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Acceptability of patient education for hypertension self-management among healthcare providers and beneficiaries in South Africa 2023-2024: A qualitative study

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ACCEPTABILITY OF PATIENT EDUCATION FOR HYPERTENSION SELF-MANAGEMENT AMONG HEALTHCARE PROVIDERS AND BENEFICIARIES IN SOUTH AFRICA, 2023-2024: A QUALITATIVE STUDY

By

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A research report submitted to the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg in partial fulfilment of the requirements of Master of Science (MSc) in Epidemiology in the field of Implementation Science.

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Dr. Samanta Lalla-Edward

March 2025

Declaration

I, **Xoliswa Simelane**, declare that the research report is my own work, unaided work. It is being submitted for the Degree of Master of Science in Epidemiology in the field of Implementation Science at the University of Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination at this or any other university.

Xoliswa Simelane



(Candidate Signature)

I declare this on the 25th of March 2025 in Parktown, Johannesburg, South Africa

Dedication

I dedicate this report to my son Inamandla, you can do much better than what I have done in life baby. May you always remember that life is not about competition but about becoming the best version of yourself. In whatever path you choose, academic or otherwise, strive to make yourself proud and leave a positive mark in the world. You have the potential to achieve greatness in your own unique way, and I believe in you always.

Abstract

Background

The prevalence of hypertension is on the rise among people living with HIV (PLWH) in low- and middle-income countries. Previously tested interventions for integration of HIV and non-communicable diseases (NCD's) such as patient education have been implemented in South Africa. However, knowledge of acceptability of those interventions remains low in the country. We explored the acceptability of patient education for hypertension self-management among PLWH and healthcare providers in Johannesburg, South Africa

Methods

An exploratory qualitative study using in-depth interviews guided by the theoretical framework of acceptability was conducted with 18 healthcare providers and 13 PLWH who have hypertension in Johannesburg. Audio recorded interviews were conducted in English, the theoretical framework of acceptability underpinned the study and guided analysis. MAXQDA version 22 was used for analysis. This is a sub-study of the Integrating HIV and hEART health in South Africa (iHEART-SA) trial (UH3HL156388). iHEART-SA is a hybrid type II effectiveness-implementation trial of a multicomponent intervention to control, identify and manage hypertension in PLWH.

Results

PLWH who have hypertension and healthcare providers accepted health education. The identified facilitators included the use of simple language, empowerment through knowledge, and perceived health improvements. However, emotional discomfort due to booklet colours, diagnosis denial, and staff shortages were identified as barriers of acceptability. Continued training was identified as a strategy to enhance acceptability.

Conclusions

Despite these barriers the intervention was highly accepted and considered effective, with calls for broader implementation and continuous training and digital tool integration to enhance patient education acceptability. Further research should refine and adapt these interventions for diverse populations.

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To the residents of South Africa who willingly participated in this study, to provide us their experiences and preferences for the sake of contributing to the scientific health knowledge. This enabled us to understand how to design future interventions that will suit the residence of South Africa so they can be sustainable. We thank you for your generosity.

I am grateful to iHeart-SA, supported by the National Heart, Lung, and Blood Institute of the National Institutes of Health (Award Number UG3HL156388), for participant reimbursement, ensuring that I have an experienced qualitative field staff during my interviews, for ensuring field that notes were collected and lastly for ensuring that I reach all the clinics. Without this support, the study would not have been possible.

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Acronyms

Term/ Abbreviation	Definition
AIDS	Acquired immunodeficiency syndrome
ART	Antiretroviral Therapy
BP	Blood pressure
HIV	Human immunodeficiency virus
NCD	Non-communicable disease
PHC	Primary health care
PLWH	People living with HIV
SSA	Sub-Saharan Africa
SDG	Sustainable development goal
TFA	Theoretical framework of acceptability
UNAIDS	United Nations Programme on HIV/**AIDS**
WHO	World Health Organization

CHAPTER 1: INTRODUCTION

This chapter provides a background on the burden of hypertension and HIV, and patient education for hypertension self-management which is in a form of booklets and posters offered in the iHEART-SA study. The section includes a review of literature which explains the effects of patient education on hypertension self-management and a brief description of the intervention that is being assessed. The chapter ends with the rationale for the study, research question, objectives, and the theoretical framework of acceptability guiding the study.

Background

Globally, the growing burden of HIV and non-communicable diseases (NCDs) poses a significant risk to reversing the progress made by HIV programmes in reducing HIV/AIDS-related mortality and morbidity. Hypertension being the most prevalent cardiovascular disease (CVD) among people living with HIV (PLWH) (1–3). Approximately 24% of PLWH are hypertensive, equating to 8.9 million affected people globally (2,4). South Africa, home to the largest population of PLWH globally, has an estimated 7.97 million PLWH, representing 13.5% of the total population (4,5). The prevalence of hypertension among PLWH in South Africa is 25.5% with gender-specific prevalence rates of 22.4% for men and 27.0% for women; The prevalence varies by geographic location with 38.0% in peri-urban areas, 25.6% in rural areas, and 18.5% in urban areas (6). Identified factors associated with hypertension among PLWH included increasing age, elevated BMI, history of comorbid medical conditions such as diabetes, hyperlipidaemia and antiretroviral therapy (ART), particularly, regimens based on Non-Nucleoside Reverse Transcriptase Inhibitors (NNRTIs) and Protease Inhibitors (PIs) (7,8).

Despite recognizing the harm of hypertension and the efficacy of traditional hypertension treatment approaches, hypertension control remains suboptimal for most patients, even in high-income countries (9). In highly developed countries around 67% of people living with hypertension are undiagnosed, with only 55% treated achieving control while in contrast, in low- and middle-income countries only 37% of hypertensive patients are diagnosed, with only 8% achieving control (10,11). Provision of patient education is increasingly considered by programmes as a potential low-cost solution to allow patients to be able to self-manage their hypertension. Education on hypertension in a study conducted in Uganda demonstrated to increase patient understanding and self-management abilities, assisting patients in making decisions to effectively manage their medical conditions (12). Self-management has become the cornerstone of hypertension care, with five core skills - problem solving, decision making, resource utilization, and forming a patient-health care provider partnership has shown to significantly improve health-related behaviour and health status, as well as reduce health care utilization (13).

South Africa has not been left out in the implementation of patient education for hypertension self-management in HIV care.Aiming at accelerating reductions in the prevalence of hypertension among PLWH through the **I**ntegrating **H**IV and h**EART** health in **S**outh **A**frica (iHEART-SA) (NCT05846503) study (14). However, little is known of the acceptability of patient education in this setting. Thus, exploring the acceptability of patient education which is one of the interventions being offered for hypertension self-management among PLWH and healthcare providers in the iHEART-SA study provided insights on how it was accepted and how its acceptability could be enhanced.

Literature review

This section reviews evidence from literature on self-management of hypertension as a strategy for hypertension control, existing hypertension interventions in HIV management, and the use of the theoretical framework of acceptability in accessing acceptability of education intervention. This section provides a clear picture and processes that led to the researcher to explore the acceptability of the patient education intervention among stakeholders.

1.1.1. Self-management as a strategy to improve hypertension care

Self-management include activities which individuals engage in to promote wellbeing with support from family, community, and care providers, it allows patients to manage their conditions (12,15). The comprehensive approach includes pharmacological and non-pharmacological measures, encompassing aspects like adherence to medication, regular monitoring of blood pressure, follow-up consultations, adoption of a nutritious diet and physical activity, smoking and alcohol abstinence (16). Providing patients with disease-specific information and guidance on lifestyle modifications has been shown to improve clinical outcomes in patients with chronic conditions including hypertension (17). The 2017 scientific declaration from the American Heart Association stressed the importance of self-management in fostering healthier lifestyles and attaining optimal management of blood pressure(16,18,19).

Hypertension knowledge, understanding of its effects, goals of treatment, consequences of various actions on blood pressure regulation, and social support are believed to be mediators in self-management (19,20). Hypertension knowledge plays a crucial role in enhancing patients' comprehension of health issues and treatment modalities, resulting in positive alterations in health-related actions fundamental for acquiring self-efficacy skills (21). Research has shown that social support has a significant impact on self-management practice, either directly or indirectly, by enhancing self-efficacy (22). However, in a study in Malaysia participants highlighted having challenges in

maintaining the self-care practices they had learnt in the face of influences from friends and family, a primary obstacle to practicing self-management daily was a lack of self-discipline. It has been determined that the secret to effective hypertension self-management is self-determination (12). This clearly indicates that, while patients benefit from the support of families, friends, and healthcare providers their intrinsic motivation to self-manage is even more essential.

Although, self-management is a critical component in the care of patients with chronic conditions, it is often influenced by a range of factors that complicate the process. The ability of patients to manage their health within the context of their everyday environment poses a great challenge. Patients struggle with interpreting bodily signals and cues, which hinders their ability to apply medical advice to specific situations. This difficulty is compounded by a lack of tailored training and coordinated information, which limits their capacity to understand their condition, react appropriately, and plan for various self-management scenarios regardless of environmental changes (23). This gap in understanding complicates self-management by creating uncertainty in decision-making, as patients struggle to align medical recommendations with their day-to-day experiences. Another study conducted in China reported that demographic and disease factors influence self-management (13). A study among South Africans noted that people with higher levels of education, higher personal income, medical insurance coverage, and longer disease course have better self-management skills (2). Conflicting knowledge, care access, provider to provider communication, and depression were also reported as barriers of self-management (24). However, the relationship between self-management and characteristics such as age, gender, race/ethnicity, marital status, work position, and severity of hypertension remain heterogeneous. A systematic review on challenges of self-management when living with multiple conditions reported that the application of cognitive techniques, such as prioritising, reframing, and altering attitudes, enhances people's capacity to effectively manage their various chronic illnesses. Participants advocated for tailored, written information and mutually agreed-upon carefully explained care plans that prioritise and respect their goals to facilitate their self-management practices (24). These challenges highlight the need for enhanced patient education and more robust systems of support to facilitate better integration of medical knowledge and personal health monitoring in chronic condition management.

With the growing use of technology globally, mHealth has emerged as an effective tool for promoting patient education and supporting self-management. mHealth refers to the use of mobile devices such as smartphones, patient-monitoring systems, and wireless technologies to deliver health services and medical support. It incorporates various features like SMS text messages, emails, phone calls, and mobile apps (25). A recent systematic review recommended mHealth as an effective intervention for controlling blood pressure (26). For example, digital interventions like the HOME BP programme have shown promising results in improving hypertension outcomes by incorporating self-monitoring of blood

pressure, motivational training, and health behaviour support, indicating a cost-effective approach to hypertension self-management in primary care settings (27).

1.1.2. Existing interventions in the context of HIV/hypertension management

There have been evidence-based interventions implemented to integrate hypertension and HIV care and management in low-and-middle income countries: these include task shifting, information management, audit and feedback, healthcare worker education and training and patient education and support (14). National policies and interventions targeting unhealthy diets and physical inactivity, with a focus on chronic disease management services, counselling, and community-based projects to enhance patient self-management, such as a nutritious food security strategic plan, and initiatives on smoking cessation have been implemented with an aim of hypertension control (28). Task shifting has been implemented in Uganda where community health workers offer hypertension education, and this was found to be effective as they understood the communities they were working in (29). Patient education has been previously introduced in the low-and middle-income countries, and it is characterised as a collaborative relationship between healthcare providers, patients and their families, aimed at providing the necessary information to enable patients to actively engage in decision making (29,30). By empowering patients with knowledge specific to their condition and guidance on lifestyle modifications, this approach has the potential to enhance clinical outcomes (31).

1.1.3. Health education for hypertension self-management

There has been widespread advocacy for hypertension management among PLWH. Recommendations emphasize that patient-centered education reduce CVD (29). Education for hypertension self-management is a crucial element in patient care, emphasizing five key skills: problem-solving, decision-making, effective use of resources, establishing a collaborative relationship with healthcare providers, and taking proactive measures. This approach has been proven to significantly enhance both health behaviours and overall health outcomes (21). The WHO's Global Action Plan for the prevention and control of non-communicable disease 2013-2020 recommendations highlighted the importance of empowering people to seek early detection for hypertension and stressed the importance of better management of their condition by ensuring education provision, incentives, and tools for self-care and self-management are offered (32). Patient education and support in managing hypertension are prerequisites in helping PLWH dealing with daily care (2).

Self-management education using information booklets has been implemented and was found to increase dietary compliance in hypertensive PLWH in the United States, through the Health Couches for Hypertension Control (HCHC) programme which led to increased knowledge, adherence to healthy behaviours and improved BP control (32). Findings suggested that patient participation in the

management of hypertension is dependent on having necessary tools, education, and a holistic care approach (33). Blood pressure self-monitoring among hypertensive PLWH combined with education has been found to improve and reinforce adherence behaviour to medications and lifestyle modifications (12)

1.1.4. Acceptability as an implementation outcome

Acceptability has emerged as a key factor in the design, evaluation and implementation of healthcare interventions. It is a necessary factor for effectiveness of the intervention (34). The success of implementation and intervention effectiveness hinges on perceived acceptability (35). Interventions viewed as acceptable by both providers and beneficiaries are likely to enhance implementation, uptake, fidelity, and intended outcomes (35,36). A better understanding of contextual needs and preferences is crucial for successfully implementing and achieving effective outcomes. In line with the recently developed Theoretical framework of acceptability (TFA), We define acceptability as a “multifaceted construct that reflects the extent to which people delivering or receiving an intervention consider it to be appropriate, based on anticipated or experienced cognitive and emotional responses to the intervention” (34).

1.1.5. Theoretical Framework guiding assessment of acceptability

The TFA has seven essential components: affective attitude, burden, ethicality, intervention coherence, opportunity costs, perceived effectiveness, and self-efficacy (37). The researcher adopted the constructs meanings as defined by Sekhon, Cartwright, and Francis. Affective attitude is defined as “how an individual feels about the intervention.” Burden is defined as “the perceived amount of effort that is required to participate in the intervention.” Ethicality is defined as “the extent to which the intervention has good fit with an individual’s value system.” Intervention coherence is defined as “the extent to which the participant understands the intervention and how it works”, opportunity costs defined as “the extent to which benefits, profits or values must be given up to engage in the intervention”, perceived effectiveness is defined as “the extent to which the intervention is perceived as likely to achieve its purpose”, and self-efficacy is defined as “the participants confidence that they can perform the behaviour(s) required to participate in the intervention” (Figure 1) (34,38). The first 3 constructs (affective attitude, burden and ethicality) talk to retrospective acceptability while the others talk to prospective acceptability (34).

The TFA is a new concept, thus has been used in a few studies (35,37,39). The use of TFA allows for a comprehensive, rich, and diverse assessment of acceptability of interventions, and it provides opportunities to refine the intervention based on its explicit domains, ensuring a comprehensive

assessment and potential iterative improvements. Previous studies have reported overlap between constructs the perceived effectiveness and intervention coherence, opportunity cost and ethicality construct(11,29). These constructs serve as a theoretical foundation for examining the findings of a qualitative inquiry exploring the concurrent acceptability of patient education on hypertension self-management among PLWH and healthcare providers in Johannesburg, South Africa.

Studies have highlighted key factors that enhance acceptability of interventions (29,36). For example, in Uganda, a qualitative study was conducted to explore the acceptability of patient-centered hypertension education delivered by community health workers among people living with HIV (29,36). One of the studies that used the TFA identified that using easy to understand, colloquial, non-technical language in patient facilitated intervention acceptability. Community Health Workers (CHWs) also demonstrated enthusiasm in delivering this education, thanks to the necessary training that enabled them to convey information in a simplified manner conducive to patient understanding. Some of the themes were interrelated and often overlapped within the constructs (29). Specifically, overlapping themes were found between self-efficacy and burden, perceived effectiveness and intervention coherence, as well as opportunity costs and ethicality.

Another study by Renko *et al* that used the TFA to evaluate the experienced acceptability of training and anticipated acceptability of later delivering the teachers training programme. This was a longitudinal field implementation study conducted in Finland (40). It was found that the intervention was highly accepted leading to a wider reach. Which is line with what Sekhon, Cartwright, and Francis proposed “If an intervention is highly accepted it improves reach” (34). Results from a study on acceptability of mHealth strategy in Nepal showed that use of mobile phone text messaging (TEXT4BP) intervention was acceptable for hypertension management. Majority of the participants reported that the text messaging was useful, culturally appropriate, and age appropriate. With majority recommending that the intervention be extended to other settings. However, it was found that older participants did not find text messaging user-friendly. Such findings indicate a need for planning of interventions to address the needs of diverse populations to ensure acceptability to wider groups (41). In a study among low-income PLWH in the United States it was noted that offering digitally based blood pressure self-monitoring programme with training, behaviour support, and physician communication was acceptable. However, the utilization decreased with time, this suggests a need for continued education. This community health worker led self-management blood pressure programme showed promising results in improving hypertension management through education, resource assistance, and support (33). Findings highlight the importance of patient education and support in empowering PLWH to effectively manage their hypertension thereby reducing the risks of adverse events associated with hypertension.

Intervention

Patient health education is first offered in waiting areas in iHEART-SA intervention clinics through presentations / education materials on hypertension and HIV and importance of managing both conditions. PLWH are encouraged to complete vital signs measurements at each clinic visit. Here they are provided with their blood pressure readings and given information about what their reading means. They were issued with pocket sized colour coded information booklets providing easy to understand information about the measurement and what to do to either lower or maintain their blood pressure: green (normal), yellow (subnormal) and red booklets(abnormal). In the clinics there are colour coded posters again with information on what different blood pressure values mean and what lifestyle change to undertake to maintain healthy blood pressure. All the information material is available in English, isiZulu, isiXhosa, and Shona to cater for most of the clinic attendees.

Conceptual framework

The researcher aimed at assessing concurrent acceptability as the intervention is being offered, this will allow for suggestions on how the intervention may be offered for it to be acceptable. The researcher drew on the below theoretical constructs to model findings from a qualitative study to understand acceptability of patient education for hypertension self-management among healthcare providers and PLWH who have hypertension

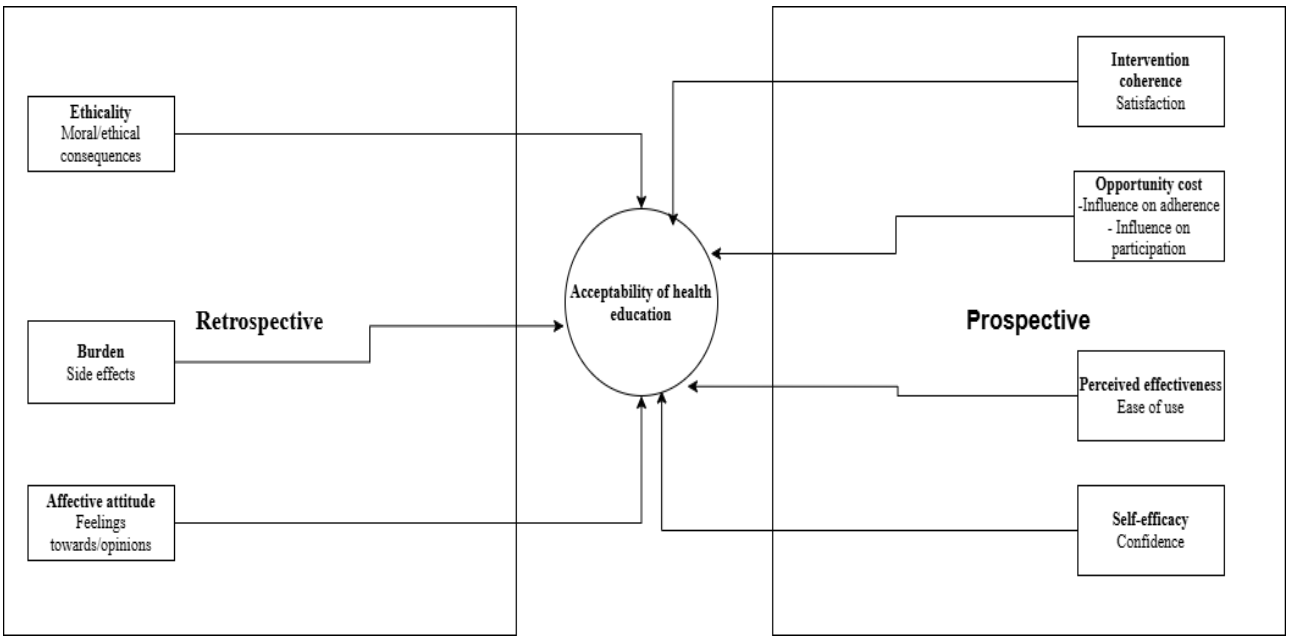


***Figure 1**: Conceptual framework (assessment of acceptability of patient education)(37)*

Problem statement

In South Africa, the prevalence of hypertension is 25.5% among PLWH (6). This is concerning because hypertension is associated with increased morbidity and mortality (33). The increasing morbidity and mortality of NCDs among PLWH places a heavy burden on the healthcare system, increases medical costs, and diminishes overall quality of life (9,42). Despite the availability of pharmacological treatments, adherence to lifestyle modifications and self-management practices remains suboptimal (43). An intervention has been implemented by iHEART-SA, providing PLWH with tailored booklets containing information on hypertension management and lifestyle modifications. The success of this intervention component relies on the acceptability of the patient education by both healthcare providers and PLWH. The healthcare providers and PLWH's acceptability of patient education for hypertension self-management had not been evaluated.

Justification

There have been several studies, each of which focus on different health conditions, which show that in instances where patients have accessed health educational materials, patient outcomes have shown improvement (20–22). Given that such interventions have shown promise, an understanding of the extent of acceptability regarding currently available hypertension educational material and what particularly could enhance future health education resources, can be very valuable in PLWH who have hypertension support material innovations which cater to the South African context. Identifying determinants of acceptability of patient education on hypertension self-management by PLWH who have hypertension and healthcare providers will provide information which will facilitate the tailoring of the intervention to the stakeholders needs. Understanding how to improve self-management. This is essential for reducing healthcare costs and improving health outcomes. Effective patient education, particularly if tailored to be acceptable and appropriate for both PLWH and healthcare providers, can enhance adherence to treatment and lead to better hypertension control, reducing hospital admissions and the strain on healthcare systems. Furthermore, the findings of this study can inform policies that promote integrated care models, where hypertension management is incorporated into routine HIV care, aligning with global strategies such as the WHO's Integrated People-Centered Health Services. Additionally, insights from healthcare providers can shape policies that better address the psychosocial and mental health needs of PLWH, ensuring that hypertension management is comprehensive, and patient centered. Finally, exploring the acceptability of patient education will ensure that future policies are culturally relevant and context-specific, increasing their effectiveness and likelihood of successful implementation.

Research question

What are the iHEART-SA stakeholders' views regarding the acceptability of patients' education for hypertension self-management?

1.1.6. Research aim

To explore the acceptability of patient education in the form of booklets and posters for hypertension self-management among PLWH and healthcare providers in the Johannesburg inner city iHEART-SA intervention clinics.

1.1.7. Objectives

1. To explore the acceptability of patient education for hypertension self-management among iHEART-SA healthcare providers and PLWH in Johannesburg, 2024.
2. To describe strategies to enhance acceptability of patient education for hypertension self-management among iHEART-SA healthcare providers and PLWH in Johannesburg, 2024.

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CHAPTER 2: MANUSCRIPT

This chapter presents the completed manuscript for the submissible research report submission. Manuscript drafted based on AFRICAN JOURNAL OF PRIMARY HEALTHCARE & FAMILY MEDICINE guidelines: https://phcfm.org/index.php/phcfm/submission-guidelines. This chapter includes an introduction of the research topic, objectives, a detailed description of the materials and methods, results, discussion of the findings and finally conclusions drawn.

Acceptability of patient education for hypertension self-management among healthcare providers and beneficiaries in South Africa, 2023-2024: A qualitative study

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Abstract

Background: The prevalence of hypertension is increasing among people living with HIV. While education for hypertension self-management has been implemented in South Africa, little is known about its acceptability by both users and providers.

Aim: To explore the acceptability of patient education for hypertension self-management among people living with HIV and hypertension, and healthcare providers in Johannesburg iHEART-SA intervention clinics.

Setting: The study was conducted in six primary healthcare facilities in Johannesburg.

Methods: A qualitative study design using in-depth interviews was conducted with 18 healthcare providers and 13 people living with HIV and hypertension. Data were gathered using a semi-structured interview guide. Interviews were conducted in English and audio recorded for transcription and analysis. The Theoretical Framework of Acceptability underpinned the structure and interpretation of the study. MAXQDA was used for analysis.

Results: The use of simple language, empowerment through knowledge and perceived health improvements were identified as facilitators of acceptability. Emotional discomfort attributable to booklet colours, diagnosis denial and staff shortages, however, were barriers. Ongoing training for patients was the preferred strategy to enhance acceptability.

Conclusion: The level of acceptability of patient education among participants in Johannesburg was high and can be enhanced via continuous trainings. Future research should further explore these aspects to refine and tailor interventions for diverse populations.

Contribution: The study contributes to the body of literature about the acceptability of patient education for hypertension self-management among healthcare providers and people with HIV and hypertension. Findings can be used in improving education interventions using innovative approaches.

Keywords: acceptability, patient education, TFA, self-management, hypertension, PLWH, healthcare providers, qualitative

Introduction

While global HIV prevalence remains concerning, various projects and national governments have enjoyed some success in managing HIV and giving people living with HIV (PLWH) the opportunity to live longer. This is largely because 77% of individuals who know their status are on ART, 72% of whom are virally suppressed[1–4]. However, with advancing age PLWH are more susceptible to developing co-morbidities; cardiovascular disease (CVD) with hypertension being one of its most common co-morbidity in sub–Saharan Africa[5–7]. Meta-analyses and systematic reviews, in sub-Saharan Africa reported prevalence estimates of hypertension in PLWH ranging from 5.2% to 50%, with its pooled prevalence being as high as 25.5% in South Africa[8,9]. One tool that can be utilized to facilitate greater patient involvement in improving health outcomes of PLWH who have hypertension, is patient education[10]. It has gained momentum in promoting HIV/hypertension awareness in Uganda for example but still needs substantial development in South Africa[11]. Therefore, this study was undertaken to gain insight into how acceptable the booklets were to patients and healthcare providers, so that this information can in future assist in formulating hypertension education endeavours.

Developing health education programmes and materials requires an awareness of which gaps in hypertension management need to be addressed. Typically, the contributing factors to South Africa are failure to diagnose, lack of patient involvement in care, inadequate treatment, and lack of disease information among patients and healthcare providers[12,13]. These factors are likely major reasons why in Africa particularly, and especially among patients with little to no education about hypertension, fewer than 40% of hypertensive individuals are diagnosed, less than 30% of whom receive treatment, and fewer than 20% of those treated successfully achieve blood pressure control[14,15]. Although South Africa's established ART programme has reduced HIV-related mortalities in the country, these have not yet fully integrated hypertension management with HIV care and PLWH often have limited knowledge about hypertension[16].

One approach to mitigating hypertension among PLWH, is to encourage self-management of the disease to complement support from health professionals, family and members in the wider community[12,15]. A key component of self-management is patient education in the form of booklets, as this could be valuable in enhancing hypertension knowledge and thereby not only increasing the likelihood of early detection of high blood pressure but also sustained hypertension control[15]. Providing patients with disease-specific information and guidance on lifestyle modifications has been shown to improve clinical outcomes in patients with chronic conditions including hypertension[17,18]. South Africa has not been left out in the implementation of these interventions to urgently incorporate hypertension therapy and advocacy in HIV care aiming at accelerating reductions in the prevalence of hypertension among PLWH. The **I**ntegrating **HI**V and h**EART** health in **S**outh **A**frica (iHEART-SA) (NCT05846503) study aims to address how a multi-component intervention designed to improve hypertension diagnosis

and management in PLWH can enhance the delivery of guideline-recommended care in primary healthcare PHC clinics in the Gauteng province[19].

A common feature in health education is reading material like pamphlets, posters, and more recently audio-visual resources. There have been several studies, each of which focus on different health conditions, which show that in instances where patients have accessed health educational materials, patient outcomes have shown improvement[20–22]. Given that such interventions have shown promise, an understanding of the extent of acceptability regarding currently available hypertension educational material and what particularly could enhance future health education resources, can be very valuable in PLWH who have hypertension support material innovations which cater to the South African context.

Gauging acceptability means understanding how patients cognitively and emotionally react to an intervention, in relation to their expectations or previous experiences[11]. Such measurements are important to healthcare innovation, as they can influence how successfully a programme can be carried out, whether the recipients trust and are willing to sustain their involvement in it and the extent to which the intended outcomes of the intervention are realized[19]. Improved understanding of contextual needs and preferences is important for successful implementation. To this end, Sekhon, Cartwright, and Francis proposed a Theoretical Framework of Acceptability (TFA) comprising seven constructs named affective attitude, burden, perceived effectiveness, ethicality, intervention coherence, opportunity costs, and self-efficacy. This framework, when employed in interview design, allows the researcher to gain a comprehensive understanding of how and why a participant responds in the way they do. This insight can then be used to create a product which as far as possible is agreeable to recipients/users[11]. We have used these components as a theoretical foundation for our study, examining the findings of a qualitative inquiry to assess the acceptability of booklets and posters on hypertension self-management among PLWH who have hypertension and healthcare providers in Johannesburg, South Africa, participating in the iHEART-SA study, described earlier.

Research methods

Study design

This study employed an exploratory qualitative design rooted in phenomenology to understand the acceptability of patients and healthcare providers regarding currently used educational materials for hypertension self-management, through in-depth one-on-one interviews (IDIs).

Study setting

The study was conducted in six primary health care (PHC) clinics in the City of Johannesburg Region F participating in the iHEART-SA study. All clinics were owned by the City of Johannesburg municipality. In 2019, it was estimated that each clinic served 5681 PLWH and hypertension. These clinics offer sexual and reproductive health services, comprehensive acute and chronic care, community outreach, and HIV, and tuberculosis screening and treatment services[19]. PHCs are the foundation of the South African healthcare system and where the majority of hypertensive PLWH are managed [23,24].

Study population

The population of interest included PLWH who have hypertension and healthcare providers (Professional and enrolled nurses) who are part of the iHEART-SA study. For PLWH who have hypertension the inclusion criteria were: ≥18 years old, able to converse in English, willing to give written informed consent, had been using antihypertensive medication for six months or more, and on ART for a year and virally suppressed. Participants were invited to take part in the study as they came for their chronic medication refills. Eligible healthcare providers were those with experience in delivering health education within the selected PHCs. No participant refused to participate or withdrew from this qualitative study.

Sampling strategy

Using convenience sampling, only participants who were part of the iHEART-SA studies, who met eligibility criteria and consented to participating in further investigations, were invited to participate in the study as they presented themselves at the clinic to collect their chronic medication refills. Eligibility was confirmed from the iHEART-SA study database.

Healthcare providers offering iHEART-SA intervention were purposively recruited. The researcher approached these individuals after obtaining their information from the iHEART-SA research coordinators.

iHEART-SA educational material

When patients completed their vitals measurements on their medication refill visits, they were provided with their blood pressure readings and given information about what their reading meant. They were issued with pocket-sized colour-coded information booklets (green for normal, yellow for elevated, red for high/hypertensive). The booklets also included information about the measurement and what to do to lower or maintain their blood pressure, or to include medication adherence as well as holistic health and wellness behavioural strategies. In the clinic there were also colour-coded posters, again with information on what different blood pressure values meant and what lifestyle change to undertake to get pressure under control or to maintain healthy blood pressure. All the information materials were available in English, isiZulu, isiXhosa, and Shona to cater for most of the clinic attendees.

Data collection

During June and July 2024, trained researchers conducted in-depth interviews using a pilot-tested semi-structured interview guide (Supplementary material A & B) that was developed using the TFA by Sekhon (25,26). Data were collected at the PHCs or at the iHEART-SA research offices in cases where PHCs did not have space. On average, interviews lasted for 25 minutes. The IDIs were audio-recorded. Data from the pilot interviews were included in the final analysis to enhance credibility.

Data analysis

Audio recordings were transcribed verbatim, and quality checked. Initially, deductive coding was utilized to organize the data according to each TFA domain (affective attitude, burden, ethicality, opportunity cost, intervention coherence, perceived effectiveness, and self-efficacy). Directed content analysis was then applied to identify and categorize instances of TFA domains. This process involved reading each transcript and coding occurrences related to each TFA domain using the definitions provided for each domain[26]. Specific codes within each TFA domain were grouped into themes. Coding was done individually and then discussed within the research team to ensure intercoder reliability and consistency in the coding. MAXQDA software version 22 was used for analysis. The findings of this study were reported according to the consolidated criteria for reporting qualitative studies (COREQ)[27] (supplementary material C).

Ethical considerations

The ethics approval for this study was obtained from the University of the Witwatersrand Human Research Ethics Committee (reference number:M240316). Ethics for the parent study was provided by the University of Witwatersrand (reference number: M200882) and Emory University. Permission to conduct the sub-study was provided by the iHEART-SA principal investigator. The study was conducted according to the ethical guidelines of the Declaration of Helsinki. Written informed consent was obtained prior to participation, participants were reminded that they could withdraw themselves from the study at any point without fear of not getting their health education. The audio recordings and the transcripts were kept secured electronically in a password-protected folder that was only accessible to the study investigators. A unique code was allocated for each participant to ensure confidentiality, no personal identifiers were used during storage or analysis. Each person with HIV and hypertension received R150.00 reimbursement to compensate for their time, inconvenience and travel.

Results

The findings are presented under the seven constructs of the TFA: affective attitude, self-efficacy, burden, perceived effectiveness, opportunity costs, ethicality, and intervention coherence. We present the results within each construct divided into distinct sub themes.

Demographic characteristics of the participants

A total of 31 in-depth interviews (IDI) were conducted. There were 13 patient participants who had HIV and hypertension among whom 11 were female and 10 had attended school up to grade 12. The mean age was 43.9 years, with an average duration of 10.5 years living with HIV and 5.8 years living with hypertension. The number of participants in each of the single and married categories was 4/13 (30.77%). Most of the patients (8/13, 61.54%) had at least some type of employment (see Table 1)

A total of 18 healthcare providers enrolled in the study, with the minority (2/18, 11.11%) being males. Healthcare providers' ages ranged from 30 to 64 years. Healthcare providers had a minimum of 4 years of experience working in PHC settings in Johannesburg Region F. Professional nurses comprised the bulk of the healthcare providers sample (11/18, 61.11%) refer to Table 2.

Table 1 *Summary of the social demographics of PLWH who have hypertension*

Characteristics	Frequency (N)	Percentage (%)
Gender		
Female	11	84%
Male	2	16%
Level of education		
Primary	3	23%
Matric	8	62%
Tertiary	2	15%
Marital status		
Single	4	31%
Married	4	31%
Widow	3	23%
Divorced	1	7.5%
Widowed	1	7.5%
Occupation		
Employed	7	54%
Self employed	1	8%
Not employed	5	38%
Age in years [mean(sd)]	43.9(7.0)	

N, number; %, percentage; sd, standard deviation.

Table 2 *Summary of social demographics of healthcare providers*

Characteristics	Frequency (N)	Percentage (%)
Gender		
Female	15	83%
Male	2	11%
Transgender	1	6%
Marital status		
Single	6	33%
Married	12	67%
Occupation		
Professional nurse	11	61%
Enrolled nurse	5	28%
Health promoter	2	11%
Age in years [mean(sd)]	38.7(7.6)	

N, number; %, percentage; (sd, -standard deviation)

TFA constructs and themes

Eleven themes emerged from the seven TFA constructs. Three themes arose from the affective attitude and burden constructs. Emotional discomfort due to colours (affective attitude construct) and staff shortage and diagnosis denial (both under the burden construct) were identified as barriers to patient education. The remainder of the themes (8/11) were all viewed as facilitators of health education.

Table 3 *Acceptance of patient education for hypertension self-management. A summary of the Themes and TFA construct*

TFA construct	themes	Facilitator or barrier
Affective attitude	Simple and understandable language	Facilitator
	Empowerment through knowledge	Facilitator
	Emotional discomfort due to colours	Barrier
Burden	Effort	Facilitator
	Staff shortage	Barrier
	Diagnosis denial	Barrier
Ethicality	Empowering and reduces workload	Facilitator
Intervention Coherence	Health improvements	Facilitator
Opportunity costs	Benefits	Facilitator
Perceived effectiveness	Improvement in hypertension management	Facilitator
Self-efficacy	Confidence in self-management	Facilitator

TFA, theoretical framework of acceptability.

Acceptability of patient education for hypertension self-management

Construct: Affective attitude

Affective attitude denotes how an individual feels (either negatively or positively) about the intervention (26). Two themes were identified as facilitators (simple understandable language, empowerment through knowledge) and one as a barrier (emotional discomfort due to colours) of affective attitudes towards the patient education for hypertension self-management.

Theme: Simple understandable language

Both patients and healthcare providers welcomed the fact that irrespective of which South African language was used in the educational material, both the simplicity of the language as well as the graphically presented information was understandable. There was appreciation of the blood-pressure tracking table included in the booklet.

> *"Everything is quite clear and simple if you give yourself time to understand what exactly the contents of the booklet are, everything is written in simple English. There are also pictures in my book which makes it easy for me to understand. Also, the booklet has a table where I write and track my blood pressure" (JPC-741, female,33 years, matric)*

"So far so good. I cannot complain and what I like about it, even the information that is in the booklets, it's very simple, straightforward, even our patients are able to understand it. Remember the information is provided in a very simplified language…Zulu, Xhosa, English" (HCW005, male,34 years, Health Promoter)

Theme: Empowerment through knowledge

The patient education empowered PLWH who have hypertension to understand their condition. The booklet was viewed as being akin to a convenient reference text, which they could consult when in doubt about their health conditions. Healthcare workers shared a similar sentiment with respect to the enhancement of their hypertension knowledge. Further, they found the educational material, especially in the absence of formal professional development sessions, to be a reliable source of updated information which they, in turn were able to use to guide their practice.

"It's very helping, because if there's something that I don't understand, I just open the book and read. So, it serves as my reference every time…and I am very happy with the education am getting at the clinic." (MVC643, female, 33 years, matric)

"When I joined the clinic, I was not competent in offering hypertension education but through this booklet I have been able to gain information, am excited about this booklet. It has sharpened my hypertension education skills... remember guidelines change so this booklet has all information that I need to share with my patients… it has been easy to offer education now. I have learnt from this booklet. I have not attended any training but through this intervention I am empowered." (HCW018, female 32 years, Professional Nurse)

Theme: Emotional discomfort due to colours

While participants expressed their overall interest for the intervention, some noted discomfort associated with the colours of the educational materials provided. Healthcare workers revealed that patients felt that red booklets drew unnecessary attention to the recipient. Some patients found this to be so distressing, that they refused the booklet, but others put aside their fear of social exclusion in favour of the healthcare workers' advice to focus on improving their health instead. It should be noted however, that such discomfort was not universally perceived as a barrier to successful health education.

"One of my clients refused to take a red booklet because he did not understand why he had to get a red one, after explaining he promised to come back better next visit… he refused to take the booklet because of the colour." (HCW001, female,39 years, Professional Nurse)

"The colours are a bit offside because, you know, people tend to stigmatize you when you have something that obviously is different from them, carrying the red booklet is not great, but what the nurse told me was not to focus on the colour but to understand why I got the red one and aim to reduce the BP (blood pressure)." (MVC643, female; 33 years, matric)

Construct: Burden

Burden refers to effort an individual thinks is required for the successful outcomes of the intervention if they participate (26). There were three themes for burden: one facilitator being effort and two barriers being staff shortage and diagnosis denial.

Theme: Effort

Patient participants were initially more amenable to the guidance available from educational healthcare literature and healthcare workers than others. However, the general feeling was that the steps they needed to take to maintain acceptable blood pressure was more significant than inconveniences like having to concentrate on the information they needed to read. In fact, the desire to be able to manage their hypertension was so strong that some went to great lengths to adapt their habits and monitor their own blood pressure.

"Yes, reading the booklet requires concentration but I think it's for my good because now I know how to manage my BP (blood pressure) … I remember one day the nurse made me stay long in his room telling me about my BP I was annoyed because it was like he was threatening me about stroke, but after that session I felt the need to change my lifestyle… that really helped. Now my BP ranges between 130/89 and 136/92." (GNC494, male, 62 years, matric)

"Oh, it's easy. It's easy to self-manage because you know that if it's high, it means I'm doing something wrong. So, I must adjust what I'm doing wrong. I have brought myself a BP (blood pressure) machine just to check it at home and I record on the booklet so that my nurse can see the BP… this has helped me to know what makes it high (participant laughs) it's relationship stress." (ESC748, female, 43 years, matric)

Theme: Staff shortage

Staff shortage resulting from over-burdened clinics was a key barrier to offering comprehensive education. Despite their eagerness to engage in the intervention, healthcare workers expressed concerns that these conditions limited the quality and consistency of health education they were able

to offer patients. They felt strongly that additional staff were paramount to ensuring the success of the intervention, failing which they would have little choice but to utilize their time dispensing medication.

> *"…sometimes we don't have enough time to give health education because it's busy. This clinic is one of the busiest in Johannesburg sometimes it becomes hard to do other stuff such as offering the intervention. Thus, we end up focusing on only giving medication only not focusing on the intervention…There is a need for more staff so that we can offer the intervention." (HCW006, female 44 years, Enrolled Nurse)*

> *"Oh, oh. I think it's quite doable. However, as I mentioned, that the more human resource or staff, the more it's doable…. but having extra staff to focus on delivering the intervention can work." (HCW007, female 44 years, Professional Nurse)*

Theme: Diagnosis denial

Despite the healthcare providers' motivation to offer hypertension education, accepting hypertension diagnosis is at times problematic particularly for PLWH. This is either because they find it inconceivable that they could have multiple diseases concurrently, or because they view HIV as being a far more serious condition than hypertension. Consequently, patients neglect their hypertension management, and at times this is exacerbated by their healthcare professionals who over-focus on HIV to the detriment of hypertension. The healthcare provider reported that such attitude towards hypertension management could jeopardize the continuity of hypertension patient education

> *"In some cases, it is a challenge because some of our patients do not believe that one can have both conditions. For example, a patient taking ART might not accept that they have hypertension on top of HIV. They do not concentrate on taking care of themselves when it comes to hypertension; the only thing that matters to them is HIV. So, now you are telling them their BP (blood pressure) is high, and they need to take antihypertensives it becomes a problem." (HCW002, female 35 years, Professional Nurse)*

> *"Patients tend to concentrate only on HIV, they don't want to accept hypertension diagnosis. So, offering hypertension education becomes hard. I am not sure how we can work around this one going forward because what happens is that the clinicians themselves, they concentrate more on HIV than hypertension. That is why am worried about sustainability of patient education hypertension." (HCW002, female 35years, Professional Nurse)*

Construct: Ethicality

Ethicality refers to the extent to which the intervention is considered a good fit with personal values (26). One theme was identified; patient education was found to be empowering and reduced workload.

Theme: Empowering and reduces workload

Educational intervention was doubly beneficial to PLWH who have hypertension as they were able to self- manage their health as well as build up the confidence to advocate for the programme within their communities. Healthcare providers reported to have a reduced workload as their clients are having information from the booklets and posters.

> *"It helps me. It reduces the burden of me having to say one thing all the time because some patients, just by looking at the posters, they can be able to have the hypertension information they are able to take points to say…this is what I need to do to control my BP (blood pressure). It is a very good thing because it also reduces the burden on my job, you know… It fits well with my work ethic." (HCW017, female, 36 years, Enrolled Nurse)*

Moreover, PLWH and hypertension viewed the intervention so positively that they expanded the intervention's broader impact by proactively sharing hypertension information and even suggested that the intervention should be expanded to include other clinics.

> *"I have started sharing my booklet with my friends, family because I can see that this thing is working, there is a great need to have this education provided in every clinic." (MVC643 female,33 years, matric)*

Construct: Intervention coherence

Intervention coherence is the extent to which participants understand the intervention and how it works (26). Health improvements were identified as a factor facilitating acceptance of patient education.

Theme: Health improvements

The health education was viewed as useful to the participants. PLWH who have hypertension explained that applying the information from the sessions helped them to improve their adherence to medication, manage their blood pressure, and improve their well-being with some expressing excitement at being able make informed health management decisions. Patients' claims were verified by healthcare providers who remarked that they have noted a decline in the number of PLWH with uncontrolled hypertension.

"Health education is very beneficial to me because I am now able to control my blood pressure through exercising, through cutting down some foodstuffs and eating healthy, and able to take my medication correctly. It has been quite beneficial to me. And as I noticed last month, my blood pressure was normal. It's really helping me a lot." (MVC545, female, 42 years, matric)

"It benefited them in terms of managing their blood pressure, patients with uncontrolled BP (blood pressure) have declined. You can tell from their booklets that there is a change; people's BP is improving compared to before the introduction of the intervention." (HCW002, female,35 years, Professional Nurse)

Construct: Opportunity cost

Opportunity cost refers to the potential loss or gain from other options when a choice is made (26). Participants reported to have gained more benefits from participating in the intervention, this was the only theme identified as a facilitator for acceptability of patient education for self-management.

Theme: Benefits

Participants found the opportunity cost of engaging in the intervention to be justified by the benefits they received. PLWH and hypertension reported that if there is a chance of getting more information on hypertension they would want to get more. While healthcare providers reported that the health education has led to reduced number of patients they see in the facilities.

"For me, this was not a problem because I was there in the facility to do that. It works for my benefit that if people have managed BP (blood pressure), it becomes lighter even in the facilities. Do you understand that if this can be done across the country, in the long run, we might have reduced the number of people seen in the facilities? This also provided me a chance to learn new things. It allowed me to learn why people fail to take medication." (HCW002, female, 35 years, Professional Nurse)

Another participant shared same sentiments

"There is nothing that feels refreshing than getting my hypertension education, there is no way this can feel like wasting my time why say that, is like if you get more education will be little more informed on different things to manage my high blood…okay I mean that I will learn and that it would make a change." (ESC501, female, 43 years, matric)

Construct: Perceived effectiveness

Perceived effectiveness refers to the extent to which an intervention is expected to achieve its purpose (26). Participants reported that patient education facilitated an improvement in their hypertension management skills.

Theme: Improvement in hypertension management

Provision of health education was reported to have increased awareness among PLWH with hypertension. Participants reported improved health status and were excited that they can self-manage, which had led to reduced clinic visits.

> *"The education contributes positively to their lives, we have seen great improvement in overall health status in our patients with hypertension in this facility, the education has helped in allowing people to understand their condition." (HCW003, female, 31 years, Health Promoter)*

PLWH and hypertension felt the same way as healthcare providers.

> *“The education is very helpful sister; my hypertension is now managed after I have been following the guidance…I find the materials to be effective. They are helpful in providing essential information and supporting my health." (MVC643, female, 33 years, matric)*

Construct: Self-efficacy

Self-efficacy is an individual’s confidence that they can perform the procedures of the intervention (26). One facilitator was identified as confidence in self-management.

Theme: Confidence in self-management

As evidenced in the transcript extracts for several of the previous themes, not only did patients view themselves as possessing high levels of confidence in their ability to manage their hypertension, but the healthcare professionals also displayed confidence in the patients’ hypertension management competency. This newfound confidence was reflected in patient’s ability to monitor their blood pressure, adhere to medication, and make informed lifestyle choices.

> *“I am very confident in managing my high blood, you know the way this change has excited me. I am now able to self-manage; can check my bp, take my medication correctly. My booklet is my bible.” (ESC501, female, 43 years, matric)*

Healthcare providers feel confident in providing education for hypertension self-management because they have positive experiences.

"I am super confident. Yeah, I'm confident, because I have seen it working for my patients, they are doing well and staying in treatment." (HCW006, female, 44 years, Enrolled Nurse)

Strategies to enhance acceptability

Apart from the TFA guided interview, all participants also responded to prompts requesting suggested strategies to improve acceptability. Healthcare professionals advocated strongly for ongoing training to be able to keep abreast of evolving guidelines and practices relating to hypertension management. PLWH and hypertension suggested including more non-traditional ways of disseminating hypertension information and sustaining interest in related matters, like using multimedia and strategies. Some participants also emphasized that since mobile phones are widely used, they could be used to send messages to patients. One concern was however that accessing patients' active contact details might be an obstacle.

Training

Healthcare providers and PLWH who have hypertension reported the importance of ongoing training to ensure they stay informed of hypertension information. Whether it's through monthly workshops, screens in waiting areas, or health reminders on phones, these methods can make a sizable difference in how well PLWH who have hypertension retain and apply the information they are given.

"The workshops can be done at least once a month, or quarterly. There is a need for us to undergo training frequently to stay updated with hypertension information. Guidelines keep on changing so there is a need that we keep up with new information" (HCW005, male, 35 years, Health Promoter)

Participants emphasized the need for the integration of multimedia resources to reinforce educational messages, such as using screens in waiting areas to continuously display educational content.

"…Lastly is to have something we can watch. It will help. Because remember, when we are sitting there by the waiting area, you're thinking about a lot of things at home, right? But if there could be something to watch related to hypertension that will allow us to have more knowledge. It will also benefit those that are not yet hypertensive." (GNC154, female, 39 years, tertiary)

Other participants shared that sending PLWH educational messages could be effective, although one patient participant cited that this might be hard especially getting patients active contact details

"Creating a database of people with hypertension, sending them messages on hypertension will be great. You know, people like their phones. It's easy for them to check. These messages

should be structured as the booklets are. In that way, I think this intervention could work more effectively." (GNC494, male,62 years, tertiary)

Discussion

In this study undertaken in Johannesburg, South Africa, in-depth interviews were conducted with a total of 31 participants, including PLWH and hypertension patients and healthcare providers to gain clarity on their acceptability of the current tools for patient education for hypertension self-management. We found that there was a high acceptability among healthcare providers and PLWH who have hypertension alike. Identified facilitators of acceptability of patient education were simple and understandable language, empowerment through knowledge, effort, empowering and reduces burden, health improvements, benefits, improvement in hypertension management, confidence in self-management. Emotional discomfort due to colours, staff shortage, and diagnosis denial were barriers of acceptability of patient education. Participants also identified sustained professional development for healthcare staff, multimedia presentations and messages communicated to patients' mobile phone as potential areas for hypertension education improvement.

The recurring responses from both patients and healthcare providers emphasized the fact that hypertension education benefited both groups of respondents. Patient participants appreciated the fact that the intervention empowered them to assume more control over their health. The implication of such empowerment bodes well for patients like those in our study, since the potential advantages extend beyond just encouraging regular blood pressure monitoring and medication management. In fact, Vainauskiene *et al* state that patients who feel empowered to self-manage their conditions also enjoy better mental health and relationships with others[28]. Another positive result of patient empowerment is that it reduces over-reliance on healthcare staff in monitoring patients' hypertension, nurses could support such patients without needing to spend long periods of time on one patient and were able to perform other duties apart from administering medication. Each disease in isolation of the other may not necessarily have the same positive outcomes for patients and their healthcare providers when patients have to manage both conditions concurrently, for as Gondongwana, De Wet-Billings & Milovanovic warns that not all patients are able to cope with multiple treatment regimens, and even in instances where patients can access integrated chronic care facilities, not all health professionals have the adequate skills across a range of chronic conditions to be able to provide acceptable levels of patient support [29]. This suggests that the results from our study, when analyzed in tandem with HIV self-management investigations, can be used to inform further health education solutions for PLWH who have hypertension.

Our study showed that simplified educational materials improved patients' comprehension of hypertension thereby facilitating their self-management Patients were inspired to share information with friends and family. This means that people with whom these patients share information with may be encouraged to take control of their health too. This is not a far-fetched possibility, as a recent scoping review in the lower- and middle-income countries suggested that stakeholders' opinions on recommending treatment intervention to a friend or family helps determine acceptability [30]. Studies undertaken in various sub-Saharan African countries (including South Africa, Uganda, Ethiopia and Nigeria) have also shown a positive correlation between the ease with which patients can understand information and the willingness to share it with the greater community and subsequent uptake in disease management[11,31–34]. Besides language, a Ugandan investigation concluded that PLWH who received structured hypertension education had better adherence to medication and lifestyle modifications compared to those who did not receive hypertension education[31]. If the way information is presented as well as the accessibility of the language used is well considered, it could be beneficial to policy makers and hypertension content creators particularly for South African PLWH with limited formal education, who are susceptible to high hypertension-related mortality.

This study also highlighted that while participants acknowledged the effort required to engage with the intervention, they perceived these demands as justified by the benefits. The balance between perceived burden and benefit is essential, as it aligns with the TFA, which posits that interventions are more likely to be accepted when the perceived benefits outweigh the costs [26]. Our study reported inconsistencies in perceptions about the colour of the booklets used. While a few expressed emotional discomfort stemming from the belief that the colour led to stigma, others believed that the booklet's information was more important than the colour used. This finding is supported by previous studies that emphasize the importance of perceived effectiveness in the acceptability of health interventions[13,26,35]. The positive response to the intervention is consistent with the evidence supporting the effectiveness of patient education in managing chronic diseases[11,22]. We are convinced that one explanation could be that our results may explain a common belief among individuals that certain situations and solutions may not be universally applicable. Although the entire iHEART-SA intervention was designed with extensive and intense stakeholder input; this study indicates that there will be no intervention that will have universal satisfaction from its recipients.

It emerged that patient education could be more acceptable if there could be continued training for health professionals, and integrating multimedia resources (sending health messages, screens displaying educational content in clinic waiting areas). These were thought to be practical strategies to reinforce health messages. Our findings are in line with what previous studies reported where implementing mobile health reminders have been acknowledged for their potential to enhance patient

outcomes, and as an effective tool for engaging diverse population groups[36–38]. This could serve as a better strategy as it was noted in a hypertension health coaching study among PLWH in the United States, that offering a digitally based blood pressure self-monitoring programme with training, behaviour support, and physician communication was acceptable, although it had to be mentioned that the utilization decreased with time [39].

Incorporating the messaging of health education between clinic visits could serve as a back-up because once PLWH are managed, they become eligible for multiple month dispensing[40]. Thus, having the option of health education in between longer visits could serve as a means of continuing patient engagement. This approach could help bridge the gap between patient visits and ensure that key information is consistently reinforced. However, barriers such as the logistical issues of maintaining accurate patient contact details for mobile reminders must be addressed. Strategies such as routine data updating during clinic visits or integrating this task into existing health information systems could enhance the feasibility of this approach.

This study provides new insights into the potential of using multimedia resources within clinic settings as a means of reinforcing educational messages, a method that could be particularly effective in resource-limited settings. For example, a study that examined the impact of a digital hypertension self-management and lifestyle change support programme on blood pressure in the United States reported that comprehensive digital heath on hypertension and home blood pressure monitoring was effective for self-management over a year[39]. The emphasis on regular training aligns with previous research that highlights the dynamic nature of hypertension guidelines and the necessity for continuous professional development among healthcare providers[41]. There is a need to have regular in-service trainings to ensure healthcare providers are offering updated care.

Findings from this study highlight the need to appreciate that applying the TFA requires welcoming the overlap of themes within constructs, as such interpretation of findings requires a multi-faceted lens since they fit in more than one construct. For example, empowerment through knowledge, empowering and reducing workload, confidence in self-management and improvement in hypertension management. These themes highlight how participants gained knowledge, confidence and empowerment through patient education. They are all framed under different constructs, but they all centre around the benefits of knowledge leading to better management and confidence. This finding is consistent with what other studies reported on the issues of overlap while using this framework [11,13,42]. This overlap could be because this research explored concurrent acceptability, thus assessing all seven constructs. To address this overlap, several strategies can be employed. First, clearly defining each construct with operational definitions can help delineate their unique characteristics. Second, employing distinctive terminology for each construct can reduce confusion and enhance clarity.

Strengths and limitations

This is the first study of its kind in South Africa that informs about the acceptability of patient education offered by iHEART-SA. Several important strengths were noted. First, our study explored concurrent acceptability and enabled participants to suggest strategies to enhance the acceptability of the intervention, for modifications in intervention delivery. Secondly, we recruited participants from different PHC facilities to judge acceptability from varied locations. Thirdly, we interviewed stakeholders in the provision of hypertension care thus getting perspectives from both patients and providers. Our study had some limitations: the study had more females than males for both PLWH and hypertension and healthcare providers (which is consistent with the sex distribution in the area). It is uncertain whether sex differences may affect acceptability of patient education. Further, a large majority of the patient population had completed formal secondary schooling with a few having received higher education. This means that it is possible that patients with no to very little education or low literacy levels may not be able to engage with the educational material with the same level of understanding as our study participants.

Conclusions

There may be a need to restructure the TFA as there is a noticeable overlap of themes within constructs. The educational booklets and posters were acceptable by both healthcare providers and PLWH and hypertension. The results suggest that successful implementation of patient education is feasible and appreciated. Additionally, innovative integration of continued education and training for hypertension self-management is critical in HIV programmes. Programme designers need to maximise on this by tackling the recognized barriers to implementation and leveraging technology. There is potential to improve patient education and adherence, leading to better health outcomes. Future research should further explore these aspects to refine and tailor interventions for diverse populations, contributing to more effective health education strategies that can be broadly applied.

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Competing interests

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Author contributions

X.S, J.K, and S.T.L-E conceptualised study and methods. X.S and A.N organised and conducted data collection. X.S analysed and interpreted the data under the guidance of J.K, A.N, and S.T.L-E. X.S wrote the draft manuscript and J.K and S.T.L-E performed a critical review. All authors have read and approved the final manuscript.

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Data availability declaration

The data for this study is available on reasonable request from the corresponding author.

Disclaimer

The authors stated that the views expressed in this article are their own and not an official position of the institution.

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CHAPTER 3: EXTENDED METHODOLOGY

Introduction

This chapter provides further details on the procedures and techniques employed in the study, beyond what was included in the manuscript. It aims to offer a more comprehensive understanding of the research processes, with additional information regarding the primary study, study design, setting, data collection, and steps taken to ensure trustworthiness.

Study design

Primary study

iHEART-SA is one of six Africa-wide projects comprising the Heart, Lung, and Blood Co-morbidities Implementation Models in People Living with HIV (HLB-SIMPLe) Consortium funded by the US National Heart, Lung, and Blood Institute (NHLBI) (1). This is an ongoing intervention study which is being conducted in 9 primary healthcare clinics in the Gauteng province. iHEART-SA aims at assessing the short- and long-term effects of patient education on patient blood pressure reduction among patients living with HIV and hypertension. iHEART-SA adopted a cluster randomized step wedge effectiveness-implementation type 2 hybrid study design, which allows testing of strategies to promote integration of improved hypertension screening and management practices in real-world clinics while simultaneously assessing clinical effectiveness. This research project is a collaboration among four institutions namely University of the Witwatersrand, Utrecht University, Harvard University, and Emory University. Full protocol of the iHEART-SA study is under publication, all details can be found elsewhere (2).

Study design

This qualitative study was nested in a bigger on-going feasibility study conducted in 9 primary healthcare clinics in Johannesburg region F, South Africa explained above.

Study setting

The study was conducted in 6 purposively selected primary healthcare clinics in Region F of Johannesburg, namely Jeppe, Crown Gardens, Glenanda, Esselen, Malvern, and Kibler park clinics. All clinics are owned by the Metropolitan Municipality. The accompanying map below illustrates the various regions within the city of Johannesburg. Although this study was conducted in one specific region, the map provides an overview of the broader geographical context.

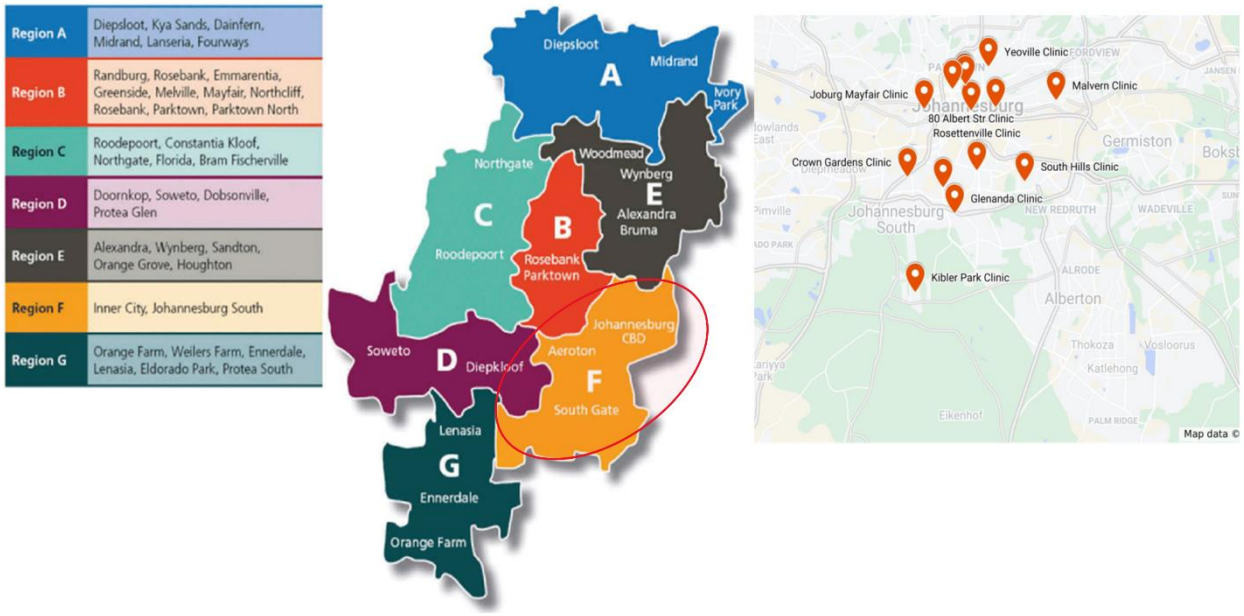


***Figure 2**: Region F location with nine main study clinics*

Data collection

One question per domain of the Theoretical Framework of Acceptability was included. The interview questions for both groups were developed based on the same framework, ensuring a consistent approach to data collection while addressing the unique contexts of each group. The overall structure of the guide remained consistent (see Supplementary Files D and E). On average, interviews with PLWH/hypertension lasted 22 minutes, whereas interviews with healthcare providers averaged 27 minutes.

Study population

A professional nurse is a practitioner who has successfully completed a four-year nursing training program in accordance with Regulation 2175 of 1993, as amended, and is capable of functioning independently. In contrast, an enrolled nurse is a practitioner who has completed a two-year nursing training program under the same regulation and performs duties under the direct or indirect supervision of a registered professional nurse. In the context of this study, both professional and enrolled nurses are those providing the iHEART-SA intervention.

Steps taken to ensure trustworthiness

The study enrolled participants from six out of nine selected clinics, which served diverse populations across different social classes, enhancing the transferability of the findings. Researchers recognized that their professional backgrounds and clinical expertise could influence the research process by

creating assumptions about effective care practices. To counter this, they used a reflexive approach, documenting reflections, thoughts, and potential biases in a reflexive journal during data collection. This method ensured that the study's findings accurately reflected the experiences and perspectives of people living with HIV and healthcare providers. The use of reflexivity maintained the integrity and objectivity of the research. As a result, the findings are more representative and credible.

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SUPPORTING INFORMATION

Supplementary material A: PLWH Interview guide

Good morning/afternoon.

You are welcome to this interview. My name is _____

I am from the University of Witwatersrand, school of Public Health, which is in Parktown, Johannesburg, South Africa. I am grateful to you for agreeing to join us here today. I'd like to speak with you about your thoughts on the acceptability of patient education for hypertension (high high) self-management. During the interview, I would like to get your feedback about the high high information you received. I want to know if you think that the information is correct for you (appropriateness), are happy with getting the information and what is put in the books (satisfaction), what makes you use the information (facilitators), and anything that makes you not want to use the information (hurdles) to implementation. The goal of this interview is to collect all your views so that we can make suitable recommendations to healthcare providers and the department of health about having this all the time / into routine care. Your opinion matters and it will be respected. Feel free and give your opinions. All information discussed will be kept confidential. We are tape recording and taking notes to be able to keep track of all that is being discussed, is that okay with you? (**Researcher asks for verbal consent**) Thank you very much.

For us to discuss freely we would like to first get to know each other, name only.

In South Africa, many people living with HIV develop hypertension and require ongoing health education. An education intervention in the form of booklets, posters and training for healthcare providers is currently being implemented in this clinic.

1. What are your views about how education for hypertension self-management is provided?

   Probe: How do you feel about the intervention-positive or negative?

2. How easy or difficult is it to self-manage hypertension after training?

3. What are your views on how fair or beneficial education offered is, for you to achieve hypertension control through self-management?

4. What are your views on how receiving hypertension information will lead to self-management?

   Probe: do you think PE is beneficial for yourself and hypertension control?

5. How has getting the information and education interfered with your daily priority duties? It could be here at clinic or outside the clinic.

   Probe: How important are the education sessions to you can you leave any other thing to attend them?

6.What are your thoughts on how patient education has changed your hypertension self-management skills?

   Probe: How important are the education sessions to you can you leave any other thing to attend them?

7.How confident are you in self-management of your hypertension after receiving education?

Probe: What small steps could you take daily to increase your self-confidence?

8.How acceptable is patient education for hypertension self-management to you?

9.What are your thoughts on how can patient education be done to enhance acceptability?

Thank you for your time.

Supplementary material B: Healthcare providers interview guide

Good morning/afternoon.

You are welcome to this discussion. My name is Xoliswa Simelane. I am from the University of Witwatersrand, school of Public Health, which is in Parktown, Johannesburg, South Africa. I am grateful to you for agreeing to join us here today. I'd like to speak with you about your thoughts on the acceptability of patient education for hypertension self-management. During this interview, I would like to get your feedback about the hypertension information you provide. I want to know if you think that the information is correct for you (appropriateness), are happy with providing the information and what is put in the books (satisfaction), what makes you use the information (facilitators), and anything that makes you not want to provide the information (hurdles). The goal of this interview is to collect all your views so that we can make suitable recommendations to the Department of Health about having this into routine care. Feel free and give your opinions. All information in this interview will be kept confidential. We are tape recording and taking notes to be able to keep track of all that is being discussed, is that okay with you? (**Researcher asks for verbal consent**) Thank you very much.

For us to discuss freely we would like to first get to know each other, name only.

In South Africa, many PLWH develop hypertension and require ongoing health education. An education intervention in the form of booklets, posters and training for healthcare providers is currently being implemented in this clinic.

.

1.What are your views about how education for hypertension self-management is provided?

Probe: How do you feel about the intervention-positive or negative?

2. How easy or difficult is it to conduct patient education from preparation till intervention is delivered?

3. What are your views on how fair education offered is?

4. What are your views on how offering hypertension information will lead to self-management among PLWH?

Probe: Do you think patient education is beneficial to PLWH.

5. How important are the PE sessions to you, can you leave any other thing to attend them? Should patient education be a priority?

Probe: How has offering education interfered with your daily duties?

6. What are your thoughts on how patient education has changed your hypertension management skills among people offered the service?

7.How confident are you in providing patient education on hypertension self-management?

Probe: What small steps could you take daily to increase your self-confidence?

8.How acceptable is patient education for hypertension self-management to you?

9.What are your thoughts on how can patient education be done to enhance acceptability?

Thank you for your time.

Supplementary material C: COREQ checklist

Section/Topic	Item No	Checklist item	Section reported on
Domain 1: Research team and reflexivity			
Personal Characteristics			
Interviewer/facilitator	1	Which author/s conducted the interview or focus group? Interviewer/facilitator	Data collection Page 20
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	
Occupation	3	What was their occupation at the time of the study?	
Gender	4	Was the researcher male or female?	
Experience and training	5	What experience or training did the researcher have? Relationship with participants	
Relationship with participants			
Relationship established	6	Was a relationship established prior to study commencement?	Data collection page 20
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	
Interviewer characteristics	8	What characteristics were reported about the interviewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	
Domain 2: study design			
Theoretical framework			
Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	Data analysis section (Sekhon's theoretical framework), page 21
Participant selection			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	Sampling strategy, page 20

Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	
Sample size	12	How many participants were in the study?	Results subsection, under demographic characteristics, page 22
Non-participation	13	How many people refused to participate or dropped out? Reasons?	Study population subsection, page 20
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	Data collection subsection, page 21
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	Population subsection, page 20
Data collection			
Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	Data collection section, page 21
Repeat interviews	18	Were repeat interviews carried out? If yes, how many?	
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	
Field notes	20	Were field notes made during and/or after the interview or focus group?	
Duration	21	What was the duration of the interviews or focus group?	
Data saturation	22	Was data saturation discussed?	
Transcripts returned	23	Were transcripts returned to participants for comment and/or correction?	
Domain 3: analysis and findings Data analysis			
Number of data coders	24	How many data coders coded the data?	

Description of the coding tree	25	Did authors provide a description of the coding tree?	Qualitative data analysis section, page 21
Derivation of themes	26	Were themes identified in advance or derived from the data?	
Software	27	What software, if applicable, was used to manage the data?	
Participant checking	28	Did participants provide feedback on the findings?	
Reporting			
Quotations presented	29	Were participant quotations presented to illustrate the themes / findings? Was each quotation identified? e.g. participant number	Results section, page 25-33
Data and findings consistent	30	Was there consistency between the data presented and the findings?	
Clarity of major themes	31	Were major themes clearly presented in the findings?	Under discussion section, page 33-35
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	

APPENDICES

Appendix 1: Plagiarism report



PLAGIARISM DECLARATION TO BE SIGNED BY ALL HIGHER DEGREE STUDENTS

SENATE PLAGIARISM POLICY: SUPPLEMENTARY MATERIAL ONE

I Xoliswa Simelane, Student number: 2259861 am a student registered for the degree of MSc in Epidemiology in the field of Implementation Science in the academic year 2024.

I hereby declare the following:

- I am aware that plagiarism (the use of someone else's work without their permission and/or without acknowledging the original source) is wrong.
- I confirm that the work submitted for assessment for the above degree is my own unaided work except where I have explicitly indicated otherwise.
- I have followed the required conventions in referencing the thoughts and ideas of others.
- I understand that the University of the Witwatersrand may take disciplinary action against me if there is a belief that this is not my own unaided work or that I have failed to acknowledge the source of the ideas or words in my writing.
- I have included as a Supplementary material a report from "Turnitin" (or other approved plagiarism detection) software indicating the level of plagiarism in my research document.

Signature:  Date: 15/10/2024

Appendix 2: In-depth Interview information sheet – healthcare providers only

Each **participant** will receive, read and understand this document **before** any study-related procedure is performed.

Study Number:	
Study Title:	Acceptability of patient education for hypertension self-management among healthcare providers and beneficiaries in South Africa, 2023-2024: A qualitative study
Funder:	Self
Principal Investigator:	Xoliswa Simelane
Institution:	Ezintsha, Faculty of Health Sciences University of the Witwatersrand Building C, Sunnyside Office Park 32 Princess of Wales Terrance Parktown, Johannesburg 2193
Daytime and After-Hours Telephone Number(s):	+26876374214/ 07634778976

To the potential participant: *Please ask the study data collector to explain any information that you do not clearly understand. You may take home* ***an unsigned copy of this consent*** *form to think about or discuss with family or friends* ***before making your decision.***

Participant unique code: _____

ICF administration starting time: _____

ICF administration finish time: _____

INTRODUCTION

Good day, my name is Xoliswa Simelane. I am a master's student at the University of the Witwatersrand. I am conducting a research project as part of the requirement for my degree.
You are invited to take part in a research study called ***"Acceptability of patient education for hypertension self-management among healthcare providers and beneficiaries in South Africa, 2023-2024: A qualitative study".***

If you are willing to participate, you will be asked to take part in a 15-20minutes in-depth interview at your workplace, this will be a face-to-face interview. With your permission, I would like to audio record the interview, so that I miss nothing you say. Before you decide if you want to be part of this interview, we would like to give you information to help you make an informed decision.

- Please take the time to think through the following information and discuss it with others if you wish. Knowing what is involved will help you decide if you want to take part.
- If you have any questions, do not hesitate to ask me.
- You should not agree to take part unless you are happy about all the procedures involved.
- If you decide to take part in this interview, you will be asked to sign a Consent Sheet to confirm that you understand the reason for the interview. You will be given a copy to keep.

WHAT IS THE AIM OF THE STUDY?

To explore the acceptability of patient education for hypertension self-management amongst healthcare providers offering patient education in the Johannesburg inner city iHEART-SA intervention clinics.

WHY HAVE I BEEN INVITED TO PARTICIPATE IN THIS STUDY?

We invite you to take part in this interview because you are currently offering patient education to People living with HIV in your health facility that is part of the iHEART-SA study You have been enrolled in the study and have experiences to share from which we can learn.

WHAT IF I DON'T WANT TO TAKE PART OR IF I WANT TO WITHDRAW LATER?

- Participation in this study is voluntary. It is completely up to you whether to take part.
- If you decide not to take part in this interview, it will not affect your relationship with iHEART-SA staff now or in future. Whatever your decision it will not affect your relationship with the study staff.
- If you wish to withdraw from the interview once it has started, you can do so at any time without having to give a reason.
- If you do decide to take part, you will be given this Participant Information Sheet and Consent Form to keep.

FINANCIAL ARRANGEMENTS

There are no costs to you if you participate in the study.

WILL ANY OF THE STUDY PROCEDURES RESULT IN DISCOMFORT OR INCONVENIENCE?

There is no anticipated discomfort for those contributing to this study, so risk to participants is minimal and participation is always voluntary. All health information collected will be used in the analysis.

WHAT ARE THE POSSIBLE BENEFITS OF TAKING PART?

We cannot guarantee or promise that you will receive any benefits from taking part in this study.

By taking part in this study, you may contribute new information regarding the acceptability of patient education for hypertension self-management in Johannesburg.

CONFIDENTIALITY

Your confidentiality will be protected as explained below. Your data will be collected, processed and stored according to the South African Protection of Personal Information (POPI) Act of 2013 detailed below.

Normally personal information will be treated in the strictest confidence and will only be available to the Principal Investigator (PI) and his/her supervisor, in the case wherein the PI is a postgraduate student. The only exceptions - and both are rare - would normally be:

1. Personal information may be disclosed if required by law.
2. the Human Research Ethics Committees of the University may exceptionally require personal data to respond to a formal complaint, or for a compliance audit.

By signing the consent form, you consent to the research team collecting and using information about you for the research study.

In terms of audio recordings, according to HPCSA regulations, these will be stored for 2 years after publication or 6 years if no publication. The information about you will be stored in a re-identifiable format where any identifiers such as your name, address, date of birth will be replaced with a unique code. Only the research team can match your name to the unique code if it is necessary to do so.

Information collected from you in an electronic format will be stored in safe password protected databases only accessible to the approved research investigators. Information collected from you using paper records will be stored in a locked cabinet in the iHEART-SA clinical trial site, and only the approved research investigators will have access to this information.

WHAT WILL HAPPEN WITH THE STUDY RESULTS?

Your information will only be used for the purpose of this research project, and it will only be disclosed with your prior knowledge.

It is anticipated that the results of this research project will be published and/or presented in a variety of forums. In any publication and/or presentation, information will be provided in such a way that you cannot be identified. Results of the study will be provided to you in summary form, at no cost to you.

ETHICAL APPROVAL:

This study has been approved by the Human Research Ethics Committee (Medical) of the University of the Witwatersrand, Johannesburg (“Committee”). The principal function of this Committee is to safeguard the rights and dignity of all human subjects who agree to participate in a research project and the integrity of the research.

If you have any concern over the way the study is being conducted, please contact the Chairperson of this Committee who is Professor Paul Ruff, who may be contacted via any one member of the secretariat. The telephone numbers for the Committee secretariat are 011 717 2700/1234/2656/1252 and the e-mail addresses are Zanele.Ndlovu@wits.ac.za,Rhulani.Mukansi@wits.ac.za,Mapula.Ramaila@wits.ac.za and Iain.Burns@wits.ac.za

SOURCE OF ADDITIONAL INFORMATION:

- Also, any additional information that becomes available during the study, which may affect your willingness to continue the study will be provided to you.
- **Contact details of researcher/s:** participants can contact the researcher, Xoliswa Simelane, at e-mail 2259861@students.wits.ac.za or telephone no +26 876 374214, or 06 347 78976 for calls for WhatsApp, or supervisors, Dr Juliana Kagura at e-mail Juliana.kagura@wits.ac.za, or Professor Samantha Lalla-Edward at e-mail slalledward@ezintsha.org

Thank you for reading this Study Information Sheet.

January 2024

PARTICIPANT QUESTIONS:

Did the participant raise any questions? **YES** ☐ **/ NO** ☐

If YES – What were they and what was the answer provided: ----------

---

Appendix 3: In-depth interview information sheet–PLWH

Each **participant** will receive, read and understand this document **before** any study-related procedure is performed.

Study Number:	
Study Title:	Acceptability of patient education for hypertension self-management among healthcare providers and beneficiaries in South Africa, 2023-2024: A qualitative study.
Funder:	Self
Principal Investigator:	Xoliswa Simelane
Institution:	Ezintsha, Faculty of Health Sciences University of the Witwatersrand Building C, Sunnyside Office Park 32 Princess of Wales Terrance Parktown, Johannesburg 2193
Daytime and After-Hours Telephone Number(s):	+26876374214/ 07634778976

To the potential participant: *This consent form may contain words that you do not understand. Please ask the study data collector to explain any words or information that you do not clearly understand. You may take home* ***a copy of this Information Sheet*** *to think about or discuss with family or friends* ***before making your decision.***

Participant unique code: _____

ICF administration starting time: _____

ICF administration finish time: _____

INTRODUCTION

Good day, my name is Xoliswa Simelane. I am a master's student at the University of the Witwatersrand. I am conducting a research project as part of the requirement for my degree.

You are invited to take part in a research study called ***"Acceptability of patient education for hypertension self-management among healthcare providers and beneficiaries in South Africa, 2023-2024: A qualitative study".***

If you are willing to participate, you will be asked to take part in a 30–40-minute in-depth interview at your health facility, this will be a face-to-face interview. With your permission, I would like to audio record the interview, so that I miss nothing you say. Before you decide if you want to be part of this interview, we would like to give you information to help you make an informed decision.

- Please take the time to think through the following information and discuss it with others if you wish. Knowing what is involved will help you decide if you want to take part.
- If you have any questions, do not hesitate to ask me.
- You should not agree to take part unless you are happy about all the procedures involved.
- If you decide to take part in this interview, you will be asked to sign a Consent Sheet to confirm that you understand the reason for the interview. You will be given a copy to keep.

WHAT IS THE AIM OF THE STUDY?

To explore the acceptability of patient education for hypertension self-management amongst people living with HIV receiving patient education in the Johannesburg inner city iHEART-SA intervention clinics.

WHY HAVE I BEEN INVITED TO PARTICIPATE IN THIS STUDY?

We invite you to take part in this interview because you are 18 years or more and are part of the iHEART-SA study. You have been enrolled in the study and have experiences to share from which we can learn.

WHAT IF I DON'T WANT TO TAKE PART OR IF I WANT TO WITHDRAW LATER?

- Participation in this study is voluntary. It is completely up to you whether to take part.
- If you decide not to take part in this interview, it will not affect any tests or treatment you receive now or in the future. Whatever your decision, it will not affect your relationship with the study staff.
- If you wish to withdraw from the interview once it has started, you can do so at any time without having to give a reason and without affecting your medical care.
- If you do decide to take part, you will be given this Participant Information Sheet and Consent Form to keep.

FINANCIAL ARRANGEMENTS

There are no costs to you if you participate in the study. You will be compensated R150.00 for time and inconvenience by being enrolled in this study.

WILL ANY OF THESE STUDY PROCEDURES RESULT IN DISCOMFORT OR INCONVENIENCE?

There is no anticipated discomfort for those contributing to this study, so risk to participants is minimal and participation is always voluntary. **If you are uncomfortable with being a part of the study after you gave permission, you may withdraw from the study at any time without any consequence to you or to your healthcare.** All health information collected will be used in the analysis and there will be no further data collection from your study file.

WHAT ARE THE POSSIBLE BENEFITS OF TAKING PART?

We cannot guarantee or promise that you will receive any benefits from taking part in this study. By taking part in this study, you may contribute new information regarding the acceptability of patient education for hypertension self-management in Johannesburg.

CONFIDENTIALITY

Your confidentiality will be protected as explained to you in this study's Participant Information and Consent Form. Your data will be collected, processed and stored according to the South African Protection of Personal Information (POPI) Act of 2013 detailed below.

Normally personal information will be treated in the strictest confidence and will only be available to the Principal Investigator (PI) and his/her supervisor, in the case wherein the PI is a postgraduate student. The only exceptions - and both are rare - would normally be:

3. Personal information may be disclosed if required by law.

4. the Human Research Ethics Committees of the University may exceptionally require personal data to respond to a formal complaint, or for a compliance audit.

.

By signing the consent form, you consent to the research team collecting and using information about you for the research study.

In terms of audio recordings, according to HPCSA regulations, these will be stored for 2 years after publication or 6 years if no publication. The information about you will be stored in a re-identifiable format where any identifiers such as your name, address, date of birth will be replaced with a unique code. Only the research team can match your name to the unique code if it is necessary to do so.

Information collected from you in an electronic format will be stored in safe password protected databases only accessible to the approved research investigators. Information collected from you using paper records will be stored in a locked cabinet in the iHEART-SA clinical trial site, and only the approved research investigators will have access to this information.

WHAT WILL HAPPEN WITH THE STUDY RESULTS?

Your information will only be used for the purpose of this research project, and it will only be disclosed with your prior knowledge.

It is anticipated that the results of this research project will be published and/or presented in a variety of fora. In any publication and/or presentation, information will be provided in such a way that you cannot be identified. Results of the study will be provided to you in summary form, at no cost to you.

ETHICAL APPROVAL:

This study has been approved by the Human Research Ethics Committee (Medical) of the University of the Witwatersrand, Johannesburg ("Committee"). A principal function of this Committee is to safeguard the rights and dignity of all human subjects who agree to participate in a research project and the integrity of the research.

If you have any concern over the way the study is being conducted, please contact the Chairperson of this Committee who is Professor Paul Ruff, who may be contacted via any one member of the secretariat. The telephone numbers for the Committee secretariat are 011 717 2700/1234/2656/1252 and the e-mail addresses are Zanele.Ndlovu@wits.ac.za, Rhulani.Mukansi@wits.ac.za, Mapula.Ramaila@wits.ac.za and Iain.Burns@wits.ac.za

SOURCE OF ADDITIONAL INFORMATION:

- Also, any additional information that becomes available during the study, which may affect your willingness to continue the study will be provided to you.
- **Contact details of researcher/s:** participants can contact the researcher, Xoliswa Simelane, at e-mail 2259861@students.wits.ac.za or tell no +26 876 374214, or 06 347 78976 for calls for WhatsApp, or supervisors, Dr Juliana Kagura at e-mail Juliana.kagura@wits.ac.za, or Professor Samantha Lalla-Edward at e-mail slalledward@ezintsha.org

Thank you for reading this Study Information Sheet.

June 2024

PARTICIPANT QUESTIONS:

Did the participant raise any questions? **YES** □ **/ NO** □

If YES – What were they and what was the answer provided: ----------
---

Appendix 4: Informed consent – healthcare providers– study participation

Study title: *"Acceptability of patient education for hypertension self-management among healthcare providers and beneficiaries in South Africa, 2023-2024: A qualitative study".*

Declaration by the participant

- I understand I am being asked to provide consent to participate in this research study.
- I have read the Participant Information Sheet, or someone has read it to me in English.
- I understand the purposes, study tasks and risks of the research described in the study.
- I provide my consent for the information collected about me to be used for the purpose of this research study only.
- I am aware that the information obtained from this discussion will be collected and analysed with similar data from other participants and combined into a report, which may be published in scientific journals and other publications. The data reported will not include any information that directly identifies me as a research participant. I understand that the summary results of the research will be made available to me on request and may be published in various media, including on the WITS website.
- I have had an opportunity to ask questions, and I am satisfied with the answers I have received.
- I may, at any moment, without prejudice, withdraw my consent and participation in the research study.
- I understand that I will be given a signed copy of this document to keep.

PARTICIPANT:

_____	_____	_____
Printed Name and Surname	Signature	Date and Place

WITNESS:

_____	_____	_____
Printed Name and Surname	Signature	Date and Place

Study staff conducting the consenting process:

_____	_____	_____
Printed Name and Surname	Signature	Date and Place

Appendix 5: Informed consent – PLWH– interviews -study participation

Study title: *"Acceptability of patient education for hypertension self-management among healthcare providers and beneficiaries in South Africa, 2023-2024: A qualitative study".*

Declaration by the participant

- I understand I am being asked to provide consent to participate in this research study.
- I have read the Participant Information Sheet, or someone has read it to me in English.
- I understand the purposes, study tasks and risks of the research described in the study.
- I provide my consent for the information collected about me to be used for the purpose of this research study only.
- I am aware that the information obtained from this discussion will be collected and analysed with similar data from other participants and combined into a report, which may be published in scientific journals and other publications. The data reported will not include any information that directly identifies me as a research participant. I understand that the summary results of the research will be made available to me on request and may be published in various media, including on the WITS website.
- I have had an opportunity to ask questions, and I am satisfied with the answers I have received.
- I may, at any moment, without prejudice, withdraw my consent and participation in the research study. Voluntary withdrawal from the study will not impact the healthcare services I receive at the pharmacy.
- I understand that I will be given a signed copy of this document to keep.

PARTICIPANT:

_____	_____	_____
Printed Name and Surname	Signature	Date and place

WITNESS:

_____	_____	_____
Printed Name and Surname	Signature	Date and Place

Study staff conducting the consenting process:

_____	_____	_____
Printed Name and Surname	Signature	Date and Place

Appendix 6: Informed consent – healthcare providers – recording

Study title: *"Acceptability of patient education for hypertension self-management among healthcare providers and beneficiaries in South Africa, 2023-2024: A qualitative study".*

Declaration by the participant

By signing below, I acknowledge that the following procedures have been followed:

- I have read and understood the information sheet provided to me.
- I have been given the opportunity to clarify any questions I may have and am aware that I may at any point contact the researcher to discuss the study further.
- I understand that the recording of my interview is entirely voluntary, and I may terminate the recording at any time.
- I understand that if I do not consent to audio recording, I cannot participate in the interview, and I will be released from participation.
- I understand that neither my name nor any other identifying information will relate to the audio recording or the transcript.
- I understand that the audio recordings will be stored in a password protected platform and any paper-based information in a locked office at the clinical trial site for a minimum of two years after publications resulting from the study or 6 years in the absence of publication, as per HPCSA (Health Professions Council of SA) guidelines.
- I understand that I will be given a signed copy of this document to keep.

PARTICIPANT:

Consent to audio recording of the interview

_____	_____	_____
Printed Name and Surname	Signature	Date and Place

WITNESS:

_____	_____	_____
Printed Name and Surname	Signature	Date and Place

Study staff conducting the consenting process:

_____	_____	_____
Printed Name and Surname	Signature	Date and Place

Appendix 7: Informed consent – PLWH– recording

Study title: *"Acceptability of patient education for hypertension self-management among healthcare providers and beneficiaries in South Africa, 2023-2024: A qualitative study".*

Declaration by the participant

By signing below, I acknowledge that the following procedures have been followed:

- I have read and understood the information sheet provided to me.
- I have been given the opportunity to clarify any questions I may have and am aware that I may at any point contact the researcher to discuss the study further.
- I understand that the recording of my interview is entirely voluntary, and I may terminate the recording at any time.
- I understand that if I do not consent to audio recording, I cannot participate in the interview, and I will be released from participation.
- I understand that neither my name nor any other identifying information will relate to the audio recording or the transcript.
- I understand that the audio recordings will be stored in a password protected platform and any paper-based information in a locked office at the clinical trial site for a minimum of two years after publications resulting from the study or 6 years in the absence of publication, as per HPCSA (Health Professions Council of SA) guidelines.
- I understand that I will be given a signed copy of this document to keep.

PARTICIPANT:

Consent to audio recording of the interview

_____	_____	_____
Printed Name and Surname	Signature	Date and Place

WITNESS:

_____	_____	_____
Printed Name and Surname	Signature	Date and Place

Study staff conducting the consenting process:

_____	_____	_____
Printed Name and Surname	Signature	Date and Place

Appendix 8: iHEART_SA HREC Clearance Certificate

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

R49 Professor WDF Venter, et al

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
CLEARANCE CERTIFICATE NO. M211160

NAME: (Principal Investigator)	Professor WDF Venter, et al
DEPARTMENT:	Wits Health Consortium Ezintsha Division
PROJECT TITLE:	*The Integrating HIV and hEART health in South Africa (iHEART-SA) intervention study*
DATE CONSIDERED:	2021/11/26
DECISION:	Approved unconditionally
CONDITIONS:	
NOTE:	If contact information regarding student study participants is required, please contact the Registrar's office - <Nicoleen.Potgieter@wits.ac.za>
SUPERVISOR:	Not applicable
APPROVED BY:	Dr CB Penny, Chairperson, HREC (Medical)
DATE OF APPROVAL:	2022/01/19

This Clearance Certificate is valid for 5 years from the date of approval. An extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office secretariat on the 3rd floor, Phillip Tobias Building, Parktown, University of the Witwatersrand, Johannesburg.

I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated from the research protocol as approved, I/we undertake to submit details to the Committee. **I agree to submit a yearly progress report**. When a funder requires annual re-certification, the application date will be one year after the date when the study was initially reviewed. In this case, the study was initially reviewed in **November** and therefore reports and re-certification will be due in the month of **November** each year. Unreported changes to the study may invalidate the clearance given by the HREC (Medical).

Signature of Principal Investigator _____ Date _____

Appendix 9: iHEART_SA study permission



GAUTENG PROVINCE
HEALTH
REPUBLIC OF SOUTH AFRICA

Joburg
a world class African city

Research Committee of Johannesburg Health District

Enquiries: Prof S. Moosa | 0824466825 (WhatsApp) | shabir@profmoosa.com

DATE: 28th January 2022

ATT: Prof Francois Venter EMAIL:
fventer@ezintsha.org Dear
Sir/Madam

STUDY TITLE: The Integrating HIV and hEART health in South Africa intervention study

NHRD REF. NO.: GP_202111_015

OFFICIAL APPROVAL

The District Research Committee has reviewed your application. This letter serves as a final approval letter for this study.

The following conditions must be observed:

- The facilities in which the research will be conducted are listed below
- These facilities will be visited from: 2022/01/19 to 2027/01/18
- Participants' rights and confidentiality will be maintained all the time.
- Neither the District nor the facility will incur any additional cost for this study.
- No resources (Financial, material and human resources) from the above facilities will be used for the study.
- The study will comply with Publicly Financed Research and Development Act, 2008 (Act 51 of 2008) and its related Regulations.
- You will submit a copy (electronic and hard copy) of your final report. In addition, you will submit an annual progress report to the District Research Committee.
- If this is academic research, then your supervisor and the University will ensure that these reports are being submitted timeously to the District Research Committee.
- The district must be acknowledged in all the reports/publications generated from the research and a copy of these reports/publications must be submitted to the District Research

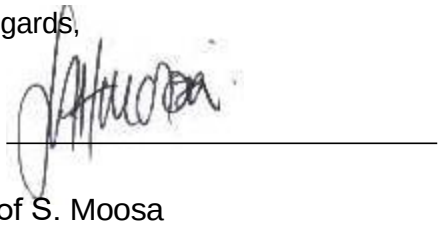
Committee.

- You will liaise with the manager/s listed below as relevant before initiating the study.

We reserve our right to withdraw our approval, if you breach any of the conditions mentioned above. Please feel free to contact us if you have any further queries.

On behalf of the District Research Committee, we would like to thank you for choosing our District to conduct such an important study.

Regards,



Prof S. Moosa
Chairperson: District Research Committee
Johannesburg Health District
As delegated by Mrs M.L. Morewane, Chief Director, Johannesburg Health District, and Mr. Frans Moseane, Acting ED Health, City of Johannesburg
Date: 28th January 2022

List of Facilities Approved

- 17 Esselen Street Clinic
- 80 Albert Street Clinic
- Crown Gardens Clinic
- Glenanda Clinic
- Hillbrow CHC
- Jeppe Clinic
- Jeppe Street Clinic
- Joubert Park Clinic
- Kibler Park Clinic
- Malvern Clinic
- Mayfair Clinic
- Rosettenville Clinic
- South Hills Clinic
- Yeoville Clinic

Appendix 10: HREC Ethics Clearance Certificate

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG

R49 Ms X Simelane

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
CLEARANCE CERTIFICATE NO. M240316

NAME: (Principal Investigator) Ms X Simelane **DEGREE:** MSc

DEPARTMENT: School of Public Health
Division of Economics and Bioststistics
Medical School

TITLE: *Acceptability of patient education for hypertension self-management amongst healthcare providers and beneficiaries in South Africa, 2023-2024: a qualitative study*

DATE CONSIDERED: 28 March 2024

DECISION: Approved unconditionally

CONDITIONS:

NOTE: If contact information regarding student study participants is required, please contact the Registrar's office <Nicoleen.Potgieter@wits.ac.za>

SUPERVISORS: Drs S Lalla-Edward and J Kagura

APPROVED BY:
Professor P Ruff, Chairperson, HREC (Medical)

DATE OF APPROVAL: 30 May 2024 **EXPIRY DATE:** 29 May 2029

This Clearance Certificate is valid for 5 years from the date of approval. An extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office secretariat on the 3rd floor, Phillip Tobias Building, Parktown, University of the Witwatersrand, Johannesburg.

I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated from the research protocol as approved, I/we undertake to submit details to the Committee. **I agree to submit a yearly progress report** in the format available at https://wits.ac.za/research/researcher-support/research-ethics/ethics-committees/. This report is due annually, for the duration of the Clearance Certificate, beginning on the first anniversary of Date of Approval above. Unreported changes to the study may invalidate the clearance given by the HREC (Medical).

Signature of Principal Investigator Date

Appendix 11: Permission letter

14 February 2024

To: Prof Paul Ruff
c/o Administrative Officer: Human Research Ethics Committee (Medical)
Tel: 011 717-2700

From: Dr. Samanta Lalla-Edward, PhD
Director: Research Development at Ezintsha, a division of Wits Health Consortium, University of the Witwatersrand

On behalf of Prof Francois Venter, PhD, FCP
Executive Director: Ezintsha, a division of Wits Health Consortium, University of the Witwatersrand

PROTOCOL No: M211160

STUDY PROJECT TITLE: Acceptability of patient education for hypertension self-management among healthcare providers and beneficiaries in South Africa, 2023-2024: A qualitative study.

This serves to confirm permission for Xoliswa Simelane to conduct her study titled *Acceptability of patient education for hypertension self-management among healthcare providers and beneficiaries in South Africa, 2023-2024: A qualitative study* within the iHEART-SA (Integrating HIV and heart health in South Africa) study. IHEART-SA is an NIH funded study conducted in the City of Johannesburg region F primary healthcare clinics between 2020 and 2025. As part of this study participants were asked if they consent to be contacted for additional related studies. Over 20 000 participants have completed this consent. Xoliswa will be inviting people from this group to participate in her study.

Please contact me if you have any questions.



Dr Samanta Tresha Lalla-Edward PhD
Director: Research Development
C: +27 82 6172490 | **E:** slallaedward@ezintsha.org | www.org

Appendix 12. Turnitin report

Xoliswa Simelane 

Juliana Kagura 

Samanta Lalla Edwards 

turnitin_11.docx

ORIGINALITY REPORT

10%	9%	8%	%
SIMILARITY INDEX	INTERNET SOURCES	PUBLICATIONS	STUDENT PAPERS

PRIMARY SOURCES

1	bmcpublichealth.biomedcentral.com Internet Source	2%
2	www.ncbi.nlm.nih.gov Internet Source	2%
3	ichgcp.net Internet Source	1%
4	bmchealthservres.biomedcentral.com Internet Source	1%
5	assets.researchsquare.com Internet Source	<1%

Appendix 13: AFRICAN JOURNAL OF PRIMARY HEALTHCARE & FAMILY MEDICINE(PHCFM) submission guidelines

Guidelines can be accessed through this link: https://phcfm.org/index.php/phcfm/pages/view/submission-guidelines

Original Research Articles

An original research article presents innovative research within the focus and scope of the journal, according to a clear and well-structured format. Detailed instructions are given below on the structure and contents required. The introduction should argue for the social and scientific value of the research and end with the aim and objectives of the study. Any conceptual or theoretical framework can also be included in the introduction. The methods section should be structured according to the following sub-headings: study design, setting, study population and sampling strategy, intervention (if appropriate), data collection, and data analysis. Occasionally a different structure may be required, for example, in quality improvement or participatory action research. The methods should be followed by a section on ethical considerations. After this, the results are presented. The article should end with a discussion section that summarizes the key findings, and then discusses these findings, the strengths and limitations of the study, and any implications or recommendations. This should be followed by a conclusion, acknowledgements and references sections.

Submission status	open
Manuscript language	English or French are considered
Word limit	3500-7000 words (excluding the abstract, tables, figures, graphs, and references)
Abstract	maximum: 250 words requires structural headings: Background, Aim, Setting, Methods, Results, Conclusion and Contribution
Main text	requires structural headings, refer to the full structure 'Ethical considerations' is a sub-section in the manuscript and must include: • Name of the ethical review committee • Study approval number • Manner of consent (written, oral) for human participants • Description of measures taken to maintain the confidentiality of data

	• If the study was not human or animal research or the study was determined to be non-human subjects research or exempt, the authors must provide a statement with those details in this section.
References	60 or less, adhere to the **Vancouver referencing style**
Tables, figures and graphs	7 or less, adhere to the Illustrations requirements found in the AOSIS House style guide
Formatting requirements	apply the guidelines located on the **Formatting requirements page** and the **AOSIS house style guide**
Compulsory supplementary file(s)	the **Authorship, disclosure statements, copyright, and license agreement form**, **Ethical Clearance/Waiver Documentation** and any other relevant form applicable to your submission
Ethical clearance/waiver documentation	evidence of ethical clearance for the study, such as the study approval letter or certificate from the Institutional Review Board (IRB), a waiver from the IRB et cetera

Appendix 14. Author contribution letter

To : The examiners

Date : 20 August 2024

Subject: Author Contributions- Xoliswa Simelane

Xoliswa Simelane has made the following contributions to the manuscript entitled “Acceptability of patient education for hypertension self-management among healthcare providers and beneficiaries in South Africa, 2023-2024; A qualitative study”: Study conceptualization and design, data collection, cleaning and analysis, interpretation of results, and manuscript preparation. Athini participated in the logistical preparation of data collection, mentored principal investigator in data collection.

Prof. Juliana Kagura and Dr. Samanta Lalla-Edward were involved in research conceptualization, supervision, and revisions to the manuscript.

All authors read and approved the final manuscript submitted to AFRICAN JOURNAL OF PRIMARY HEALTHCARE & FAMILY MEDICINE(PHCFM).

Xoliswa Simelane 

Prof Juliana Kagura 

Dr Samanta Lalla- Edward 

Appendix 15: Proof of manuscript submission (AFRICAN JOURNAL OF PRIMARY HEALTHCARE & FAMILY MEDICINE(PHCFM)).

Ref. No.: 4801
Manuscript title: Acceptability of patient education for hypertension self-management among healthcare providers and beneficiaries in South Africa, 2023-2024: A qualitative study
Journal: African Journal of Primary Health Care & Family Medicine
****

Dear Ms Simelane

Your submission has been received by the journal and will now be processed in accordance with published timelines.

Processing time guidelines are available under the journal's 'About' section, however, please note that each submission is assessed on its individual merit and in certain circumstances processing times may differ.

You can check the status of your submission in three ways:
- Journal Website: login to your account at https://phcfm.org/index.php/phcfm/author/submission/4801.
- Publisher Enquiry Service: telephone numbers are +27(0)219752602 and/or 0861000381.
- Publisher FAQ and Email Service: visit the Publisher FAQ and Email service at https://publishingsupport.aosis.co.za/index.php