STATISTICAL ANALYSIS PLAN (SAP)

A Low-Cost, Scalable Treatment Strategy for Improving Hypertension Control in Low and Middle-Income Settings: Formative Phase (Aim 1)

Short Title & Acronym: ***A Combination Triple pill Implementation strategy for blood pressure cONtrol (ACTION)***



Therapeutic indication: Hypertension

Sponsor: Imperial College London, UK

Funder: National Institute for Health and Care Research (NIHR), UK

Funder reference number: NIHR207002 (41379)

Sponsor reference number: PB2225

Imperial College Research Ethics Committee (ICREC) reference number: 8021062

NCT number: NCT07784647

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Contents

1. Administrative Information 3
    1.1. Authors and Roles 3
    1.2. Version History 3
2. Introduction 3
    2.1. Background and rationale 3
    2.2. Aims, Objectives and Hypotheses 7
3. Study Methods 8
    3.1. Design 8
    3.2. Study setting 9
    3.3. Sample size and Sampling strategy 9
    3.4. Eligibility Criteria 10
4. Data collection and Management 10
    4.1. Data collection tools 10
    4.2. Data Management 11
5. Statistical analysis 11
    5.1. Analysis population 11
    5.2. Variable definitions 11
    5.3. Primary Analyses 12
    5.4. Missing Data 13
    5.5. Sensitivity Analyses 13
    5.6. Subgroup analyses 13
    5.7. Software 13

6, References 14

Supplement 1 18

    Adapted Service Availability and Readiness Tool (SARA) 18

Supplement 2 18

    Patient survey questionnaire 18

Supplement 3 18

    Table and Figure Shells 18

1. Administrative Information

1.1. Authors and Roles

Author	Role	Signature & date
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Abdul Salam (Investigator)	Reviewing the SAP	
Dawid Jedrzejewski	Reviewing the SAP	

1.2. Version History

The current version of the SAP version 1.0 is based on the ACTION-S protocol version 3.0 dated 9 April 2026.

2. Introduction

2.1. Background and rationale

2.1.1. Background

The global burden of hypertension

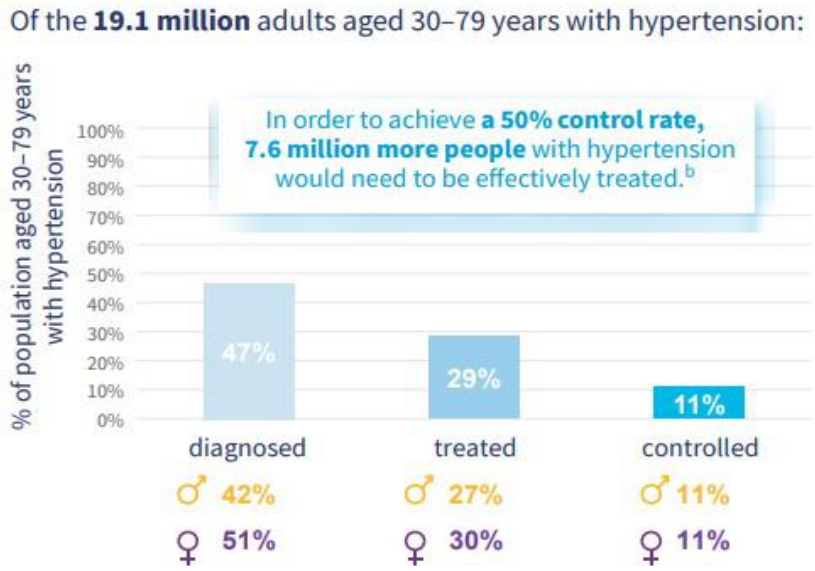
High Blood Pressure (BP) is the leading cause of death globally. In 2019 alone, high BP caused about 11 million deaths (19.2% of all deaths) and about 9% of all disability-adjusted life-years lost globally. [1, 2] In 2019, about 1.3 billion adults aged 30–79 years worldwide had hypertension, defined as Systolic Blood Pressure (SBP) ≥140 mmHg or Diastolic Blood Pressure (DBP) ≥90 mmHg or taking medication for hypertension. [3] Hypertension prevalence is increasing, largely due to population growth, unhealthy diets, physical inactivity, excessive alcohol consumption, obesity, and stress.[4] Hypertension is a major independent risk factor for stroke, coronary artery disease, heart failure, dementia, and chronic kidney disease, which impose a substantial burden on individuals, healthcare systems, and economies. Consequently, the economic impact of hypertension is significant, including direct healthcare costs for management, as well as indirect costs related to lost productivity and disability.[5]

The burden on hypertension in low- and middle-income countries

Over the past three decades, hypertension has transitioned from a significant burden in high-income countries (HICs) to one that is now highly prominent in low- and middle-income countries (LMICs) including South Asia and Sub-Saharan Africa. Besides the high prevalence and increased risk of mortality and of cardiovascular and renal events, there is a substantial burden of untreated and uncontrolled hypertension in LMICs. Sub-Saharan Africa and South Asia regions including

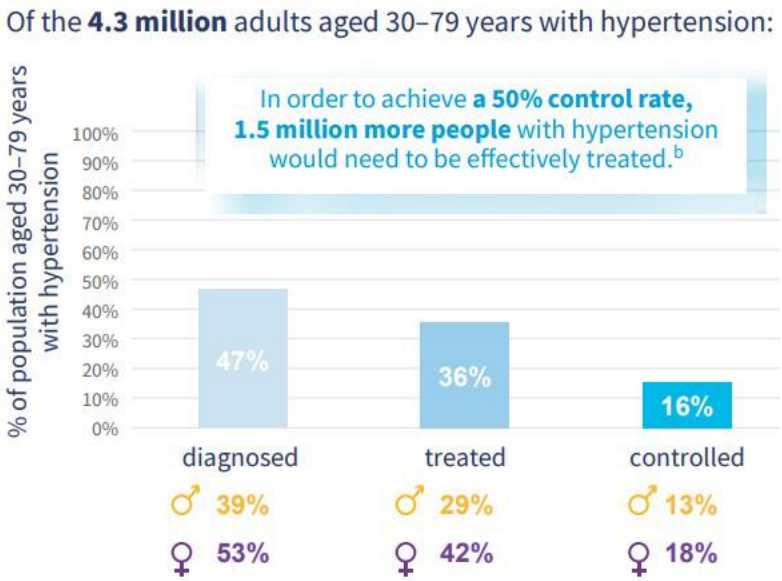
countries like Nigeria and Sri Lanka are among those that bear the highest burdens.[4] In 2019, the prevalence of hypertension among adults aged 30–79 years in Nigeria was 36%, which is already higher than the global average of 33% (Figure 1). Of the estimated 19 million Nigerian adults (age 30-79 years) with hypertension, 47% were previously diagnosed, 27% treated, and only 11% were controlled (SBP <140 mm Hg and DBP <90 mmHg). These numbers are far below global averages (54% diagnosed, 42% treated, 21% controlled). Unpublished recent data from the 2023 STEPS demographic health survey in Nigeria (n=19,523; 55% female) show a similar pattern of the hypertension cascade (26% unadjusted prevalence, 45% diagnosed, 34% treated, 17% controlled).[6]

Figure 1: Hypertension Cascade in Nigeria, overall and by sex (2019)



The burden of hypertension in Sri Lanka among adults (aged 30–79 years) is also high, and similar to that in Nigeria – with a prevalence of 36% (Figure 2). Among 4 million Sri Lankan adults (age 30-79 years) with hypertension, 47% were previously diagnosed, 36% were treated, and only 16% were controlled, and again these numbers are far below the global averages (54% diagnosed, 42% treated, 21% controlled respectively). [7]

Figure 2: Hypertension cascade in Sri Lanka, overall and by sex (2019)



The large and rising burden of hypertension in LMICs imposes economic hardships on patients and caregivers, and adds to the financial strains on health systems already facing challenges such as low physician-to-patient ratios and limited access to essential medicines.[4] Moreover, high rates of uncontrolled hypertension not only have several implications for the health of affected individuals and resource-constrained health systems in LMICs (e.g., Nigeria and Sri Lanka) but also entail substantial societal, developmental, and economic costs. [4] Therefore, it is crucial that new hypertension management strategies not only aim to improve BP control, reduce deaths and hospitalisations, but also reduce health care costs, particularly in LMICs. In LMICs, it is estimated that about half of all costs are from care delivery during clinic visits (personnel, site, and laboratory costs), with the remainder attributed to medication costs (ref).[4] For patients, out-of-pocket medication costs vary considerably but are often high and the lost work time from clinic visits also incurs costs.[4] Therefore, improved hypertension control through safe and effective, affordable, cost-effective, and scalable management strategies represents an urgent priority and a major unmet need in LMICs.

Study location justification

Nigeria, the most populous country in Africa, represents Black Sub-Saharan Africa (which constitutes ~15% of world's population) has a high prevalence of hypertension (higher than the global average), with very low BP control rates. Hypertension treatment and control are national priorities outlined in the National Multisectoral Action Plan for the Prevention and Control of NCDs. Nigeria has the national task shifting and sharing policy, which allows community health workers to prescribe BP-lowering medications according to a standardized protocol. Sri Lanka, represents South Asia (which constitutes 25% of world's population), also has high prevalence of hypertension, exceeding the global average, with very low BP control rates. Hypertension control is a national health priority. Sri Lanka's Ministry of Health has adopted the WHO HEARTS technical package for hypertension control and implemented quality improvement interventions, including standardized treatment protocols. While both countries share similarities in terms of hypertension burden, there are differences that provide a strong rationale for our research. Notably, there are major racial differences, and it is established that BP reduction is more difficult

to achieve among Black Africans compared to other races. The hypertension standard treatment protocols in Nigeria and Sri Lanka are based on first-line monotherapy and first-line combination therapy, respectively. Thus, through the evaluative part of the study, we will compare our new treatment strategy with two different contextual comparator interventions. Nigeria has poorer healthcare resources and hence poorer health and social indicators compared to Sri Lanka. The findings will have implications for the larger African region and South Asia.

2.1.2. Rationale

Current ineffective approaches and barriers to hypertension management in LMICs

Many national hypertension guidelines [8-10] continue to recommend a single BP-lowering drug as first-line therapy, and combination therapy only for "grade 2 hypertension" (BP >160/90 mmHg), despite most international/major guidelines [11-13], recommending two-drug combination as first-line for most patients. Many national standardised treatment protocols for hypertension recommend initial monotherapy, (which achieves on average only a 9/5 mmHg reduction in BP,[14] with higher dose monotherapy as the second step, which achieves only 1-2 mmHg additional BP reduction and can increase adverse effects. [14]

Additionally, most national standardized treatment protocols have 5 or more treatment steps, which could result in increase in cost and time.[15] Consequently, in most clinical practice settings, patients are started on monotherapy at a low dose, and remain on it long term [16] due to therapeutic inertia [17, 18] and the lack of available, affordable combination therapy options.[19] For example, studies in Nigeria, Ghana, and South Africa found that treatment was not up-titrated in up to 90% of the patients with uncontrolled BP.[20] Patient's adherence to BP-lowering drugs is also a major barrier [21-23].

Potential role for new paradigm for using low dose single pill combinations

The potential of single pill combinations (SPCs) to improve efficacy, reduce inertia, increase efficiency by simplifying treatment choices and optimise drug procurement [11, 13, 24] has led to their inclusion in World Health Organization (WHO) model list of essential medicines [25] and recent standardised treatment protocols from WHO, Pan American Health Organization, Resolve To Save Lives and others.[15] In recent years, there has been increasing interest in low-dose SPCs with three or more drugs to extend the potential benefits of SPC-based care. Evidence from randomised clinical trials (RCTs) indicates that low-dose combinations of multiple drug classes may achieve greater hypertension control without increasing adverse effects [14].

Much of the BP-lowering efficacy of any monotherapy is achieved at low doses and efficacy dose-response curves are typically shallow above one-quarter of the standard dose at low doses, there are few or no adverse effects, but for most classes, adverse effects increase with increase in dose.[14, 26] The incidence of idiosyncratic reactions (e.g., anaphylaxis) to individual BP-lowering drugs is sufficiently low that the risks for a patient simultaneously taking three drugs is acceptably low.[14]. There is additivity of effects across drug classes that target different pathophysiological pathways, and there is clear evidence of greater reduction in cardiovascular events with greater BP reduction. [27]

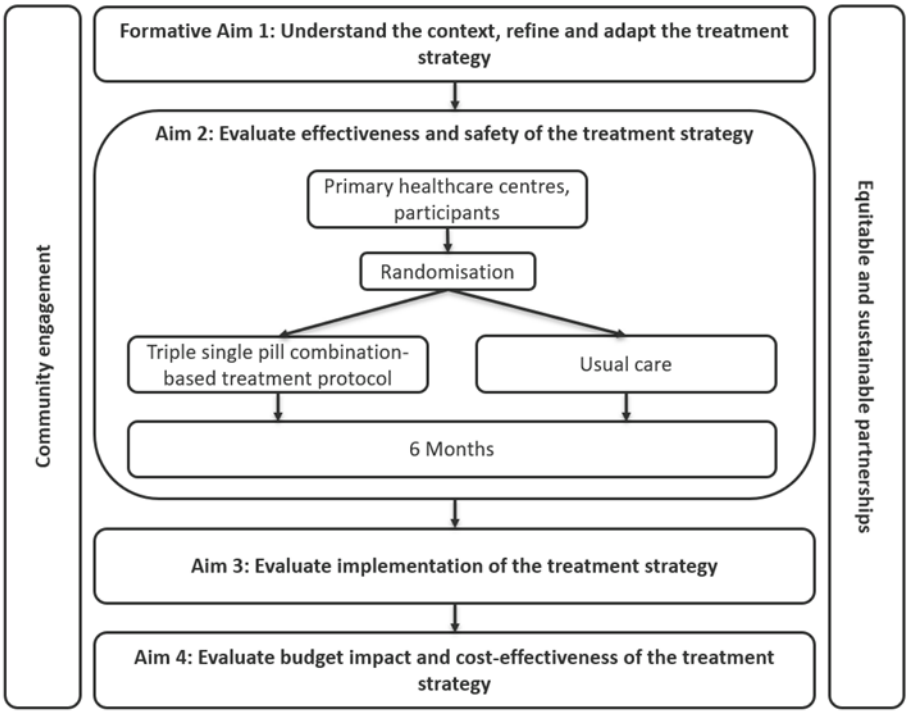
Our rationale to expand the evidence regarding hypertension management in LMICs, particularly in primary care settings in Nigeria and Sri Lanka is as follows:

- None of the previous studies of low-dose SPCs have been conducted with products available for clinical use – all have been with 'bespoke' formulations, which are only possible to use in a clinical study setting. Hence, a major novelty of the proposed study is the evaluation of a strategy that can potentially be scaled.
    - Currently available triple SPCs are only available at higher doses and only indicated for substitution among patients already taking all three-component drugs or as an add-on or substitution therapy among patients not adequately controlled on two of the component drugs.
    - None of the available triple SPCs are available in low-dose strengths, nor are they indicated for initial treatment. There are also no existing SPC products on the market with low-doses of an angiotensin receptor blocker (ARB), a calcium channel blocker (CCB) and a thiazide-like diuretic.
    - Finally, and perhaps most importantly, triple combinations are neither widely available nor affordable in LMICs. To address this unmet need, we propose to use a new triple SPC containing telmisartan, amlodipine, and indapamide developed by George Medicines for the treatment of hypertension, including as first-line therapy. George Medicines has completed pivotal efficacy and safety studies for this new triple SPC and recently received regulatory approval from the US Food and Drug Administration (FDA). Recently, triple SPCs have been included in the WHO Model List of Essential Medicines – 24th List (2025). This is will likely lead to their wider availability and increased affordability.
- While the treatment strategies being tested in our studies in tertiary care looks highly promising, uncertainty remains if they will be effective, safe, and feasible to implement in primary care settings in LMICs (in both urban and rural areas), where most patients in primary care settings with hypertension are diagnosed and treated.
- Of the numerous previous implementation studies of strategies to improve hypertension control in LMIC primary care settings, only one achieved over 80% hypertension control (from a baseline hypertension control of 61%), and this was achieved with a resource-intensive multicomponent treatment strategy.[36] Our simple and low-cost treatment strategies have the potential to achieve over 80% BP control in a short period of time and at scale.

2.2. Aims, Objectives and Hypotheses

We aim to evaluate, among adults with uncontrolled hypertension, new treatment strategies (involving a low-dose triple SPC based standardised treatment protocol with or without a potassium-enriched salt substitute intervention) compared to usual care for effectiveness, implementation, budget impact and cost effectiveness for the treatment and control of hypertension in primary care settings in Nigeria and Sri Lanka (Figure 4).

Figure 4: Study overview (overall and specific objectives)



This statistical analysis plan covers the methods to be used for the analysis of quantitative data emerging from structured surveys in the formative phase (Aim 1) of the study. The formative phase involves two quantitative surveys, 1) A facility assessment survey and, 2) Patient Survey

Aim 1: Understand the context and refine and adapt the new treatment strategies.
This aim has 2 objectives:

Objective 1:

a- Policy and evidence review: To review hypertension research, national and local policies, programs, clinical practice guidelines and treatment protocols in Nigeria and Sri Lanka to inform our research.
b- Health system assessment: To assess the availability and readiness of hypertension care in PHCs, and feasibility to conduct the RCT.
c- Understanding the characteristics of patients with hypertension, hypertension management and control, including use of pharmacological interventions and lifestyle management
d- Exploring experiences, practices, and views on hypertension care and the new treatment strategies

3. Study Methods

3.1. Design

For objective 1b, a cross-sectional healthcare facility-level survey will be conducted.
For objective 1c, a cross-sectional patient-level survey will be conducted.

3.2. Study setting

3.2.1. Healthcare facility-level survey for objective 1b

In Nigeria, the study will be conducted in Federal Capital Territory (FCT) which includes both urban and rural areas and has a high burden of untreated and uncontrolled hypertension (15.3% as per unpublished data from a 2023 STEPS survey) [37]. FCT has the necessary primary healthcare infrastructure to support the proposed study. Primary healthcare in Nigeria is governed by the national primary care agency through the state primary care development boards, and the primary care provided is similar across Nigeria. We will conduct our study in family medicine clinics within Primary Healthcare Centres (PHCs) where most patients with hypertension are managed.

In Sri Lanka, the study will undertake in Gampaha district which also includes both urban and rural areas, and an estimated prevalence of hypertension of ≈25% [38] Within the district healthcare system, primary medical care units (PMCUs) play a vital role in providing primary curative, preventive, and health promotion activities, as well as outpatient care. As in Nigeria, primary healthcare provision in Sri Lanka is organised under a nationally standardised system, with PMCUs following uniform policies and service packages across. Hypertension is primarily managed at PMCUs, with referrals to higher sites as needed. We will conduct our study in PMCUs.

We will make efforts to ensure representation of all population segments, including religious, racial, and socially disadvantaged groups in our study.

3.2.2. For patient-level survey for objective 1c

For objective 1c, patients from a total of 40 facilities from both countries will be selected

3.3. Sample size and Sampling strategy

3.3.1. For objective 1b, 25 PHCs in FCT in Nigeria and 45 PMCUs in the Gampaha district in Sri Lanka will be purposively selected.

3.3.2. Previous research indicates hypertension control (SBP < 140 mmHg and DBP < 90 mmHg) in primary care settings among treated individuals in Nigeria and Sri Lanka varies and is up to 50%. [41, 42] Assuming a conservative prevalence of hypertension control at 50%, an average cluster size of 30 participants, and an intraclass correlation coefficient of 0.02 [42], a sample size of 608 participants per country is required. This will allow us to accurately estimate the country-specific prevalence of hypertension control to within ±5% error with 95% confidence level. Therefore, the total sample size to be recruited across both countries is 1216 participants.

From the PHCs /PMCUs surveyed in Objective 1b, we will select sites that have at least two full-time staff (including at least one physician/doctor and one nurse), are accessible by road in all seasons, and are functional (defined as being open for at least five hours daily for a minimum of five days a week and offering the minimum PHC service package). We will use a cluster sampling strategy and select & survey 40 PHCs/PMCUs (cluster) (20 in each

country). At each PHC/PMCU, consecutive adult (age ≥18 years) patients with hypertension will be invited to participate until the target sample size approximately 30 per PHC/PMCU is achieved. Hypertension is defined as prior documented diagnosis of hypertension, or current use of BP-lowering drugs for hypertension, or SBP ≥140 mmHg, and/or DBP ≥90 mmHg measured on two separate occasions).

Previous research indicates hypertension control (SBP < 140 mmHg and DBP < 90 mmHg) in primary care settings among treated individuals in Nigeria and Sri Lanka varies and is up to 50%. [41, 42] Assuming a conservative prevalence of hypertension control at 50%, an average cluster size of 30 participants, and an intraclass correlation coefficient of 0.02 [42], a sample size of 608 participants per country is required. This will allow us to accurately estimate the country-specific prevalence of hypertension control to within ±5% error with 95% confidence level. Therefore, the total sample size to be recruited across both countries is 1216 participants.

3.4. Eligibility Criteria

3.4.1. Facility-level survey

Sites must also be willing to participate in the study. PHCs currently participating in the Hypertension Treatment in Nigeria 2.0 programme will be excluded.

3.4.2. Patient-level survey

At each PHC/PMCU, consecutive adult (age ≥18 years) patients with hypertension will be invited to participate. Hypertension is defined as prior documented diagnosis of hypertension, or current use of BP-lowering drugs for hypertension, or SBP ≥140 mmHg, and/or DBP ≥90 mmHg measured on two separate occasions prior to enrolment in study. Patients who are receiving BP-lowering drugs for conditions other than hypertension (e.g., benign prostate hyperplasia, migraine, etc) and without hypertension will not be included.

4. Data collection and Management

4.1. Data collection tools

For objective 1b, at each PHC, a structured facility survey will be administered using and an adapted version of WHO's Service Availability and Readiness Assessment tool [39], Supplement 1. The focus will be to capture the contemporary availability of infrastructure and human and other resources (diagnostics, medicines etc.) for hypertension care. Data will also be collected on referral system and feasibility to conduct remaining components of the formative phase and subsequently the RCT of the new treatment strategy.

For objective 1c, after obtaining written informed consent, participants will be asked to share their medical records for review and respond to questions

posed by the research staff. Data will be collected using a structured interviewer administered questionnaire informed by the STEPS instrument [40, Supplement 2] on various parameters including age, sex, height, weight, socio-economic status, medical history (current and past BP, medications), and health behaviours and lifestyle interventions (smoking, alcohol consumption, diet including consumption of salt and use of salt substitutes, and physical activity). BP will be measured on the day of enrolment.

4.2. Data Management

The data collected in structured paper forms will be transcribed into a secure electronic data collection system (REDCap). Electronic case record forms (eCRFs) will be accessible to all data collectors at the sites, the access to the collective data will be provided to the data management and statistical analysis team.

5. Statistical analysis

5.1. Analysis population

5.1.1. For the facility-level survey, data from facilities that provide responses to items from each domain will be summarised.

5.1.2. All consented participants meeting eligibility criteria as outlined in section 3.4.2, will be included in the primary analysis.

5.2. Variable definitions

5.2.1. Facility readiness score/index (FRI)
The facility readiness index or score will be calculated as the unweighted mean of four key SARA domain scores. These domains are Staff & Training, Equipment and Supplies, Diagnostic Capacity and Essential Medicines. Items in each domain will be assigned a binary outcome (0=not available/1=available and functioning/valid) based on their absence or presence in the facility. The facility score for a specific domain will be calculated by dividing the total number of items available by the total number of tracer items for that domain, then multiplying by 100. The total facility readiness score will be the average of each domain score.

5.2.2. BP control for primary analysis in patient-level survey will be defined as average SBP and DBP<140/90 mmHg. BP will be measured as usual at the clinic using available validated BP device, and the average of available measurements will be recorded as the SBP/DBP for that patient. This average will then be used to categorise each participant as under/out of control based on the cut-off 140/90 mmHg.

The actual mean BP values will be studied as secondary outcome. BP values will be excluded from calculations if SBP is outside window of 80 to 250 mmHg and DBP is outside the window of 40 to 150 mmHg.

5.3. Primary Analyses

5.3.1. Objective 1b: Health system assessment: To assess the availability and readiness of hypertension care in PHCs, and feasibility to conduct the RCT.

Descriptive statistics will be used to summarise facility characteristics. Frequencies and percentages will be reported for categorical variables and means with standard deviations or medians with interquartile ranges will be reported for continuous variables.

Domain-specific readiness scores will be calculated as the percentage of tracer items available within each domain out of the toal expected in that domain. An overall readiness score will be computed as the mean of domain scores. Facilities with higher scores will be considered as better prepared for hypertension management. Country-specific readiness scores will be the overall mean of all surveyed facilities in that country.

Comparison of facility preparedness scores between Sri Lanka and Nigeria will be done using bar graphs.

As an exploratory analysis, linear regression (or beta regression if necessary) will be used to investigate associations between facility readiness scores and country, facility type, urban/rural location and other facility characteristics related to availability of general basic amenities.

Feasibility of implementing the RCT will be assessed using descriptive summaries such as, facilities with physician available, internet connectivity, drug availability, laboratory capacity and follow-up capacity.

Qualitative data will be summarized narratively. Data will be presented separately for Nigeria and Sri Lanka and overall to enable comparisons across settings.

5.3.2. Objective 1c: Understanding the characteristics of patients with hypertension, hypertension management and control, including use of pharmacological interventions and lifestyle management

Participant characteristics (Supplement 3, Table 2) such as age group, sex, history of illness, smoking and alcohol use etc. will be reported using frequency and percentages for categorical variables. Continuous data (e.g. systolic and diastolic BP, age, and duration of hypertension) will be summarised descriptively as mean with standard deviation or median with interquartile range Categorical data for laboratory parameters as well as pharmacological management, including treatment regimen (dose and frequency) will be summarised as frequencies and percentages.

Prevalence of BP control will be estimated, and 95% confidence intervals will be adjusted for clustering effect due to facility.

A mixed-effects logistic regression model, with country as fixed effect and random-intercept for facility (to account for correlation within facilities) will be used to test the association between BP control and potential factors identified from the literature. The dependent variable (primary outcome) will be BP control represented as 1 if SBP <140 and DBP <90 mmHg and, 0 otherwise and, all potential factors will be included in a single model. Potential risk factors will include age, sex, country, duration of hypertension, BMI, treatment status, past BP control, comorbidity and lifestyle factors. We will report adjusted odds ratio with 95% CIs.

An exploratory linear mixed effects model, with will be used to study secondary outcome of average SBP/DBP. Estimates and their 95% CI will be reported.

BP control over the past year, for each participant, will be defined as the number of clinic visits with BP control <140/90 mmHg divided by the total number of clinic visits in the past year. The distribution of participants with BP control over the past year will be plotted using a histogram.

Additional analyses may be conducted as needed.

5.4. Missing Data

For both surveys, missing data will be reported but not imputed. The extent and patterns of missing data will be described for all variables.

5.5. Sensitivity Analyses

For the patient-level survey, we will conduct the following sensitivity analyses:

The mixed-effects logistic model will be run with BP control defined as SBP and DBP <130/80 mmHg.

5.6. Subgroup analyses

5.6.1. Exploratory subgroup analyses will be conducted by:

1. Country
2. Sex
3. age group (<median age, >=median age)
4. Lifestyle factors (diet and physical activity)

Effect estimates with 95% confidence intervals will be presented.

5.6.2. Patient characteristics will also be summarised by BP control (<140/90 mmHg) versus uncontrolled

5.7. Software

All analysis will be done using Stata version 19 (StataCorp. 2025. *Stata Statistical Software: Release 19*. College Station, TX: StataCorp LLC.) and R (R Core Team (2026). R: A Language and Environment for

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Supplement 1

Adapted Service Availability and Readiness Tool (SARA)

Supplement 2

Patient survey questionnaire

Supplement 3

Table and Figure Shells

Table 1. Facility Characteristics by Country and Overall

Caption: Facility survey descriptive characteristics (facility type, location, staffing, services).

Characteristic	Nigeria (n=25)	Sri Lanka (n=45)	Overall (N=70)
Rural, n (%)			
Managed by Government/NGO, n (%)			
OPD/IPD			
Other basic amenities			

Table 2. Availability of Hypertension Care Tracer Items

Caption: Availability and validity of services, equipment, diagnostics, medicines and human resources.

Domain/Item	**Nigeria n(%)**	**Sri Lanka n(%)**	**Overall n(%)**
Staff & Training			
Sites with two or more full-time staff, n (%)			
Number of full-time healthcare professionals, median (IQR)			
Full-time community health extension workers, median (IQR)			
Full-time nurses, median (IQR)			
Full-time doctors (generalists,			

specialists), median (IQR)			
Trained in CVD in the past 2 years, n (%)			
Diagnostic Capacity			
Screening			
Diagnosis			
Confirmation			
Dispense initial treatment			
Dispense follow-up treatment			
Equipment and Supplies			
Guidelines, n(%)			
Treatment algorithm, n (%)			
IEC material			
Functional BP apparatus, n(%)			
Use of electronic patient records			
Functional landline			
Functional cellular phone			
Functional computer			
Access to email/internet			
Essential Blood Pressure Lowering Medication			
ACEI, n (%)			
ARB, n (%)			
BB, n (%)			
CCB, n (%)			
Diuretic, n (%)			
CAA, n (%)			
Vasodilator, n (%)			
Fixed Dose Combination, n (%)			
No. of 30-day regimen in stock, n (%)			

CVD- Cardiovascular disease, ACEI-Angiotensin Converting Enzyme Inhibitor, ARB- Angiotensin Receptor Blocker, BB-Beta Blocker, CCB-Calcium Channel Blocker, CAA-Central Acting Agent, Diuretic includes furosemide, spironolactone, thiazide or other diuretic

Table 5. Patient Characteristics by Country

Caption: Baseline characteristics of enrolled patients.

Characteristic	Nigeria	Sri Lanka	Overall
Age, mean (SD)			
Sex, n (%)			
Male			
Female			
Other			
Education			
Occupation			
BMI			
Smoking			
Alcohol			
Treatment status			
Comorbidities			
Diabetes mellitus (type 1 or 2)			
Chronic Kidney disease			
Dyslipidemia			
Ischemic heart disease/coronary heart disease			
Heart failure			
Stroke			
Peripheral artery disease			
Sleep apnoea			
Chronic lung disease			
Cognitive impairment/dementia			
Thyroid disorders			
Other			

Table 6. Hypertension Management and Lifestyle Practices

Caption: Medication use, adherence and lifestyle practices.

Variable	Nigeria	Sri Lanka	Overall

Table 7. Blood Pressure Control Prevalence

Caption: Prevalence of BP control accounting for clustering.

Outcome	Nigeria % (95% CI)	Sri Lanka % (95% CI)	Overall % (95% CI)
BP Control (<140/90 mmHg)			
BP Control (<130/80 mmHg)			

Table 8. Factors Associated with BP Control (<140/90 mmHg)

Caption: Mixed-effects logistic regression results.

Variable	Adjusted OR	95% CI	P-value
Country			
Age category			
Sex			
Male			
Female			
Other			
Education			
Occupation			
BMI			
Smoking			
Alcohol			
Treatment status			
Diabetes mellitus (type 1 or 2)			

Table 9. Factors Associated with Mean SBP/DBP

Caption: Linear mixed-effects model.

Variable	Estimate	95% CI	P-value
Age category			
Sex			
Male			
Female			
Other			
Education			
Occupation			
BMI			
Smoking			

Alcohol			
Treatment status			
Diabetes mellitus (type 1 or 2)			
Facility readiness score			

Table 10. Sensitivity Analyses for BP Control

Analysis	Effect Estimate	95% CI	P-value
Age category			
Sex			
Male			
Female			
Other			
Education			
Occupation			
BMI			
Smoking			
Alcohol			
Treatment status			
Diabetes mellitus (type 1 or 2)			
Facility readiness score			

Results under alternative definitions and complete cases.

Table 11. Subgroup Analyses of BP Control

Caption: Associations across predefined subgroups.

Subgroup	Effect Estimate	95% CI	Interaction P-value
Age group			
Sex			
Country			
Diabetes			

Table 12. Patient Characteristics by BP Control Status

Caption: Controlled versus uncontrolled BP.

Characteristic	Controlled	Uncontrolled	P-value
Age			
Sex			
BMI, mean (SD)			
Education			
Occupation			

Rural			

Figure 1. Facility Readiness Scores by Country

Caption: Boxplot of overall facility readiness scores in Nigeria and Sri Lanka.

[Insert figure here]

Figure 2. Domain-specific Readiness Scores

Caption: Radar or clustered bar chart of readiness domains.

[Insert figure here]

Figure 3. Availability of Essential Hypertension Medicines

Caption: Bar chart of medicine availability by country.

[Insert figure here]

Figure 4. Distribution of Systolic Blood Pressure

Caption: Histogram or density plot of SBP.

[Insert figure here]

Figure 5. Distribution of Diastolic Blood Pressure

Caption: Histogram or density plot of DBP.

[Insert figure here]

Figure 6. Prevalence of BP Control by Country

Caption: Prevalence with 95% confidence intervals.

[Insert figure here]

Figure 7. Factors Associated with BP Control

Caption: Forest plot of adjusted odds ratios.

[Insert figure here]

Figure 8. Distribution of Past-Year BP Control

Caption: Histogram of BP control proportion over previous year.

[Insert figure here]

Figure 9. Subgroup Analyses

Caption: Forest plot of subgroup estimates.

[Insert figure here]