1429 articles that did not meet the inclusion criteria (English language, published in 2005 or onwards, patient population aged ≥18 years with a diagnosis of primary arterial hypertension, and a focus on patient-reported or clinical outcomes), resulting in 1114 articles, which we reviewed to extract potential outcomes. To ensure that the identified outcomes were relevant to LMICs, we conducted a supplementary search focused on LMICs. This search identified 139 articles, of which 87 were removed after the inclusion and exclusion criteria were applied, resulting in 52 publications, which we reviewed to extract additional potential outcomes. Additionally, we searched 15 registries collecting data on hypertension (Table S3) and invited WG members to add to the list of potential outcomes.

We followed a similar process to identify case-mix variables to be used for risk adjustment or stratification. Case-mix variables are usually outside of the control of the provider but impact the outcomes and so need to be accounted for when making comparisons between settings (Table S4). Additionally, we searched the literature to identify landmark hypertension treatment clinical trials. We identified 16 trials from which we extracted reported baseline variables.

Patient WG Member Input

Patients took part in WG calls during the first half of the process during which the selection and definition of outcomes took place together with the clinicians and researchers. When a patient was unable to attend a scheduled call, the Project Leader (O. Okunade) had a separate call with them to ensure they agreed with the conclusions reached during the call. Patient representative votes had equal weight to the professionals on the WG.

Process

Using established ICHOM methodology,[13,14] we developed the standard set over 8 teleconference calls between October 2016 and September 2017 (Figure 1). Before each call, the project team prepared a proposal informed by the literature and WG member input. The WG reviewed and discussed these proposals during the calls. Following each call, WG members voted via electronic survey. A threshold of 70% was used to determine group consensus. Decision points that remained inconclusive after voting were carried forward for further discussion during the next call. The full protocol is published online at http://www.ichom.org/medical-conditions/hypertension-in-low-and-middle-income-countries/.

Modified Delphi Voting Method

The WG used a modified Delphi process at 2 points (after Calls 1 and 4) of the process to determine what outcome domains and case-mix variables to include in the standard set. Variables identified during the literature search were presented for ranking on a 9-point Likert scale. Items ranked between 7 and 9 by more than 70% of the WG after the first round were included. The remaining items were carried forward to the second round of voting. After the second round, items ranked between 7 and 9 by over 70% of the WG were included, while those ranked between 1 and 3 by over 70% were excluded. Items that did not meet the criteria for inclusion or exclusion were re-discussed in the following call before being presented for a final Yes/No vote, which was decided by a simple majority.

External Input

The Project Leader (O. Okunade) conducted a group interview via teleconference with 10 patients with hypertension in Nigeria to identify their priorities of care. A convenience sample of 10 patients who consented to participation on the day of their routine outpatient follow-up was selected. The intent was not to obtain data generalizable to patients with hypertension globally, but to validate whether the outcome domains identified by the WG reflected priorities of care from the patients' perspective.

The final list of outcomes selected by the WG was presented to patients in Nepal and Portugal. Patients aged ≥18 years with a diagnosis of hypertension who attended the outpatient hypertension clinic at B.P. Koirala Institute of Health Sciences or Universidade de Lisboa were asked to anonymously rank the importance of each outcome on a 9-point Likert scale. In Portugal, patients were provided with a link to an online survey in their own time. Patients in Nepal completed the survey at the clinic on a handheld tablet or mobile device with the support of volunteers recruited for the role.

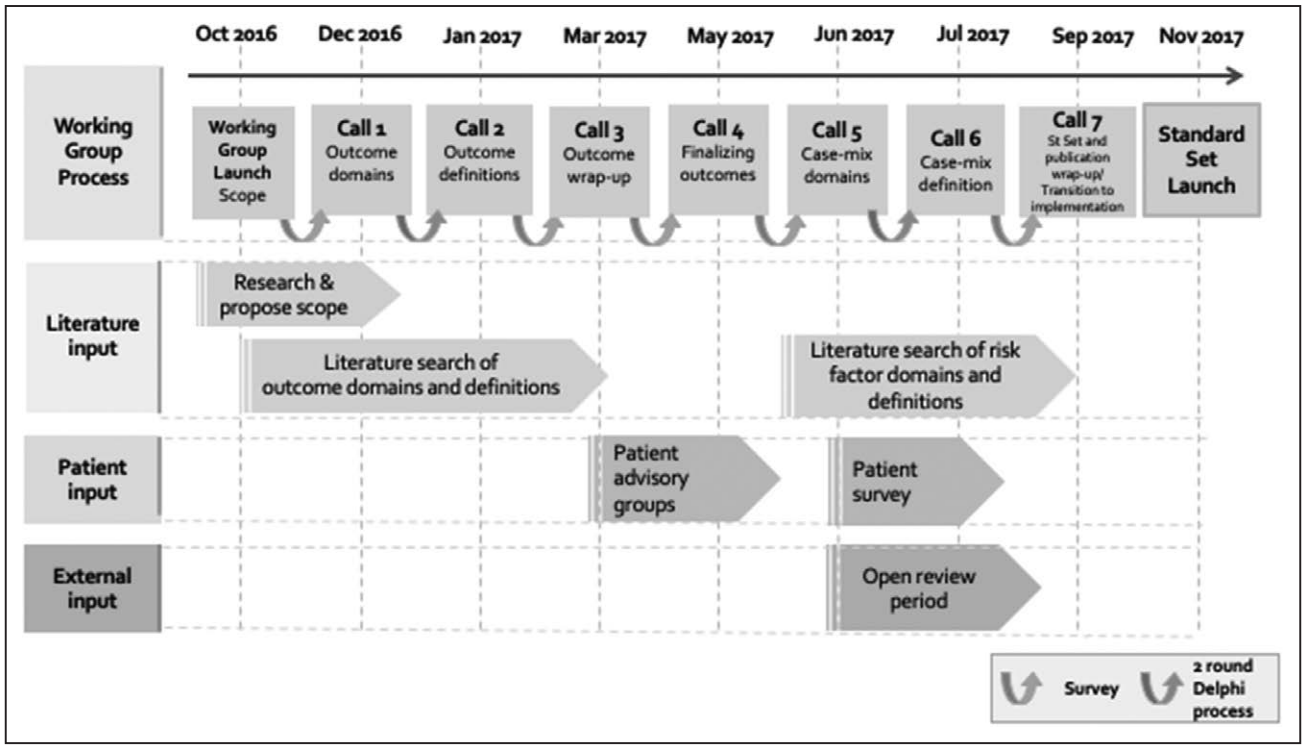

Figure 1. Timeline of standard set development. PROMS indicates patient-reported outcome measure.

The WG also sought feedback on the outcomes, case-mix variables, timeline, and general feasibility for implementation from the wider hypertension community through an electronic survey. The anonymous survey link was distributed via ICHOM's website and social media channels, as well as through WG members' professional networks.

Ethics Review

The project team obtained ethical approval for the patient engagement work from the Nepal Health Research Council (Reg no 426/2016), the Nigerian Institute of Medical Research Institutional Review Board (IRB/17/009), and the Centro Académico de Medicina de Lisboa Institutional Review Board (No 25/17).

Role of the Funding Source

Funding was provided by the Novartis Foundation. Fareed Mirza, head of Healthcare and Outcomes Research at Novartis Foundation, was a nonvoting member of the WG.

Results

Recommended Set of Core Outcomes

The project team presented the WG with 68 outcomes. These included outcomes identified in the literature and registry search as well as those added by WG members. After 3 rounds of voting and discussion, the WG settled on the 18 outcomes in Table 1 (Figure 2; Table S5). Outcomes were voted for inclusion according to the following criteria: importance to patients with hypertension, ease of measuring, and modifiable with quality improvement efforts. The final list is grouped into 4 categories: survival and disease control, burden of care, health behaviors and literacy, and patient-reported health status (Table 1).

Salt intake, physical activity, and diabetes mellitus were initially voted for inclusion as outcomes, as they should be addressed in hypertension management. Following further debate, the WG decided to recategorize them as case-mix variables because they are better viewed as determinants of hypertension outcomes. Hospital admissions because of complications of hypertension, dementia/cognitive impairment, retinopathy, lasting dietary change, financial burden, understanding/knowledge of condition and treatment, and empowerment/autonomy/self-efficacy were also originally voted for inclusion in the standard set. However, the WG ultimately decided to exclude these from the minimum set. Hospital admissions were excluded because hospitalization is dependent on multiple factors including the health system and sometimes the patient's ability to pay. Dementia/cognitive impairment was excluded due to the many types of dementia not due to hypertension and the difficulty in differentiating vascular dementia from other types of dementia. Retinopathy, lasting dietary change, financial burden, understanding/knowledge of condition and treatment, and empowerment/autonomy/self-efficacy were eventually excluded because of the difficulty of capturing in routine clinical care. Although financial burden was excluded, the standard set does capture financial barriers to care and medication.

Survival and Disease Control

The primary goals of managing hypertension are to reduce the occurrence of cardiovascular events and to prolong survival. The WG voted to include BP control, disease complications, and overall and cause-specific survival. BP control was defined as BP below 140/90 mm Hg. However, the WG is aware that this threshold may need to be adjusted under certain clinical circumstances and as hypertension guidelines are periodically updated. The following disease complications could be

Table 1. Summary of Outcomes Included in the ICHOM Standard Set for Hypertension in Low- and Middle-Income Countries

Measure	Details	Data Source
Survival and disease control		
Blood pressure	Patient blood pressure reading in mm Hg	CR
Overall survival and cardiovascular survival	Has the patient died? Cause of death, if known	CR or A
Medication side effects and adverse events	Has the patient experienced any adverse events or unwanted side effects of medication?	CR
Ischemic heart disease	Does the patient have ischemic heart disease?	CR
Cerebrovascular disease	Does the patient have cerebrovascular disease?	CR
Atrial fibrillation	Does the patient have atrial fibrillation?	CR
Heart failure	Does the patient have heart failure? Underlying cause?	CR
Peripheral artery disease	Does the patient have peripheral artery disease?	CR
Chronic renal disease	Does the patient have evidence of chronic renal disease?	CR
Hypertensive urgency or hypertensive emergency	Has the patient had a blood pressure reading above 180/120 mm Hg in the past 12 mo? (if yes, was there evidence of acute end-organ damage?)	CR
Burden of care		
Access to care	Was there any time during the past 12 mo when you really needed to consult your healthcare provider but you did not?	PR
Access to medication	Were you able to obtain the medication prescribed by your healthcare provider in the appropriate dose and formulation?	PR
Pill burden	What is the total number of pills or tablets that you take daily?	PR
Patient-reported health status		
Quality of life	Tracked via the EQ-5D-3L (preferred), PROMIS Global 10, VR-12, or SF-12	PR
Erectile dysfunction	PROMIS single question on erectile dysfunction (SFEFN101)	PR
Patient satisfaction	Single global question	PR
Health behaviors and literacy		
Health beliefs	Beliefs about Medicines Questionnaire (BMQ)	PR
Medication adherence	Hill-Bone Questionnaire	PR

A indicates administrative data; CR, clinician-reported data; ICHOM, International Consortium for Health Outcomes Measurement; PR, patient-reported data; PROMIS, Patient-Reported Outcomes Measurement Information System; SF-12, 12-Item Short Form Health Survey; and VR-12, Veterans RAND 12-Item Health Survey.

reported via clinician or administrative data: hypertensive urgency or emergency, ischemic heart disease (acute myocardial infarction and angina), cerebrovascular disease (stroke and transient ischemic attack), atrial fibrillation, heart failure, peripheral artery disease, and chronic kidney disease.

Burden of Care

The burden associated with managing hypertension is important to patients and can be a barrier to seeking appropriate care. The standard set assesses access to care and treatment, medication burden, and adverse events and side effects of medication. Access to care is measured using a 2-part question adapted from the European Union Survey on Income and Living Conditions.[17] Medication burden is captured as the number of pills taken daily. Specific adverse events and side effects are collected as part of the standard set: falls, acute kidney injury, peripheral edema, fatigue, electrolyte imbalances, hypokalemia, cough, erectile dysfunction, and urinary frequency.

Health Behaviors and Literacy

Healthcare providers have the opportunity to influence health behaviors that affect the outcomes of BP management. We suggest measuring medication adherence via the Hill-Bone questionnaire[18] and health literacy via the Beliefs about Medications Questionnaire (BMQ-Specific).[19]

Patient-Reported Health Status

We suggest using patient-reported outcome measures to quantify health-related quality of life, erectile function, and satisfaction with care. The EQ-5D-3L, which is composed of 5 questions on mobility, self-care, usual activities, pain/discomfort, and anxiety/depression, is the WG's preferred tool because of its widespread use and validation.[20] The WG acknowledges that the VR-12, Patient-Reported Outcomes Measurement Information System-10, and SF-12 are equally valid tools for measuring health-related quality of life and that validated crosswalks permit the conversion of scores across these tools, making comparisons between them possible. A single question developed by the Patient-Reported Outcomes Measurement Information System can be asked of male patients to self-report erectile function.[21]

Patient satisfaction was voted for inclusion by the WG because, although it is not an outcome in the strictest sense, it is important to patients. Additionally, patients' perceptions of their care impact their adherence to treatment advice. As the majority of patient satisfaction surveys focus on providers' adherence to specific processes, the WG decided to use a global question. If patients are found to be unsatisfied, or if patient satisfaction is an area of interest, a more detailed patient satisfaction tool, such as the Patient Assessment of Chronic Illness Care, may be used for further evaluation.[22]

Recommended Set of Case-Mix Variables

The project team presented the WG with 44 potential case-mix variables (Table S6). After the 3-round modified Delphi process, the WG narrowed this down to 12. The WG decided that cardiovascular events should be used as both case-mix

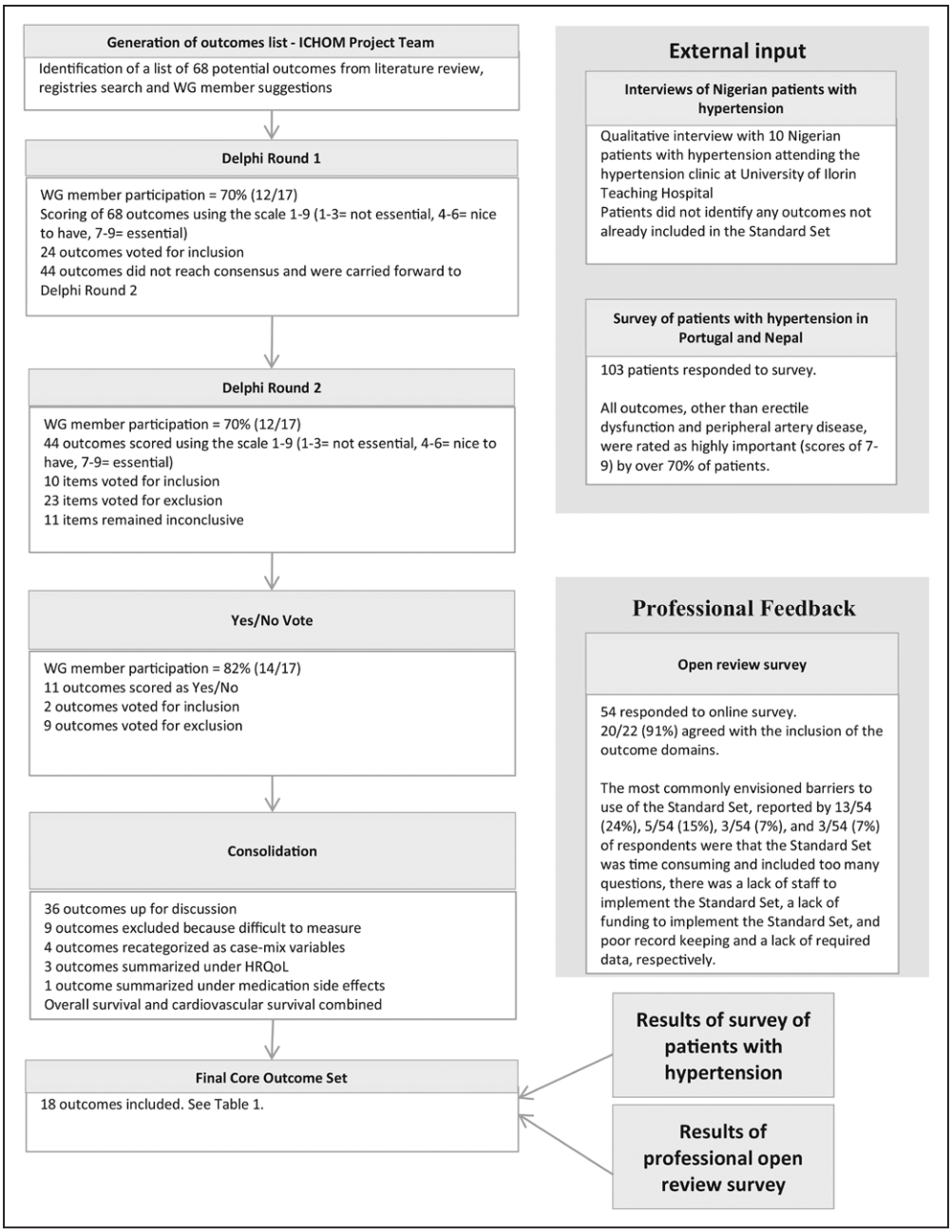

Figure 2. Overview of outcome selection process. HRQoL indicates health-related quality of life; and WG, Working Group. Adapted from Harman et al 2015.[16] Copyright © 2015. This is an open access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

and outcome variables. The case-mix variables are grouped into 3 categories: demographics (age, sex, and education) and baseline clinical factors (diabetes mellitus, body mass index, smoking status, and family history of cardiovascular disease), and treatment variables (antihypertensive drug use and class, lipid-lowering drug use and class; Table 2). The selected case-mix variables are commonly used to calculate 10-year cardiovascular risk using tools such as Globorisk[23,24] and the WHO cardiovascular risk prediction charts.[25] We suggest measuring physical activity via the International Physical Activity Questionnaire (IPAQ-short)[26,27] and salt intake via the World Health Organization STEPwise approach to Surveillance Questions.[28]

External Input

The group interview with 10 patients (4 males, 6 females, aged 34–60 years, median age 52 years) with hypertension attending a hypertension clinic at a teaching hospital in Kwara State, Nigeria, did not identify additional outcomes that had not already been included in the standard set (Table S7). Main themes identified by the patients were finances (cost of treatment, loss of income, reduced productivity), medical consequences of hypertension (stroke and heart attacks), controlling BP and restoring good health, restrictions the condition places on lifestyle (eg, salt consumption), and side effects of medication.

The patient survey received 103 responses from patients in Nepal and Portugal, the majority of which came

Table 2. Summary of Case-Mix Variables Included in the ICHOM Standard Set for Hypertension in Low- and Middle-Income Countries

Measure	Details	Data Source
Demographic factors		
Age	Indicate the patient's date of birth	A
Sex	Indicate the patient's sex at birth	A
Education level	Please indicate highest level of schooling completed	PR
Baseline clinical factors		
Diabetes mellitus	Indicate if the patient has a documented history of diabetes mellitus (regardless of duration of disease or need for anti-diabetic agents)	CR
Smoking status	Do you smoke? How long ago did you give up smoking?	PR
Family history	Family history of cardiovascular disease	PR or CR
BMI	Indicate the patient's height. Indicate the patient's weight.	CR
Physical activity	IPAQ (The International Physical Activity Questionnaire)	PR
Sodium intake	WHO STEPS Questions	PR
Treatment variables		
Treatment approach	What is the management approach?	CR
Antihypertensive drug class	Is patient on any of the following drug classes?	CR
Lipid-lowering drug class	Is patient on any of the following drug classes?	CR

A indicates administrative data; BMI, body mass index; CR, clinician-reported data; ICHOM, International Consortium for Health Outcomes Measurement; PR, patient-reported data.

from Nepal (95%). Fifty-seven percent of respondents reported they were male, 39% reported they were female, and 4% did not indicate their sex. Nineteen percent of respondents were aged between 18 and 40 years, 40% were aged between 41 and 64 years, and 41% of respondents were aged ≥65 years. All outcomes, other than erectile dysfunction and peripheral artery disease, were rated as highly important (scores of 7–9) by over 70% of patients (Table S9).

Feedback via the open review survey was received from 54 physicians, nurses, nurse practitioners, community healthcare workers, physician assistants, researchers, representatives from the life sciences industry, and healthcare strategists and business leaders (Table S10). The countries represented were Ghana, Malaysia, Tanzania, Portugal, the Netherlands, Uganda, the United States, India, Iran, Venezuela, Nigeria, Canada, Sweden, Chile, Australia, Spain, Brazil, Japan, the Maldives, and the Philippines. Fifty-nine percent of the responses came from low- and middle-income countries, and 24% of responses came from HICs. Seventeen percent of respondents did not provide their country of residence. The introduction to the survey clearly stated that the target population for the set was primarily patients who were receiving care in LMICs. Twenty out of 22 (91%) agreed with the inclusion of the outcome domains (Table S11). The most commonly envisioned barriers to use of the standard set were time consuming with too many questions, lack of staff for implementation, a lack of funding for implementation, and poor record keeping and a lack of required data, reported by 13/54 (24%), 5/54 (15%), 3/54 (7%), and 3/54 (7%) of respondents respectively.

Reference Guide/Data Collection and Implementation

The Reference Guide includes the recommended questions, sources for data, a data dictionary, and a suggested timeline for data collection (available at http://www.ichom.org/medical-conditions/hypertension/). Its purpose is to summarize the outcomes and case-mix variables within the set and act as a basic guide to implementation. The data dictionary in the appendix outlines in detail each variable, including definitions, response options, and specific timepoints within the patient's care path when the data should be collected (Figure 3).

Discussion

Our aim was to create a minimum standard set of patient-centered outcomes that can be used to measure the quality of care received by patients with hypertension. The aim to focus on patients in LMICs is because of the huge burden the condition represents in these regions. However, upon completion of the set, it became apparent that the set was also applicable in

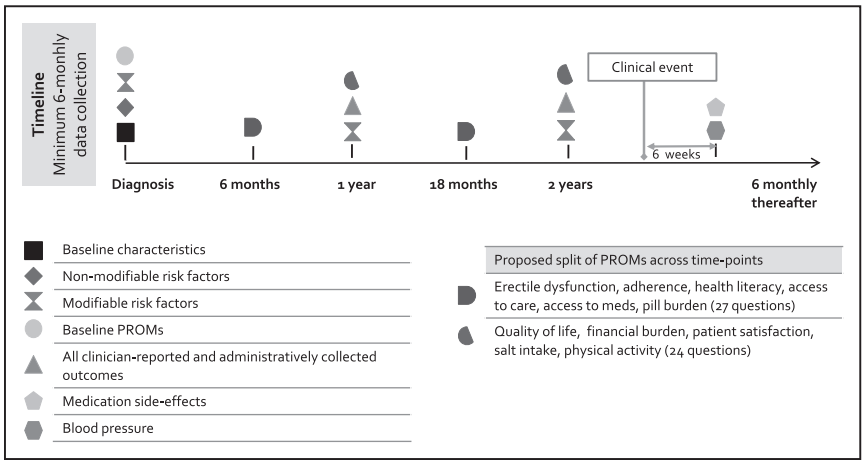

Figure 3. Recommended timeline for data collection for patients with hypertension.

HICs too. The global representation of the WG allowed us to have input from experts with experience working in a wide variety of settings ranging from rural clinics in low-income countries to well-resourced tertiary hospitals in middle- and HICs. However, it must be kept in mind that the standard set only captures patients who are aware of their diagnosis and are receiving care and cannot impact those who are unaware of their hypertension or unable to afford a visit to a healthcare provider.

We acknowledge the difficulties in recommending a standard set for use across LMICs, which are heterogeneous in terms of resources, biomedical beliefs, and patient-provider interaction. Considering that many LMICs lack vital registration systems[29] and fewer than 40% of deaths worldwide are registered,[30] the WG realized that cause of death may be difficult to ascertain in low-resource settings. Although many patient-reported outcome measures recommended in the standard set have been translated and validated across multiple settings; this is not true for all of them. The proposed measures for health literacy, quality of life, beliefs about medications, and medication adherence have not been tested for reliability and validity in most LMICs, and as such, their cultural relevance should be evaluated in studies that plan to address these outcomes. Because of the heterogeneity in the use of patient-reported outcome measures, both between and within countries, the standard set is flexible, allowing providers to include additional measures that are most appropriate for their practice in terms of affordability and familiarity

The WG recommends the use of proteinuria to identify the presence of chronic kidney disease. This can be determined using a manually read urine dipstick, an electronically read dipstick, or urinary albumin creatinine ratio. While urinary albumin creatinine ratios are the most reliable method, the WG included the option of urine dipstick readings for settings where resource restrictions may limit the availability of albumin creatinine ratios. Although serum creatinine and estimated glomerular filtration rate are commonly used markers of renal disease in HICs, estimated glomerular filtration rate is not validated for use in many LMICs.[31] To address this, at least 2 studies were recently funded to derive correction factors for use in LMIC settings where there is no valid formula to date. Where serum creatinine and estimated glomerular filtration rate are already in routine use, these data should be used to supplement the data on proteinuria.

The standard set collects variables associated with cardiovascular risk; it does not prescribe any cardiovascular risk tool. The WG debated recommending the World Health Organization/International Society of Hypertension risk prediction charts, which are well established and widely used in many LMICs, and the more recently developed Globorisk, which estimates country-specific cardiovascular risk scores. However, because these tools are frequently updated, new ones are developed, and providers often have a preference, we recommend the capture of individual elements of risk scores, allowing providers to choose which tool they wish to implement.

Perspectives

The WG has defined a consensus recommendation of the minimum outcomes and case-mix variables to collect for patients with hypertension in routine clinical practice in LMICs. This standard set will aid healthcare providers to measure the outcomes that matter most to patients and increase the comparability of data on patients with hypertension across providers, facilities, healthcare systems, and geographies. This will enable benchmarking of risk-adjusted outcomes between providers in different settings and allow them identify opportunities for improvement.

For this work to proceed, the standard set must be validated as a comprehensive measurement tool in various settings, as part of a pilot program. While the original intention was to create a set for use in LMICs, the final set appears relevant to HICs. Additional validation studies should be conducted to test the appropriateness of the standard set for HICs.

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A. Damasceno received personal fee for conference from Astra Zeneca, Merck. C. Amodeo received personal fees (scientific board) from Servier laboratory, Merck; personal fees (paper) from Novartis; and personal fees (speaker) from ACHE laboratory. D. Nitsch received funding to conduct kidney research in Africa from GSK. E. Schiffrin received honoraria (Ad Boards) from Novartis, Actelion; and Research Grant (Discovery grant unrelated to Servier products) from Servier. Thi Nam Phuong DO received speaker fees from Astra Zeneca, Boehringer Ingelheim, MSD, Novartis, Sanofi Aventis, Servier and investigator research from Astra Zeneca, MSD, Servier. Norm Campbell received Personal Fees (Consultant to hypertension control programs in low resources setting) 2016–2017 from Novartis Foundation and Personal Fees (Consultant for accurate measurement of blood pressure (2017) from Midway Corporation. Vladislav Podpalov had patents: No 17881, issued by the Republic of Belarus: risk prediction tools for myocardial infarction or stroke in patients with arterial hypertension; No 17892, issued by the Republic of Belarus: risk prediction tools for risk of death depending on blood circulation disease in patients with arterial hypertension; No 17891, issued by the Republic of Belarus: risk prediction tool on predicting the risk of death in patients with hypertension. Yook-Chin Chia received speaker honorarium from Pfizer, sponsorship to conferences, research grant from Abbott, Novartis, MSD, Sanofi, Astra, Reckitt-Benckiser, Orient-Europharma, GSK, Boehringer Ingelheim, Servier, Merck, Merck-Serono, Bayer, Zeullig; speaker honorarium patents from UMMC and licencee Asia Diabetes Foundation, NGO study. The other authors report no conflicts.

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Novelty and Significance

What Is New?

- The International Consortium for Health Outcomes Measurement Working Group has developed a core set of measures that will allow comparison of outcomes for hypertension care across various settings.
- Emphasis is placed on relevance to low- and middle-income settings.

What Is Relevant?

- The priority during the development of the set was to ensure that the outcomes reflect the priorities of patients with hypertension.
- The set aims to facilitate outcomes measurement and identifying variation in outcomes across settings, which can be targeted to improve care for patients.

Summary

We present a standard set of outcomes to evaluate hypertension management in low- and middle-income countries.