Distribution Agreement

Signature:

_________________________ _______13th April 2023________
Suha Halim Khan

Understanding Barriers and Facilitators to Integrated Care for People with HIV and Hypertension in South Africa: Application of the Theoretical Domains Framework

By

Suha Halim Khan
MPH

Hubert Department of Global Health

Dr. Mohammed K. Ali
Committee Chair

Dr. Leslie Johnson
Committee Co-Chair

Understanding Barriers and Facilitators to Integrated Care for People with HIV and Hypertension in South Africa: Application of the Theoretical Domains Framework

By

Suha Halim Khan
Bachelor of Science in Biology
Lahore University of Management Sciences
2020

Thesis Committee Chair: Dr. Mohammed K. Ali, MD, MSc, MBA
Thesis Committee Co-Chair: Dr. Leslie Johnson, PhD, MPH, MLitt

An abstract of
A thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
in partial fulfillment of the requirements for the degree of
Master of Public Health
in Global Health
2023

Abstract

Understanding Barriers and Facilitators to Integrated Care for People with HIV and Hypertension in South Africa: Application of the Theoretical Domains Framework

By Suha Halim Khan

Background: South Africa faces a dual burden of hypertension and HIV, yet faces significant barriers in the implementation of hypertension care guidelines, especially for people living with HIV (PLWH). This issue persists even after the introduction of the Integrated Chronic Disease Management model in 2011, which aimed to address the growing burden of chronic care needs within the context of existing patient-, clinician-, and health system-level barriers to integrated care.

Objectives: The study aims to inform the development of implementation strategies that promote hypertension screening and treatment practices in HIV care settings by identifying barriers and facilitators to hypertension care among providers, as well as to hypertension self-management among PLWH seeking care at HIV clinics in Johannesburg, South Africa.

Methods: This study uses qualitative data that was collected as part of a formative research phase for an effectiveness-implementation hybrid 2 study that aims to design and test strategies for improving the assessment of cardiovascular risk assessment in PLWH. Data include interviews and focus group discussions that were conducted with key actors across 6 diverse HIV care settings in Johannesburg, South Africa. The data collected was analyzed with MAXQDA22 using a two-stage analytic approach involving 1) deductively applying the Theoretical Domains Framework and 2) inductively coding for themes shared across TDF domains.

Results: Clinical actors identified notable barriers to implementing an integrated hypertension-HIV care model, including limited structural and operational capacity, inadequate training, lack of incentives and organizational readiness of clinicians towards such a model. However, ability to practice task-shifting and clinical managers' willingness to adopt an integrated model were identified as key enablers. Patients, meanwhile, were motivated to improve their health out of fear of negative consequences, had support from loved ones, and access to reliable information, but expressed dissatisfaction with the clinic's physical layout and operational protocol.

Conclusion: The promotion of an integrated HIV-hypertension care model will require overcoming both patient- and clinical actor-level barriers to implementation and engagement. The reported findings serve as a blueprint for designing integrated care approaches that are relevant to the local context and thus have the potential to be sustained over time.

Understanding Barriers and Facilitators to Integrated Care for People with HIV and Hypertension in South Africa: Application of the Theoretical Domains Framework

By

Suha Halim Khan
Bachelor of Science in Biology
Lahore University of Management Sciences
2020

Thesis Committee Chair: Dr. Mohammed K. Ali, MD, MSc, MBA
Thesis Committee Co-Chair: Dr. Leslie Johnson, PhD, MPH, MLitt

A thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
in partial fulfillment of the requirements for the degree of
Master of Public Health
in Global Health
2023

Acknowledgement

I would like to express my sincere gratitude to all those who made the entire thesis process easy for me. First and foremost, a special thank you to Dr. Mohammed Ali, who advised this thesis and provided much support and guidance in the finalization of my thesis topic. Thanks to him as he connected me to my amazing supervisor, Dr. Leslie Johnson. I am immensely grateful for her unwavering support, expert knowledge, and assistance that guided me throughout the course of the research. Her mentorship made my first qualitative research project truly enjoyable.

Furthermore, I would like to express my deepest gratitude to my family, especially my parents, for their encouragement throughout my academic journey. Their commitment to my education and belief in my abilities has been an unwavering driving force for me. I am forever grateful for their love, guidance, and sacrifices.

Table of Contents

Chapter 1. Literature Review....1

Chapter 2. Methods....5

- 2.1. Setting....5
- 2.2. Participants....5
- 2.3. Eligibility Requirement....6
- 2.4. Ethics....6
- 2.5. Data Collection....6
- 2.6. Data Analysis....7

Chapter 3. Results....9

- 3.1. Clinic Actor-level IDI and FGD Data....10
- 3.2. Patient-level IDI Data....22
- 3.3. Data Triangulation....29

Chapter 4. Discussion and Public Health Implication....31

- 4.1. Main Findings....31
- 4.2. Strength and Limitation....39
- 4.3. Public Health Implication....41
- 4.4. Conclusion....42

Appendix A. Codebook....45

Reference....48

List of Figures

Figure 1. Emerging themes for both groups, patients and clinical actors, based on data obtained under each TDF domain..10

Chapter 1. Literature Review

Cardio-vascular diseases (CVDs) are the leading cause of global mortality, accounting for an estimated 17.9 million deaths annually (*Noncommunicable Diseases - PAHO/WHO | Pan American Health Organization*). Nearly three-quarters of all CVD deaths worldwide occur in low- and middle-income countries (LMICs); countries that have been facing a growing burden of CVD in recent years (Roth et al., 2017). A similar trend is also reflected in Sub-Saharan Africa (SSA) where CVDs constitute the most common cause of non-communicable disease (NCD) deaths - attributing to about 37% of all NCD-related deaths, and around 13% of all deaths (Yuyun et al., 2020).

The significant burden of CVD is caused by a number of risk factors, including diabetes, physical inactivity, obesity, excessive alcohol consumption, and hypertension. Among these preventable risk factors, hypertension is considered to be the greatest contributor to CVD cases (Hypertension, 2021; Mcfarlane et al., 2011). Given the high prevalence of CVDs in SSA, hypertension forms a major public health concern in the region (Kandala et al., 2021). However, the rate of diagnosis, treatment, and management of the condition has been markedly low. According to a large systematic review, in SSA less than 40% of hypertensive patients are aware of their diagnosis; less than 30% of this group received medical treatment, and fewer than 20% of those receiving treatment were able to control their blood pressure to within the normal range (Addo et al., 2007). These gaps in the hypertension care cascade are particularly problematic in South Africa, the country in SSA with the highest burden of hypertension and where the prevalence rate continues to grow at over 40% (Kohli-Lynch et al., 2022). Despite a high disease burden, the rates of hypertension diagnosis and treatment have been suboptimal (Kohli-Lynch et al., 2022; Mash et al., 2012).

Hypertension is the leading cause of hospital encounters in South Africa and the most diagnosed condition. The trendline for encounters reported as hypertension in the country appears to increase progressively across age groups from 10-14 years and higher, peaking at an age group of 60-64 years (Mash et al., 2012). The growing burden of hypertension is further exacerbated by the simultaneous presence of other health problems such as infectious diseases, trauma, and interpersonal violence that both serve as risk factors for hypertension and cumulatively burden the health system, resulting in resource constraints and limited clinical capacity to address the growing demand for hypertension care (Achoki et al., 2022). For instance, one study identified intimate partner violence (IPV) as a risk factor for hypertension, indicating that stress caused by experiences of IPV can act as a potential confounding factor in the development of hypertension in women (Nkeh-Chungag et al., 2021). In the case of the ongoing HIV epidemic, another disease endemic to South Africa affecting about 8 million people, hypertension struggles to compete for investments in the form of funds and human resources in an already constrained health system (De Wet-Billings & Godongwana, 2021).

With the majority of funds and efforts in South Africa being concentrated on HIV, there has been a marked improvement in HIV treatment. However, this has also led to a growing ageing population living with HIV that is at an increased risk of developing NCDs, including hypertension (Johnson et al., 2022). A meta-analysis of more than 44,000 HIV-infected people showed Antiretroviral Therapy (ART)-treatment patients were at twice the risk of developing hypertension than those who were treatment-naive patients (Fiseha et al., 2019). Those exposed to ART treatment also experience immune activation that puts them at a higher risk of hypertension (Fiseha et al., 2019; Kwarisiima et al., 2019). Despite the increasing evidence that people living with HIV (PLWH) have a higher risk of hypertension, the quality of care provided to address hypertension in this population has been inadequate compared to the success and quality of care delivered by HIV-related programs (Mahomed et al., 2016). Thereby, the given the status of the diagnosis, care and control for hypertension among PLWH, there is a need of integrating chronic disease management into the continuum of care for HIV crucial to maintain the benefits gained from ART treatment.

South Africa introduced the integrated chronic disease management model (ICDM) in 2011 in response to the dual-epidemic burden the country is facing with HIV and chronic diseases. ICDM was introduced to improve health outcomes for patients living with HIV, hypertension, and other diseases in primary healthcare facilities (Mahomed et al., 2016). However, based on evaluation studies conducted of the ICDM model, the purpose for which the model was introduced has not been used to its full potential, that is, leveraging HIV healthcare systems to scale up and improve services for hypertension and other NCDs in South Africa (Ameh et al., 2017). Possible bottlenecks in making the model a success have been reported to be due to dissatisfaction expressed by staff and patients, suboptimal involvement of doctors, and poor integration and implementation of the model in facilities (Ameh et al., 2017).

In order to meet the growing chronic care needs of PLWH in South Africa, it is necessary to fully understand the patient-, provider-, and clinic-level barriers and enablers to hypertension screening, treatment, and management. The Theoretical Domains Framework (TDF) has been widely used to analyze barriers and facilitators to the uptake of evidence-based health interventions in order to improve understanding of health service delivery and guide quality improvement efforts (Arden et al., 2019; Cahill et al., 2021; De Leo et al., 2020; Taylor et al., 2013). The TDF is an extension of the elements of the Capability, Opportunity, Motivation-Behavior (COM-B) model and allows for a more granular understanding of the contextual factors impacting behavior change among healthcare professionals and patients (Atkins et al., 2017). The framework comprises 14 theoretical domains that cover a spectrum of behavioral determinants, ranging from individual-level to system-level variables. The application of TDF allows researchers to analyze domains relevant to the target behaviors and subsequently to design implementation strategies that can optimize the desired behavior change. This is important given that interventions targeting behavioral determinants of target behaviors are more likely to be effective (French et al., 2012).

Theory-based approaches are needed to comprehensively understand what prevents the effective integration of hypertension and HIV care in order to more effectively and sustainably promote this form of integrated care. This study aims to identify barriers and facilitators to hypertension screening, treatment, and management among PLWH seeking care at HIV clinics in Johannesburg, South Africa.

Chapter 2. Methods

This study uses qualitative data collected as a part of the formative research phase informing the integrated care package to be tested in an effectiveness-implementation hybrid 2 study, Integrating HIV and hEART health in South Africa (iHEART-SA). All data were collected in alignment with the COM-B model and were later utilized in an intervention design process guided by the Behavior Change Wheel (BCW) framework. Data collected from clinical actors aimed to identify barriers and facilitators to hypertension screening and treatment among PLWH, while patient data aimed to identify barriers and facilitators to clinic attendance and hypertension self-management.

2.1. Setting

Qualitative data collection activities were conducted across six HIV healthcare clinics located within an urban region in Johannesburg, South Africa. These sites were selected because they provide comprehensive healthcare services for people with HIV.

2.2. Participants

Interviews (46 patient interviews and 6 clinical leader interviews) and focus group discussions (9 focus group discussions comprising 3-7 participants each from the different groups of clinic stakeholders) were conducted with key actors across 6 diverse HIV care settings in Johannesburg, South Africa.

2.3. Eligibility Requirement

To be a part of the study, participants had to: (i) be 18 years or older, (ii) be willing to participate in the 1-hour-long interview or 1.5-2 hour long focus group discussion depending on their role, (iii) speak English or a local African language, (iv) either work as a healthcare provider or official at any one of the selected sites, or be a person living with HIV on ART, and (v) be diagnosed and receiving care for hypertension, if a patient.

2.4. Ethics

Ethical approval was obtained from the research ethics committees at the University of the Witwatersrand and Emory University.

2.5. Data Collection

Participants for the study were selected through purposive sampling based on their roles within the health system and included patients and clinic personnel. These participants were identified through recruitment conducted in health facilities. Only patients and clinical leaders who expressed interest and met the eligibility requirement of the study were invited to take part in the interviews, whereas health officials and clinic staff were invited to participate in the focus group discussions. Due to the COVID-19 pandemic, planned in-person data collection activities with patients were shifted to phone interviews while data collection with clinical actors were held in-person in private outdoor spaces. Informed consent procedures varied based on the method of data collection, with patients providing verbal consent and clinical actors providing written consent. In-depth interviews (IDI) and focus group discussions (FGD) were only completed after participants provided informed consent.

Interview guides were developed for both participant groups, that is, patients and clinical leaders. Questions addressing the patients covered the following areas: (i) current chronic disease self-management practices adopted, (ii) experience of receiving care at their clinic, and (iii) barriers or challenges they face to attending clinic and managing their conditions. As for clinical leaders, they were questioned about the access and availability of chronic care guidelines within clinics, ways through which current clinic work plans and resources create barriers to integrated hypertension-HIV care, key challenges and strategies employed to meet patients' chronic care needs, their role in motivating the healthcare workforce, and their feedback on selected evidence-based improvement interventions.

Similarly, focus group discussion guides were also developed for clinic-based healthcare workers, staff, and administrators that covered barriers and enablers present in accessing treatment guidelines as well as training opportunities for integrated hypertension-HIV care, clinic-based factors that have hindered the implementation of integrated care practices, and strategies to enhance healthcare quality in the face of COVID-19 and other challenging past experiences.

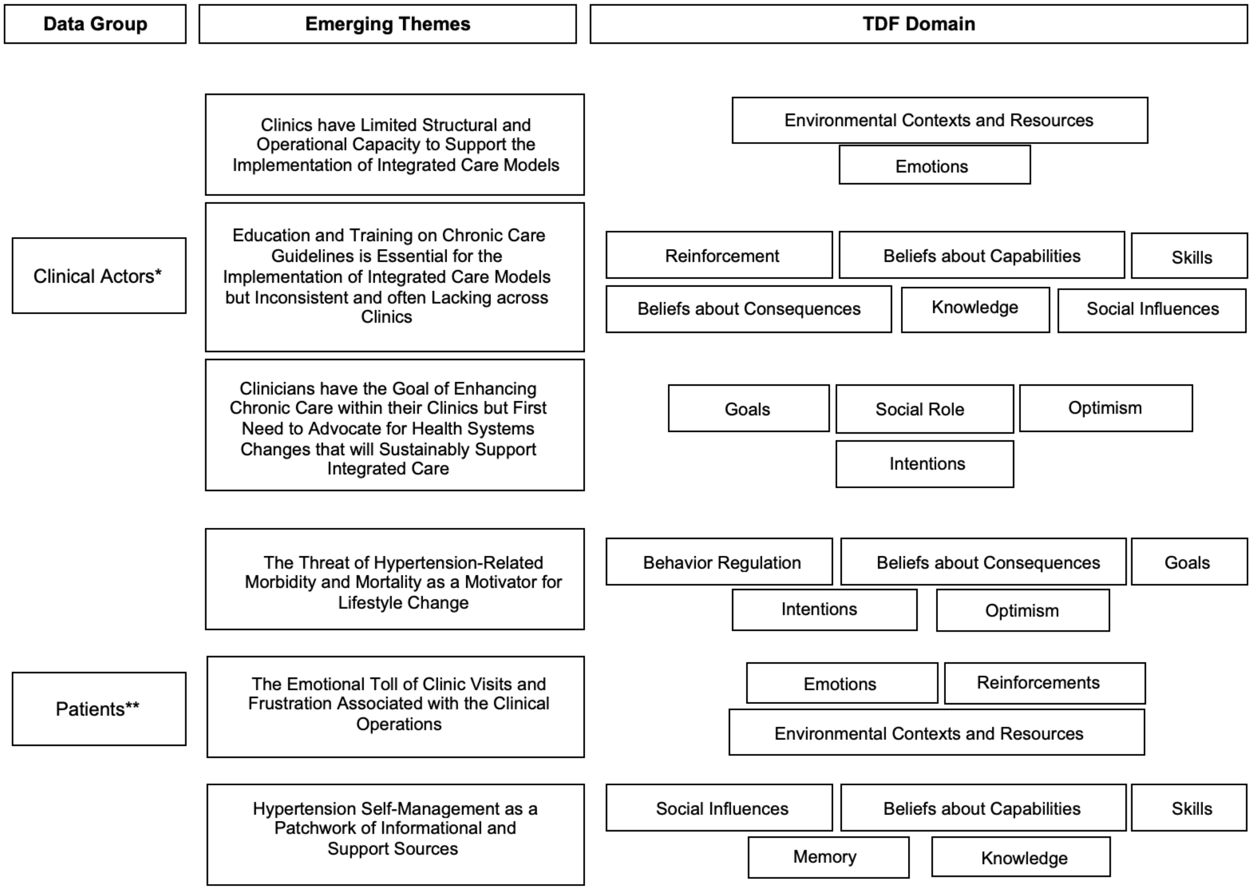
2.6. Data Analysis

The interviews and focus group discussions were audio-recorded with consent and then transcribed and translated verbatim into English. In the case of interviews, the transcripts were given a unique identifier and de-identified to remove any identifying information from the data. As for the focus group discussions, colour labels were assigned to each participant as an identifier that was kept consistent throughout the discussion as well as the transcript.

For this paper, a secondary qualitative data analysis of iHEART-SA formative data, MAXQDA22 was used to conduct a two-stage framework analysis (Ritchie & Spencer, 1994). The first stage involved a theory-driven coding process where TDF was used as the reference framework. One transcript from each category, that is, interviews and focus group discussions, were coded independently by two researchers trained in qualitative research methods to assess the fit of the data to the TDF domains. Based on the coded transcripts, agreement in coding application was assessed and in case of any discrepancies, discussions were undertaken to resolve and finalize the codebook (Appendix A). The finalized codebook operationalizing TDF domains as they related to behavioral targets for both patients and clinical actors was utilized to analyze the remaining transcripts. Following a deductive analysis, an inductive analysis was performed to identify themes that emerged across clusters of TDF domains. Perceived barriers to hypertension care were compared among different groups of participating clinical actors and triangulated with patient-level data to determine convergence and divergence in attitudes and beliefs about how hypertension screening and management occurs in HIV care settings.

Chapter 3. Results

Data obtained under each TDF domain were organized into emerging themes for both groups, patients and clinical actors (Figure 1), as they related to barriers and facilitators to hypertension screening, treatment, and management among PLWH. Both groups identified the lack of enabling resources and physical infrastructure in health clinics as the primary barrier. However, facilitators in promoting integrated healthcare differed between the groups. For patients, it was the support they received from their friends and family in helping them fulfill their self-management practices as well as the fear of the consequences of uncontrolled hypertension, whereas clinicians' shared their optimistic outlook on integration and ability to task-shift among themselves, both of which seemed as possible contributing factors to chronic care integration.



Data Group	Emerging Themes	TDF Domain
Clinical Actors*	Clinics have Limited Structural and Operational Capacity to Support the Implementation of Integrated Care Models	Environmental Contexts and Resources Emotions
	Education and Training on Chronic Care Guidelines is Essential for the Implementation of Integrated Care Models but Inconsistent and often Lacking across Clinics	Reinforcement Beliefs about Capabilities Skills Beliefs about Consequences Knowledge Social Influences
	Clinicians have the Goal of Enhancing Chronic Care within their Clinics but First Need to Advocate for Health Systems Changes that will Sustainably Support Integrated Care	Goals Social Role Optimism Intentions
Patients**	The Threat of Hypertension-Related Morbidity and Mortality as a Motivator for Lifestyle Change	Behavior Regulation Beliefs about Consequences Goals Intentions Optimism
	The Emotional Toll of Clinic Visits and Frustration Associated with the Clinical Operations	Emotions Reinforcements Environmental Contexts and Resources
	Hypertension Self-Management as a Patchwork of Informational and Support Sources	Social Influences Beliefs about Capabilities Skills Memory Knowledge

Figure 1: Emerging themes for both groups, patients and clinical actors, based on data obtained under each TDF domain. (*For patients, no data for the following construct was found: Professional Role and Identity. **For Clinical Actors, no data for the following constructs were found: Memory and Behavior Regulation)

3.1. Clinic Actor-level IDI and FGD Data

The analysis of the IDIs with the clinic managers and the FGDs with the clinic staff and clinicians (i.e., physicians, nurse practitioners) yielded three distinct themes. Each theme is characterized by a unique set of domains, providing an in-depth understanding of the barriers and enablers to implementing an integrated hypertension-HIV care management system.

Theme 1: Clinics have Limited Structural and Operational Capacity to Support the Implementation of Integrated Care Models

A pervasive theme that emerged from the interviews and focus group discussions conducted with clinical actors was the limiting impact of the clinics' existing physical and operational infrastructure to support the implementation of comprehensive care for people with chronic conditions, particularly those with hypertension.

The majority of the healthcare providers reported a lack of medical resources and staff, making an integrated care model difficult to operate. A subset of this group shared that the structure of their clinic is not conducive to promote the integration of HIV and hypertension in the first place because "there are extra rooms that are needed" and "extra staff that [are] needed" to take vitals and provide patient counseling and support. For example, two individuals from different clinics shared that the room for vitals in their clinics is very small and requires more space to accommodate the flow of patients coming through the clinics. The COVID-19 pandemic made routinely taking vitals an even greater challenge due to the lingering fear that one can contract the virus in small spaces. This consequently resulted in low motivation to conduct vitals. COVID-19 also impacted staff shortages. One clinician shared that staff absenteeism due to illness placed an extra burden on the remaining staff members to implement new COVID-19 screening protocols, resulting in fewer staff available to conduct routine checkups. Regarding resources, BP machines were frequently mentioned to be in limited supply or in disrepair. Clinical actors emphasized that staff are overburdened, with a low provider-to-patient ratio.

Clinicians expressed that the nature of the current state of clinical operations created obstacles to implementing hypertension screening and care. Across the six represented clinics, individuals reported a variation in the degree of adherence to routine health screening guidelines as a result of staff shortages and the resulting inadequate time to assess each patient. A few clinicians shared that comprehensive checkups, including screening for hypertension, are often not done or done infrequently because HIV screening and treatment are prioritized over hypertension care. This was exemplified by individuals representing two different clinics who stated:

> *Some of them get missed, we only focus on their HIV and we are missing hypertension. (Clinical IDI 2)*

> *I have seen that some patients have extremely high blood pressure but have never received any scripts for medication for BP. I feel in the section that I am in, we focus on ART patients more than people with BP or Diabetes. These patients do not get enough attention but once the client is in front of me, we do it. But from the beginning, they do not do everything. (FGD 1, Clinician ID Red)*

Clinicians recognized the lack of quality in hypertension screening and management as a result of such a workflow, but overall felt that as long as patients were attending clinic appointments and taking their medication, it was sufficient.

In another clinic, they reported that they at least do routine blood tests once a year to check for diabetes. For HIV, clinicians reported that it depends on how long the patient has been on medication. The checkup is done annually if patients have been adherent for more than 6 months. Only representatives from one clinic shared that screenings are consistently completed for mental health, hypertension, tuberculosis, and diabetes. However, they noted that it depends on the type of patient visit that is scheduled and the demand from the patients, that is, if a patient requests to be screened. For example, according to one staff member, in their clinic, a patient's blood pressure is only checked if they are coming for the first time. It is understood that beyond that initial screening, a patient will only have their blood pressure taken if they are making an appointment regarding hypertension care needs, as expressed by one clinician who stated:

> *The next time you come back, you have no blood pressure [taken], you have come back for something else which is different, and your blood pressure does not get done….The previous time you did not have blood pressure, what you are complaining about today has nothing to do with blood pressure. Then why am I still going to check your blood pressure when I've got people whose blood pressure needs to be checked because they're here for that? (FGD 3, Clinician ID Brown)*

Other operational challenges shared across clinics included a high patient headcount per service and patients skipping vitals to avoid waiting in long lines. Additionally, the clinics struggled with a disjointed filing system. Misplaced files were a particular concern and imposed a *'big challenge around filing [for the clinics]…..[because] the care continuity [for patients]...[was] then affected.' (Clinical IDI 3)*

A subset of clinics perceived that they were already equipped to effectively integrate hypertension screening and treatment. Clinicians from one clinic believed that they could confidently implement an integrated care model without further training and support. Clinicians from another clinic shared that they already follow an integrated model if the patient is HIV positive, stating:

> *It is the headcount per service that makes us tend to separate the diabetics and chronic and hypertension and we only integrate it if the patient is HIV positive not because of the structure, but because of the numbers of the patients that we see that are HIV positive and the number of nurses that are responsible. (Clinical IDI 6)*

This highlights the priority given to HIV treatment and the growing demand for integrated HIV and hypertension care based on the increasing number of patients with these comorbidities.

Theme 2: Education and Training on Chronic Care Guidelines is Essential for the Implementation of Integrated Care Models but Inconsistent and often Lacking across Clinics

Implementation of integrated care was hindered based on the level of training HIV clinicians had regarding chronic care, namely knowledge of evidence-based chronic care guidelines, and their ability to implement these guidelines within the context of their clinical environment. While inadequate training was a commonly reported barrier, some clinical actors reported that the ability to task-shift, having existing knowledge of hypertension care, and the ability to educate patients regarding hypertension management facilitated the delivery of integrated chronic care. Implementation of any guidelines was also reported to be top-down by a few clinicians where the manager sets the expectation that the guidelines are to be followed. As reported by clinicians, this approach reduced their motivation because being a part of decision-making processes and having opportunities to provide feedback was perceived as an important aspect of work culture.

Clinicians and staff members reported that their primary sources of information on various health conditions were health promoters and prior school-based education and training, which were supplemented by their subsequent experiences treating patients. A few clinicians reported that there are varying levels of skill sets and levels of knowledge amongst the clinicians and staff due to differences in prior training based on the type of schooling individuals completed. Not all nurses were NIMART trained (Nurse Initiated Management of Anti-Retroviral Therapy), which made it difficult for them to assist with chronic cases. In addressing what clinicians would need to better provide integrated care to patients, a clinic manager emphasized the need for clear and straightforward guidelines, particularly for non-NIMART trained nurses:

> *Because we also get some people that are not NIMART trained that are assisting with the chronic patients that are already on stable medication.... [so] if you did not know what to do, you would not know. (Clinical IDI 2)*

For a few clinicians, meetings organized in clinics provided another way to gain information on any new chronic care guidelines. Despite a general agreement among the clinicians that having exposure to these guidelines made them feel more confident in treating hypertension, half of them reported not being able to attend these trainings. Barriers to attending in-session trainings included how time-consuming the trainings were and the perception that they could not afford to take leave from the clinic, whereas others noted that trainings on hypertension care were not routinely conducted.

For clinicians that reported having received chronic disease training in the clinic, there was variability in who the target audience was and how they were conducted. One clinician shared that introductory sessions on chronic disease care were conducted to familiarize clinicians with the guidelines, while in another clinic a participant reported that they were trained by the district health management on how to follow chronic care guidelines set forth by South Africa's Department of Health. Even with these training, most of the clinicians reported that they were not trained on guidelines for hypertension specifically. Consequently, for any hypertension diagnosis case a clinician was required, as the nurses were only trained for HIV.

> *"With HIV, we are trained, we did NIMART, we know how to initiate patients on antiretrovirals but with some other things like hypertension, it's very dynamic you understand that, so they need to be seen by the doctor." (FGD 5, Clinician ID Black)*

Training on hypertension guidelines and levels of familiarity with these guidelines among clinicians and clinic staff differed depending on the individual's respective roles. Staff members report attending trainings that are relevant to their job responsibilities, as one individual summed up:

> *If it is training for high blood, they feel that they want to teach how to take BP, it involves everyone but if that day we will focus on a treatment, it is then when they take only the professional nurses. It will depend. (FGD 4, Clinician ID Blue)*

The variation in training within clinical settings created a system whereby clinicians are reliant on their peers who have more training in select clinical competency areas. For example, according to one nurse, '…when I encounter an issue [chronic care], I may have to take that patient to a PHC-trained sister to deal with the patient, and because of this, we are not able to provide a one-stop-shop kind of care. So, our training is limited…' - (FGD 5, Clinical ID Black). Similarly, staff members reported that they are unable to operate outside of the role they were trained for, such as data capturers and analysts, but are often asked to do tasks beyond their skill level to support the implementation of quality care practices. The data capturers, for instance, reported how the lack of proper training in tasks to support the adoption and implementation of these guidelines negatively impact their desire to work towards these clinic-level goals, stating:

> *You find that we have difficulty with that system, no one has ever trained us to use it, but they say they want stats by the end of the week. So, you know that these kinds of things demotivate you. (FGD 2, Clinical ID Benz)*

Clinical actors reported variations in the format and frequency of in-session training on chronic care delivery. Clinicians from two different clinics shared that a doctor comes in to provide in-service training, in one clinic the focus was on providing nurses with different training opportunities. This model was shared across clinics, with some clinics reporting that they have in-service training on a weekly basis where external clinicians are invited to conduct training.

Clinicians believed that they had an important role in raising awareness about hypertension and HIV care management among patients. They described how this is best achieved by providing counseling and information about adherence to treatment. Incase of HIV, using condoms and urging their partners to undergo testing; while for hypertension reducing salt intake and engaging in physical exercise.

They recognized the importance of health education in making an integrated model of healthcare operate and advocated for more ways to support patient health education around chronic disease care. One individual expressed the importance of educating patients about the long-term impacts of not managing their chronic conditions:

> *I think we need to go back to health education. I think we need to invest more in the education of patients…..We need to go back for counseling, education, lifestyle modification, doing more, doing more for these patients to make them understand the risk that if they are not suppressed and they are also not controlled it would later become a problem. (Clinical IDI 1)*

To further raise awareness, a professional nurse shared how they are honest with patients and inform them of the potential repercussions of not adhering to medications. They described how they communicate to the patients using direct phrases such as ‘you will die’, ‘you are going to die if you are not doing the right things, a stroke will kill you’, or ‘you don’t want to sleep at the hospital with a 2-year-old so eat right, come to the clinic.’

Overall clinics had different requests for further training based on needs seen in their patient populations and knowledge level among clinicians. Types of requested training included how to manage hypertension and comorbidities, diagnose hypertension among patients with HIV, facilitate effective patient-provider communication, and file patient documents to better facilitate care follow-up. There was also a demand for refresher courses following any disease-focused training sessions conducted. There was also a need expressed by clinicians for empowering community health workers and staff members through training opportunities to make them more confident in their role of supporting integrated healthcare. It was noted that these trainings need to be accompanied with efforts to ensure proper resource allocation so that staff members can apply their knowledge and training around chronic disease care. As one individual stated:

> *We need to … provide them with the equipment they need. We know that if you give somebody a skill and do not provide them with equipment to use, the skill becomes useless. In our case we have our CHWs, the community health workers…..they have received a lot of training, but they do not have the equipment to support the work that we do, and the skill becomes easily lost. (Clinical IDI 1)*

Clinic staff expressed mixed views about what motivates them in their work. Some felt seeing patients' health improvements were sufficient, some believed a clinic's supportive environment, as well as professional development opportunities (e.g., training), served as a reward, while others believed that a formal incentive system for adhering to clinical guidelines could be motivating. Individuals from a few clinics reported that there is currently a lack of incentives to implement integrated care and suggested that time off, salary increases, or offering training sessions could be beneficial to improving the quality of patient care. Some clinics had a staff and clinician recognition system in place to improve adherence to care guidelines, but individuals from one of those clinics reported that it was not effective and that they would prefer monetary incentives instead. Clinicians also reported that their motivation to continue working is strengthened by both their involvement in decision-making within the clinic and the opportunity to provide feedback to clinic leadership on planned quality improvement initiatives.

Theme 3: Clinicians have the Goal of Enhancing Chronic Care within their Clinics but First Need to Advocate for Health Systems Changes that will Sustainably Support Integrated Care

The implementation of an integrated care model for patients with HIV was largely supported by clinicians, though some exhibited a reluctance due to beliefs around anticipated implementation challenges. Anticipated barriers included imposing additional responsibilities on the existing staff, especially for data capturers who in addition to HIV reporting would also have to capture metrics for hypertension care, the "time-consuming" nature of such a model, "uncertainty" and possible "resistance" from clinic staff, and the ability to adhere to the guidelines given the high volume of patients at each clinic. One nurse practitioner felt the high volume of patients was the primary barrier because all procedures were conducted in the same room and given the rooms size it was not possible to support patient workflows through the vital rooms without creating longer waiting times.

Individuals who had a positive outlook on integrated care, however, believed that this model of care has the potential to reduce staff workload and shorten patient waiting times. These individuals did not feel that such a model would impose an added burden but rather would enhance patient care and improve patient self-management. An administrator from one such clinic shared that this care model will work in their clinic because tasks can be divided amongst clinicians and staff based on how their specific role can support the care model, thus not overburdening one individual. Clinical managers from one clinic expressed receptiveness to the integrated care model, however, shared that it may be seen as additional work by the staff if the idea is introduced by the managers and not the Department of Health. Thereby, they stressed the importance of gaining buy-in from the staff members through the Department of Health by having the idea of an integrated care model coordinated at all levels of the department. Only one clinic shared that they are already working towards the integration of hypertension with HIV services. Individuals from this clinic reported that patients who skipped the vitals room are sent back to ensure proper screening and treatment of hypertension in their patient population. However, due to the limited number of resources only those on hypertension medications can be prioritized.

All clinicians were aware of the standard workflow in their clinical settings and bottlenecks in clinic operations that required improvement for an integrated care model to operate (e.g., creation of a shared space for vitals checkup, integrated electronic filing system in place across clinics). Most of the clinicians also showed an awareness of the importance of having vitals checked, namely in providing a full picture of each patient's state of their health and where changes of medication are needed. However, the lack of functional BP machines and staff presented a barrier to checking vitals consistently. Among the majority of clinics that did not have an integrated care model in place, some shared their goals of working towards that integration of care. For instance, in planning for this model of care, some clinics were actively advocating for equipment, having clinicians conduct rotations with a chronic care focus, and extending chronic care-focused training to the managers. One individual also highlighted the importance of buy-in from clinic staff and the broader community to support the successful implementation of integrated healthcare. A few clinics indicated receptiveness towards the idea of having technological innovation adopted to promote an integrated care model, for example, an electronic system to capture and report patient data, a digitalized treatment guideline for ease of access and use, and an automated reminder-based system for patients to reduce workload and burden on the staff. Two clinics also suggested a more operational-oriented solution, that is, to have all patients pass through the vitals room, and to provide BP machines to the patients to ensure proper monitoring outside of the clinic setting.

3.2. Patient-level IDI Data

The analysis of patient-level data both deductively and inductively revealed three overarching themes. Each theme encompasses a unique set of TDF domains that offer a comprehensive understanding of the factors that hinder or promote patients' access to hypertension care management.

Theme 1: The threat of hypertension-related morbidity and mortality as a motivator for lifestyle change

Most of the patients reported that their motivation to modify their behavior towards hypertension management originated from their fear of the adverse effects of the condition. As a result, any effort to regulate their behavior, set goals, or adopt preventive practices was primarily to avoid the serious consequences of hypertension.

Some patients had set their own goals to be able to handle their condition. From general ones like avoiding to overthink, controlling anger, nursing health, to as specific as drinking at least 2 liters of water in a day. Even when individuals recognized that they were not meeting their hypertension self-management goals, they voiced an intention to try to make an effort in bringing about a lifestyle change. One patient shared that they are attempting to try and improve their hypertension self-management stating,

> *"To be honest I don't know [what else to do] because I'm trying each day you see; each day is a new day for me to encounter which might be helpful." (Patient ID 17)*

Other forms of goals set by the patients were more effort-based, for example, ensuring not to skip meals, medications, or appointments, each reported by three different patients.

Adherence to medication was the most common form of behavior regulation practiced among the participants. Many patients reported being consistent in taking their medication at the prescribed frequency and time, and ensuring that they never ran out of it. In addition to medications, patients also altered their health habits by adjusting their diet. The majority of participants took deliberate actions to manage their chronic conditions by reducing the intake of unhealthy food and adopting healthy food options instead. For example, some participants in addition to adhering to medications, adjusted the level of salt, spices, and oil in food in accordance to the diet counseling received while others incorporated new food options such as porridge, vegetables, and fruits to control their condition. A few patients also recognized the importance of staying hydrated as it controlled their anger and stress, and as a result, their blood pressure as well. However, a minority of participants reported that they did not regulate their diet and solely concentrated on taking their medications as prescribed.

Physical activity was the third most prevalent behavior regulation common among the patients. Many patients shared that they had attempted to or successfully incorporated exercise as a part of their routine. This ranged from walking to running to going to the gym, with individuals developing new routines to build physical activity into their schedule. For instance, one patient reported substituting short taxi rides with walking. However, for those who were unable to incorporate physical activity as part of their routine, it was largely due to work that made it difficult to set aside time for exercise or old age.

Patients reported to be highly motivated to practice hypertension self-management out of fear of the negative consequences in case of mismanagement. For example, one patient shared that if they did not take their medication every day, they would have a stroke, while another shared that they would end up hospitalized. Several patients shared accounts of when they saw others die due to hypertension and how they would not want the same for themselves.

> *What encourages me….is that I have seen so many people suffer the consequences of BP without knowing that they even had it, people find out when they already have a stroke. One of my colleagues fell and passed out last week and we called an ambulance for her, they told her the BP was too high. (Patient ID 41)*

Observing people succumb due to BP-related issues was reported to be a compelling reason for several patients to modify their lifestyle and practice behavior regulation.

One patient also mentioned that the consequence of not controlling their blood pressure is having to return to the clinic in a month, which they perceived as a form of punishment that keeps them motivated and accountable.

> *They monitor your weight too and ask when it has changed drastically. When my BP is not controlled, the punishment is always that I need to be back in a month, and I like this because it keeps me motivated and accountable. (Patient ID 44)*

In explaining what they believed were the consequences of uncontrolled hypertension, patients also took a positive outlook on the results of maintaining control on hypertension. For example, the ability to live a longer life and continue caring for their children or grandchildren served as strong motivations for patients. Similar levels of positivity were reflected when some patients expressed confidence in being able to achieve their health goals. Additionally, even though clinic visits were widely reported to be burdensome and stressful, a patient shared that their choice of the clinic was “because it is life” (Patient ID 22) for them, indicating that the clinic was the way that kept them alive. However, a few other patients had a pessimistic view about hypertension that the diagnosis of the condition felt like the end of their life as it is not curable.

> *They have information about BP, most of them say it's not curable, so I know it will not be cured, so I can just take care of it, those are things I look for, how to take care of it. (Patient ID 17)*

They felt alone in their fight against hypertension as they did not want to burden other people with their condition and so had to take care of themselves.

THEME 2: The emotional toll of clinic visits and frustration associated with the clinical operations

Almost all the patients had concerns with the unorganized clinical workflow as well as inadequate infrastructural capacity in terms of staff and resources. The only factors that motivated them to continue visiting the same clinics were familiarity with the working staff, proximity to their homes, and their medical history already being secured in these clinics.

Many patients had concerns about long wait times especially when it required waiting outside the clinic in front of the public. In order to reduce wait times, they proposed several solutions, such as having a separate queue for double chronic conditions or providing early guidance on where to queue. Patients also voiced concerns about public stigmatization and suggested that waiting lines be moved inside the clinic instead.

Some patients complained about the clinic's slow service and lack of resources, such as BP medication and healthy food. To this end, they suggested that the government should consider delivering health services to the people or providing people with food as monetary constraints made it challenging to follow dietary restrictions.

> *Only if the government had the plans to deliver health services for us….we could be caught by things along the way (to the clinic) and they could hurt us….It is no longer healthcare if I died because I was coming to the clinic. (Patient ID 5)*

Regarding medications, a few patients requested if the provision of medications could be fast-tracked or if there could be multiple options to collect medications, for example, from stores as an alternative to clinic pharmacies.

To facilitate behavior regulation, some patients suggested having spaces for people with BP to exercise as well as areas for counseling sessions. Other patients reported positive experiences with the clinic as they were given more medications than the standard monthly supply to avoid frequent long visits to the clinic, received encouragement and support from clinicians, and were accommodated by the clinicians in the event of missed appointments.

> *It is that I receive my treatment the way I am supposed to receive it and even if I missed my date, they call me and ask why I did not come. That shows that they care about us and that will always make me continue seeking care here. (Patient ID 19)*

Patients also shared their negative experiences with the clinic's attitude as well as lateness in attending to the patients and requested refresher courses for the staff on how to deal with the public, while others appreciated the clinic's human-centered approach. Additionally, these experiences were reported to be further aggravated by the pandemic, job insecurity, and a lack of money to buy healthy food.

During the patient interviews, individuals shared their experiences managing their medical conditions, often describing their experiences as being emotionally laden. Some patients reported that managing their condition and adhering to medication made them feel good about themselves and enabled them to enjoy each day without feeling down.

> *"I enjoy my life; I just take each day as it comes. I do not sit and cry, I do not get depressed because of my condition." (Patient ID 34)*

Conversely, there were reports of how patients found different stages of the process frustrating and burdensome. One patient found the diagnosis phase of hypertension to be a traumatic experience. Succeeding steps, which included attending clinics were frequently deemed as frustrating, with patients expressing discontent with the clinic's record-keeping procedures, extended wait times resulting in public humiliation, and clinicians' attitude towards them.

THEME 3: Hypertension self-management as a patchwork of informational and support sources

Hypertension self-management practices undertaken by patients seemed to be facilitated by the integration of both informational and supportive resources for the patients. There were however also accounts where patients shared experiences of self-managing hypertension care on their own.

On asking whether someone else has an impact on their BP management, some patients reported that they are able to manage it independently. A few patients expressed their self-management practices but indicated that they are still trying to be better at it. For example, one patient reported difficulty maintaining dietary adjustments consistently and giving up when they would feel physically weak.

> *"I do take spices and oil when I do not feel well, I am not as strong." (Patient ID 27)*

Similarly, another patient shared that they had difficulty following dietary restrictions when with friends as they ate whatever was cooked. Regarding self-management practices in collecting medications, one patient shared their preference of sending their children to collect their medications as they did not like being on foot for long periods of time. Another patient mentioned that their old age limited their ability to exercise or walk, so only relied on medication to control their condition. However, a 60-year-old patient reported that they incorporated walking as part of their behavior.

Many patients reported to rely on trustful channels of information for hypertension self-management, that included, their health providers, individuals on the same medication, traditional healers and also, self-research. Information that was provided by providers was focused on hypertension itself, its treatment, dietary requirements, timely adherence to medication, and consequences of not doing so. However, there were also some patients who reported not having received any health educational sessions to begin with, or even an explanation of the treatment, results obtained, or changes in medication. Consequently, many of them expressed a dependency on health providers for more information and counseling sessions to bridge the knowledge gap, for example, training on how to use BP machines and its interpretation, and exercises and dietary changes to incorporate. For the usage of BP machines, many patients expressed an interest in learning how to operate the BP machine and any specific skills required to use it. This way, they would be able to track their BP and manage their treatment outside of clinic appointments. However, some patients were not confident in their ability to use the machine and so preferred visiting the clinic instead.

As per patients' responses, the social support network either seemed to strengthen or weaken behavior regulation practices for the patients. For example, many patients shared the role of family members in reminding them to take medication, assisting with household chores, and providing dietary information.

> *".....they always make sure that when it is that time they ask me if I have taken my medication and if not, they remind me to take them there and then." (Patient IDI 9)*

> *"They are extremely helpful with cooking when I am at work….They also do the laundry, clean the house, and that really pleases me." (Patient IDI 10)*

Some patients also mentioned the support they received from support groups that were on the same medication or had the same condition. One patient mentioned the support received from their employer in reminding them of their appointment and medication collection dates which were unlike what many patients as employees experienced. Conversely, patients also reported experiencing stress from certain social relationships, such as work due to a lack of cooperation from their end, or within communities due to the risk of being stigmatized or discriminated against. As a result, they would opt out of disclosing their condition to friends or family to avoid the stress that would aggravate their blood pressure.

3.3. Data Triangulation

Consistency was found in the factors that hindered integrated care-management, as evidenced by the convergence in findings from both clinical actors and patients. Both groups acknowledged the lack of infrastructure and clinical operations supporting routine hypertension screening as barriers to the implementation of an integrated care model, with high patient volume and resulting long times, inadequate resources (e.g., operating blood pressure machines), and overburdened staff being commonly reported. Education and training sessions were also identified as crucial in practicing hypertension care management, leading to requests for frequent training sessions for the clinic staff, and better-organized educational and counseling sessions for patients. This was seen as a way to bridge the knowledge-to-skill gap and enhance self-efficacy in hypertension management behaviors in both groups. Lastly, both groups affirmed the importance of social support in hypertension management, with patients relying on family and friends for support, and clinical actors depending on clinic staff and managers as their primary source of support.

Clinical actors, including clinic managers and staff members, noted that they did not have knowledge of patients' hypertension self-management practices beyond assessing medication adherence during clinic visits. This was also the case for HIV care management, where clinical actors emphasized the importance of attending routine clinic appointments and adhering to prescribed medications. Patients, however, reported being more concerned about disease-related stigma and lack of social support to manage their conditions. As a result of these dynamics, most clinical actors prioritized essential steps pertaining to hypertension and HIV care management, neglecting the behavioral determinants of health that patients expressed concern over.

Another area of discordance was identified in terms of disease priority. Patients appeared to consider hypertension more severe compared to HIV, while clinical actors considered HIV to be the primary concern among patients with both diseases. This disparity was reflected in the patients' concern about non-functioning BP machines, lack of counseling and educational sessions for hypertension management, failure to check vitals, and staff not attending to patients promptly, all of which were more consistently mentioned as barriers among patients compared to clinical actors.

Chapter 4. Discussion and Public Health Implication

4.1. Main Findings

The study undertook a two-layered qualitative analysis to understand the barriers and facilitators to integrated chronic care management among patients and clinicians in selected HIV care settings in Johannesburg, South Africa. The initial step involved a deductive analysis utilizing the TDF, followed by an inductive analysis that identified any emerging themes using the data under each domain. The identified primary hindrances in care integration were a lack of enabling resources, siloed flow of operations, the stigma surrounding HIV, and a lack of awareness about managing chronic care. Conversely, common factors conducive to care integration were reported to be peer support for both patients and clinicians, fear of adverse health outcomes among patients, and to some degree, ability to practice task-shifting among clinical actors.

Clinic-level Enablers and Barriers

The primary barriers to implementing hypertension screening and treatment were the clinic's operational capacity and the value placed on these care guidelines by clinicians. Nearly all of the clinics expressed that the infrastructure of the clinic and operational procedures were not suitable for an integrated HIV and hypertension chronic care system. They reported the lack of resources, staff, and space to implement hypertension care practices as factors hindering the integration of hypertension and HIV care. These findings are congruent with several other qualitative studies conducted in African countries that assessed barriers to integrated hypertension-HIV management in clinics and found that non-functioning BP machines, inadequate planning for HTN/HIV integration, and lack of anti-hypertensive medicines hindered implementation success. (Basenero et al., 2022; Muddu et al., 2020; Rabkin et al., 2018).

Clinicians in this study also reported that routine blood tests and BP checkups were not implemented with fidelity and that hypertension care was not prioritized unless a patient was previously diagnosed or self-reported symptoms related to high blood pressure. This mirrors findings from a study in HIV clinics in Eastern Uganda where hypertension management was observed to be a lower priority in HIV clinic workflows (Muddu et al., 2020). Neglecting to screen patients living with HIV for hypertension puts them at risk of developing serious hypertension-related complications (e.g., severe headache, stroke), otherwise preventable conditions. To address these challenges and ensure quality care for both HIV and comorbid chronic conditions (e.g., hypertension), new models and approaches that utilize evidence-based strategies and insights from implementation science are necessary to integrate HIV and chronic care (Basenero et al., 2022).

This study identified additional barriers to implementation that varied based on provider characteristics and training opportunities afforded to them within their clinical context. Inadequate training on hypertension care guidelines was frequently cited as a barrier in hypertension care management. The importance of providing disease-focused education and training opportunities is underscored by findings from Musinguizi and colleagues who found that healthcare providers without specialized training and skills in chronic care are forced to attend to patients with chronic illnesses due to staff shortages, resulting in suboptimal performance by clinics in terms of care management (Musinguzi et al., 2015). Establishing a monitoring and evaluation system (e.g., audit and feedback) that keeps clinicians adherent to hypertension screening and treatment guidelines is one approach that has been proposed to help combat clinical inertia (Muddu et al., 2020)**.** Given the importance of enhancing clinicians' psychological capabilities, it is important to focus on establishing mechanisms that support clinician-level psychosocial factors, for example, knowledge, motivation, self-efficacy, and other competencies through educational and training interventions.

Lack of incentives was another commonly reported barrier by the clinical staff, influencing their willingness and motivation to provide integrated chronic care. The absence of a system that either provides a monetary reward, physical opportunity (e.g., resources and training), or recognition, has been shown to hinder the motivation of clinic members to promote effective hypertension care integration in Ugandan HIV clinic settings (Muddu et al., 2020). To better motivate clinicians' and staff members' action towards integrated hypertension-HIV care, incentive structures should be implemented that recognize clinical actors for assuming additional responsibilities.

Attitudes towards integrated care varied widely in this study. Clinicians and staff members mostly expressed concern with such a model owing to apprehensions over the uncertainty involved in routinely implementing hypertension screening and treatment, namely the possibility of an increased workload. Resource constraints, shortage of staff, and lack of certainty around how the model would work impeded their buy-in for an integrated healthcare system. This is because implementing such a model requires changes at all levels of clinic operations, including staffing, patient and clinician workflows, and data management. A pilot program conducted at two HIV clinics in Malawi for the implementation of integrated hypertension and HIV model found that the provision of cost-effectiveness information to stakeholders, continued investment in a supply management channel for medications and other resources, and training of healthcare workers are all crucial for gaining more advocacy and increased buy-in for an integrated care model (Patel et al., 2018). Therefore, efforts to implement an integrated care model should first enhance implementation readiness among clinicians and staff through educational sessions and feedback sessions. To effectively gain support from clinicians, it is important to direct efforts towards interventions that not only familiarize them with the benefits of the integrated model, in terms of its cost-effectiveness and potential health return, but also make them feel comfortable with hypertension care guidelines.

Clinic managers, on the contrary, showed a higher level of receptiveness towards the idea of hypertension and HIV care integration. One clinical manager stressed the importance of the idea being introduced and coordinated by a higher authority (i.e. Department of Health) to obtain a greater buy-in from the clinicians and staff. This finding advocates for health system buy-in with new care models and an assessment of who the appropriate actors are to champion quality care initiatives. Although research about the role of leadership in the context of SSA and integrated care for hypertension and HIV is limited, various reviews have highlighted the importance of leadership in promoting an organization's readiness towards integration of healthcare services (Struckmann et al., 2018; Suter et al., 2009). To promote the implementation of an integrated care model in the clinical setting, it is crucial to utilize the organization's leadership to introduce the idea of integrated hypertension-HIV care, to then generate clinician buy-in to sustain the model of care.

The ability to practice task-shifting to some degree was identified as a key factor in facilitating the integration of hypertension screening and care in the HIV clinics. Clinicians in our study reported instances where tasks were delegated to other professionals based on the level of complexity and specialization required. This approach was found to be beneficial in streamlining patient workflows and allowing those clinicians and staff trained to screen and treat for hypertension to do so, therefore allowing for successful BP screenings and HTN care with the limited staff available. Studies undertaken in LMICs have tested the effectiveness and feasibility of task-sharing interventions for integrating the management of NCDs with this approach and have shown success in improving care management and health outcomes, for example, increased uptake of medications and reductions in blood pressure (Anand et al., 2019; Joshi et al., 2014; Lekoubou et al., 2010)**.** Further research would be needed to fully understand the effects of task-sharing on healthcare professionals' satisfaction and/or burnout with their roles, their ability to sustainably implement integrated care models, and patient-centered outcomes, particularly in the management of hypertension alongside HIV. If found to be effective, policy changes will be necessary to enable the widespread implementation of task-sharing interventions in clinics and to promote integrated healthcare services.

Patient-level Enablers and Barriers

Many patients reported that the threat of hypertension-related mortality and morbidity acted as a driving force for them to manage their health behaviors. Several patients showed an understanding of the serious repercussions of the condition and shared that they tried to stay healthy for the sake of their families and to enjoy a longer life. Consequently, many patients adhered to medication, made dietary adjustments, and engaged in physical activity. There are a limited number of studies exploring patients' motivation to practice hypertension self-management in the context of SSA, however, those that do, demonstrate the importance of understanding the consequences of uncontrolled hypertension. A study conducted in a primary care hospital in Nigeria among hypertension patients found that increased awareness of the consequences of uncontrolled hypertension facilitated self-management practices for the condition (Omoronyia et al., 2021). Several studies conducted outside of SSA also showed evidence that modifying health behaviors is often driven by the fear of poor health outcomes (Ma, 2018). For example, Ma (2018) conducted a cross-sectional study among a hospital-based sample of adults between ages 18-59 with hypertension in China and found that constructs from the Health Belief Model, such as perceived susceptibility and perceived severity, explained 47% of the total variance in self-management behaviors. Another study conducted in rural Iran showed that hypertensive patients who had a higher perceived susceptibility and severity of hypertension had better adherence to hypertension medication (Kamran et al., 2014). These results suggest that efforts to educate people about the importance of lifestyle changes and the potential consequences of neglecting proper hypertension care management through awareness sessions should be prioritized.

A predominant facilitator identified as important for effective chronic care management was the patients' social support network, typically in the form of family and friends who played a role in ensuring the patient's adherence to medication and clinic visits. The findings for social support are consistent with previous studies that suggest social support as a crucial factor in promoting protective behaviors for hypertension and HIV, such as physical activity, medication adherence, and clinical visits (Magrin et al., 2015; Quigley et al., 2019). A meta-analysis conducted by Magrin et al. (2015) explored the association of social support with adherence to a healthy lifestyle and treatment in hypertensive patients. It conceptualized social support across two domains, structural social support and functional social support, where structural social support entailed an individual's social network and functional social support referred to the encouragement and support provided by people in the individual's social network, respectively. It was found that functional support had a significant positive impact on overall adherence to hypertension treatment. Thus, assessing and supporting a patient's social support network can help improve their lifestyle behaviors, for example, through the use of peer educators for chronic care management.

High self-efficacy level was also a crucial facilitator in our study in promoting behavior regulation among patients to manage hypertension and HIV. This was evident through patient reports of making lifestyle modifications, such as opting to walk to the clinic rather than taking a taxi and reducing the amount of oil and salt in their food. The study's findings have been supported by a cross-sectional study conducted by Areri et al., (2020) in Northwest Ethiopia where self-efficacy was one of the two strongest predictors influencing HIV self-management practices (e.g., daily physical health practices and medication adherence) for adults on antiretroviral therapy. A systematic review of the association between self-efficacy and self-care revealed that 21 out of 22 studies found a correlation between higher self-efficacy and improved hypertension self-management behaviors such as adhering to medication, engaging in physical activity and adjusting one's diet (Tan et al., 2021). Based on these collective findings, interventions aimed at improving patients' chronic disease self-management practices should also aim to promote patients' self-efficacy. One such intervention is health coaching, which helps patients to discover ways to practice hypertension care management (Gierisch et al., 2017).

Other common enabling factors reported by the patients included the proximity and familiarity with the clinic staff, but more importantly well-established relationships with the health providers. According to studies by Kirby et al. (2012) and Lall et al. (2018), patient-clinician relationships are critical in encouraging self-managing practices, quality of care, medication adherence, and continuity of care within the context of chronic disease management. Lall et al.'s (2018) qualitative research focused on chronic care management in primary care facilities in LMICs and emphasized the importance of improving the quality of interpersonal communication between healthcare providers and patients. This is particularly important in LMICs where other factors such as poor infrastructure and lack of resources form additional barriers to healthcare. Therefore, in the context of SSA, interventions should seek to cultivate positive patient-provider relationships that can be leveraged to facilitate chronic disease management practices among the patients. The study's findings underscore the essential role of communication between providers and patients in hypertension self-management, as patients in the study seem to depend on their providers for effective hypertension care. Therefore, interventions should seek to leverage these existing positive patient-provider relationships to facilitate chronic disease management practices among the patients.

Patients in this study showed a baseline understanding of the consequences on health if hypertension is left untreated, however, there was variation in how patients perceived the condition itself, particularly in relation to recognizing its symptoms and how to manage it. This was attributed to the lack of educational or counseling sessions conducted within the HIV care clinic. Similar findings were reported in a study in South Africa by Mshunqane and colleagues (2012) among NCD patients who displayed a lack of knowledge of lifestyle modifications required to prevent complications of chronic diseases. Additionally, several other qualitative studies in rural South Africa demonstrated a lack of knowledge among patients about the causes of hypertension and diabetes, leading to poor medication adherence and other self-management practices (Kagee et al., 2007; Mothiba et al., 2013; Muchiri et al., 2011). The effectiveness of educational interventions in improving hypertension and HIV health outcomes, where patient education is deemed crucial in the management of both conditions has also been demonstrated in studies by Govender et al. (2022) and Goverwa et al. (2014). In one study conducted in Ivory Coast, compliance with antihypertensive treatment increased from 15% to 85% one year after the implementation of an educational program (Koffi et al., 2018)**.** Therefore, it is imperative to disseminate information on both effective approaches to self-managing hypertension and the consequences of mismanaging hypertension-HIV through tailored educational interventions to promote the adoption of protective and preventive behaviors among patients.

Attending clinic appointments is critical in supporting chronic disease management, yet findings from this study indicate that the clinic environment can evoke negative emotions that deter regular follow-up care. Frustrations with long distances to the clinic, long clinic wait times, clinic operations, and negative staff interactions were all factors that deterred patients from attending clinics. These findings concur with previous studies conducted in SSA that highlight the role of health system deficiencies, such as the lack of medications at health clinics, in hindering the management of hypertension control by patients (Pires et al., 2013; Ulasi et al., 2011). Similar shortcomings of long queues and waiting times were also reported in a study on hypertension treatment-seeking behaviors and perceived barriers among socio-economically disadvantaged migrants in Delhi, India (Kusuma, 2010). Studies conducted in different regions of the world, where human development outcomes are comparable, including Asia and South America, have consistently reported large distances as a barrier to maintaining regular clinic attendance (Legido-Quigley et al., 2015; Risso-Gill et al., 2015). These studies recommended decentralization of chronic care services to enable access to care at a shorter distance, similar to patient suggestions in this study for community-based medication pick-up points to better support patient self-management.

4.2. Strength and Limitation

The utilization of a theory-informed implementation framework to understand the barriers and enablers to hypertension-HIV integrated care strengthened the study by enhancing the rigorous and scientific validity of the findings. Moreover, such a methodology yields insights that can be translated into actionable recommendations for policy and strategy by tracing back the data in each TDF domain to its corresponding COM-B function and ultimately to its pertinent intervention function. The involvement of multiple stakeholders - patients, clinic managers, healthcare providers, clinic administrators and staff - is another strength of the study. This approach enables the triangulation of data, thereby increasing confidence in the reliability of the findings. Furthermore, the concurrence of the data obtained from stakeholder groups across different clinics indicates that the data may have wider applicability to other similar settings.

One limitation of the study is that the interview and focus group discussion guides were developed in alignment with the COM-B model and not the TDF. It is therefore likely that certain domains of the TDF that applied to hypertension-HIV integration may not have been explored with the participants at a granular level. Another limitation is that even though the application of TDF allowed a thorough comprehension of the data, there were slight challenges in assigning data across domains. Content from the interviews or focus group discussions often overlapped in more than one domain, making it a time-consuming task to resolve as there is limited guidance available for it (Atkins et al., 2017).

4.3. Public Health Implication

Despite the recognition of the need for an integrated hypertension-HIV model, HIV programmes in SSA have not been fully leveraged for improved quality of care for NCDs through the ICDM model. Moreover, existing evidence available about the barriers and facilitators to integrated care is either limited to small-scale studies or lacks granularity (Ameh et al., 2016; Muddu et al., 2020).

The application of the TDF in this study makes it possible to closely examine patient-, provider-, and system-level barriers and enablers to implement an integrated model of HIV and hypertension care in HIV care settings in Johannesburg, South Africa. The identification of both unique and cross-cutting themes among each stakeholder group allows for the development of tailored implementation strategies that are responsive to the local context, in addition to highlighting where added behavioral intervention components could be developed to promote patient engagement with the healthcare system and to better support hypertension self-management among people living with HIV. For example, primary concerns shared by both providers and patients pertained to the environmental structure and resources domain, where the clinic's structure and operations were deemed inadequate for an integrated care model. Skills and knowledge were also named as barriers to clinic-level implementation and patient-level engagement, with clinicians reporting insufficient knowledge and training to diagnose and treat hypertension, and patients reporting inadequate knowledge of causes of and ways to self-manage hypertension. Thereby, the following recommended implementation strategies should be prioritized:

- ➢ Train healthcare providers to diagnose, treat, manage, and prevent hypertension alongside managing HIV care
- ➢ Conduct educational sessions with patients to raise awareness of the importance of co-managing hypertension with HIV, the potential impacts of uncontrolled hypertension, and effective approaches for self-management
- ➢ Ensure the availability of working blood pressure machines

- ➢ Streamline clinical workflows based on each clinic's unique physical setup to ensure clinicians' ability to consistently take patients' blood pressure during clinic visits
- ➢ Create systems to support clinicians' adherence by establishing clinic champions and devising systems through which clinicians receive feedback on their care practices

As part of the next steps, it is important to test these implementation strategies and evaluate their effectiveness in changing clinician behavior and in supporting patients' self-management behaviors. To assess the sustainability of these approaches, implementation evaluation of the feasibility and acceptability of these strategies should also be examined. This evidence can then be adapted for use in different clinical settings across SSA to support enhanced chronic disease control among PLWH.

4.4. Conclusion

Integrated care models continue to gain increasing attention for their potential benefits for improving chronic disease control, patient satisfaction, and service delivery (Ameh et al., 2017; Baxter et al., 2018; Gavaldà-Espelta et al., 2020; Mitchell et al., 2015; Rocks et al., 2020). This trend is also observable in South Africa, where the country established the ICDM model to leverage the success of HIV healthcare systems and improve service provision for hypertension through integration. However, the performance of such a model has been suboptimal due to many patient-, clinician-, and health system-level barriers as mirrored in findings from this study. These barriers hinder the successful integration of hypertension care into HIV care settings and call for strategies targeting these contextually bound behavioral determinants.

The findings of this study are consistent with existing literature and provide additional nuances, thus enabling the development of implementation strategies based on the barriers identified by both clinical actors and patients, not only in South Africa but also in similar settings. Many of the barriers enumerated by the clinical actors and patients included inadequate clinical infrastructure, lack of knowledge and training, and disorganized clinical operations.

As such, efforts should be directed towards restructuring and enabling the clinic environment and actors to support the implementation of hypertension care guidelines, through means such as streamlining clinic-based operations, establishing peer support and feedback mechanisms, redefining provider roles, and providing regular educational sessions for clinicians who can then educate and support patient’s chronic disease self-management.

Appendix A. Codebook

Domain	Definition of Constructs	Application to Patient's Behaviors	Application to Clinical Actor's Behaviors
Knowledge	An awareness of the existence of something	Awareness and familiarity of behaviors patient should adopt for hypertension management	Knowledge of hypertension care guidelines for patients with HIV
Skills	An ability or proficiency acquired through practice	Skills and ability to practice hypertension care management (e.g., lifestyle modification, medication adherence)	Training and skills in implementing hypertension care guidelines
Professional role and identity	A coherent set of behaviors and displayed personal qualities of an individual in a social or work setting	N/A	The extent to which implementation of hypertension care guidelines is perceived as part of the clinician's role
Beliefs about capabilities	Acceptance of the truth, reality, or validity about an ability, talent, or facility that a person can put to constructive use	Confidence in one's ability to practice hypertension care management	Confidence in one's ability to implement hypertension care guidelines
Optimism	The confidence that things will happen for the best or that desired goals will be attained	Confidence that following hypertension care management will lead to better health outcomes	Confidence that the implementation of hypertension care guidelines will be attained
Belief about consequences	Acceptance of the truth, reality, or validity about outcomes of a behavior in a given situation	Any beliefs (positive/negative) held by the patients associated with controlling their hypertension	Any beliefs (positive/negative) held by the clinicians associated with the implementation of hypertension care guidelines
Reinforcement	Increasing the probability of a response by arranging a dependent relationship or contingency, between the response and a given stimulus	The extent of recognition and reward expected by the patients for self-managing their hypertension	The extent of recognition and reward expected by the clinicians for implementing hypertension care guidelines

Intentions	A conscious decision to perform a behavior or a resolve to act in a certain way	Patient's intention to self-manage their hypertension	Clinician's intention to implement hypertension care guidelines
Goals	Mental representation of outcomes or end states that an individual want to achieve	The relative importance to patients of controlling their hypertension	The relative importance to clinicians of implementing hypertension care guidelines
Memory, attention and decision processes	The ability to retain information, focus selectively on aspects of the environment and choose between 2 or more alternatives	The extent to which taking steps to manage their hypertension is habitual	The extent to which implementing hypertension care guidelines is part of usual care practice
Environmental resources and context	Any circumstance of a person’s situation or environment that discourages or encourages the development of skills and abilities, independence, social competence, and adaptive behavior	The environmental context that may hinder or facilitate the implementation of hypertension self-management	The environmental context that may hinder or facilitate the implementation of hypertension care guidelines
Social influences	Those interpersonal processes that can cause individuals to change their thoughts, feelings, or behaviors	The interpersonal relationships that may hinder or facilitate the implementation of hypertension self-management	The interpersonal relationships clinicians that may hinder or facilitate the implementation of hypertension care guidelines
Emotions	A complex reaction pattern, involving experiential, behavioral, and physiological elements, by which the individual attempts to deal with a personally significant matter or event	Positive or negative emotions experienced managing one's hypertension	Positive or negative emotions experienced when implementing hypertension care guidelines

Behavioral Regulation	Anything aimed at managing or changing objectively observed or measured actions	The ability of the patients to self-monitor and plan to self-manage their hypertension	The ability of the clinicians to self-monitor and plan to implement hypertension care guidelines

Reference

Achoki, T., Sartorius, B., Watkins, D., Glenn, S. D., Kengne, A. P., Oni, T., Wiysonge, C. S., Walker, A., Adetokunboh, O. O., Babalola, T. K., Bolarinwa, O. A., Claassens, M. M., Cowden, R. G., Day, C. T., Ezekannagha, O., Ginindza, T. G., Iwu, C. C. D., Iwu, C. J., Karangwa, I., … Naghavi, M. (2022). Health trends, inequalities and opportunities in South Africa’s provinces, 1990–2019: Findings from the Global Burden of Disease 2019 Study. *J Epidemiol Community Health*, *76*(5), 471–481. https://doi.org/10.1136/jech-2021-217480

Addo, J., Smeeth, L., & Leon, D. A. (2007). Hypertension In Sub-Saharan Africa. *Hypertension*, *50*(6), 1012–1018. https://doi.org/10.1161/HYPERTENSIONAHA.107.093336

Ameh, S., Klipstein-Grobusch, K., D’Ambruoso, L., Kahn, K., Tollman, S., & Gómez-Olivé, F. (2016). Quality of integrated chronic disease care in rural South Africa: User and provider perspectives. *Health Policy and Planning*, *32*. https://doi.org/10.1093/heapol/czw118

Ameh, S., Klipstein-Grobusch, K., Musenge, E., Kahn, K., Tollman, S., & Gómez-Olivé, F. X. (2017). Effectiveness of an Integrated Approach to HIV and Hypertension Care in Rural South Africa: Controlled Interrupted Time-Series Analysis. *Journal of Acquired Immune Deficiency Syndromes (1999)*, *75*(4), 472–479. https://doi.org/10.1097/QAI.0000000000001437

Anand, T. N., Joseph, L. M., Geetha, A. V., Prabhakaran, D., & Jeemon, P. (2019). Task sharing with non-physician health-care workers for management of blood pressure in low-income and middle-income countries: A systematic review and meta-analysis. *The Lancet Global Health*, *7*(6), e761–e771. https://doi.org/10.1016/S2214-109X(19)30077-4

Arden, M. A., Drabble, S., O’Cathain, A., Hutchings, M., & Wildman, M. (2019). Adherence to medication in adults with Cystic Fibrosis: An investigation using objective adherence data and the Theoretical Domains Framework. *British Journal of Health Psychology*, *24*(2), 357–380. https://doi.org/10.1111/bjhp.12357

Areri, H., Marshall, A., & Harvey, G. (2020). Factors influencing self-management of adults living with

HIV on antiretroviral therapy in Northwest Ethiopia: A cross-sectional study. *BMC Infectious Diseases*, *20*(1), 879. https://doi.org/10.1186/s12879-020-05618-y

Atkins, L., Francis, J., Islam, R., O'Connor, D., Patey, A., Ivers, N., Foy, R., Duncan, E. M., Colquhoun, H., Grimshaw, J. M., Lawton, R., & Michie, S. (2017). A guide to using the Theoretical Domains Framework of behaviour change to investigate implementation problems. *Implementation Science*, *12*(1), 77. https://doi.org/10.1186/s13012-017-0605-9

Basenero, A., Neidel, J., Ikeda, D. J., Ashivudhi, H., Mpariwa, S., Kamangu, J. W. N., Kakubu, M. A. M., Hans, L., Mutandi, G., Jed, S., Tjituka, F., Hamunime, N., & Agins, B. D. (2022). Integrating hypertension and HIV care in Namibia: A quality improvement collaborative approach. *PLOS ONE*, *17*(8), e0272727. https://doi.org/10.1371/journal.pone.0272727

Baxter, S., Johnson, M., Chambers, D., Sutton, A., Goyder, E., & Booth, A. (2018). The effects of integrated care: A systematic review of UK and international evidence. *BMC Health Services Research*, *18*(1), 350. https://doi.org/10.1186/s12913-018-3161-3

Cahill, L. S., Carey, L. M., Mak-Yuen, Y., McCluskey, A., Neilson, C., O'Connor, D. A., & Lannin, N. A. (2021). Factors influencing allied health professionals' implementation of upper limb sensory rehabilitation for stroke survivors: A qualitative study to inform knowledge translation. *BMJ Open*, *11*(2), e042879. https://doi.org/10.1136/bmjopen-2020-042879

De Leo, A., Bayes, S., Bloxsome, D., & BUTT, J. (2020). *Exploring the usability of the COM-B model and Transtheoretical Domains Framework (TDF) to define the underlying helpers and hindrances of evidence-based change in midwifery*. https://doi.org/10.21203/rs.3.rs-40581/v1

De Wet-Billings, N., & Godongwana, M. (2021). Exposure to Intimate Partner Violence and Hypertension Outcomes among Young Women in South Africa. *International Journal of Hypertension*, *2021*, 5519356. https://doi.org/10.1155/2021/5519356

Fiseha, T., Belete, A. G., Dereje, H., & Dires, A. (2019). Hypertension in HIV-Infected Patients Receiving Antiretroviral Therapy in Northeast Ethiopia. *International Journal of Hypertension*, *2019*, 4103604. https://doi.org/10.1155/2019/4103604

French, S. D., Green, S. E., O'Connor, D. A., McKenzie, J. E., Francis, J. J., Michie, S., Buchbinder, R., Schattner, P., Spike, N., & Grimshaw, J. M. (2012). Developing theory-informed behaviour change interventions to implement evidence into practice: A systematic approach using the Theoretical Domains Framework. *Implementation Science : IS*, *7*, 38. https://doi.org/10.1186/1748-5908-7-38

Gavaldà-Espelta, E., del Mar Lleixà-Fortuño, M., Baucells-Lluis, J., Ferré-Ferraté, M., Mora-López, G., Tomàs-Navarro, B., Curto-Romeu, C., Lucas-Noll, J., Aguilar Martin, C., Gonçalves, A. Q., & Ferré-Grau, C. (2020). Effectiveness of the integrated care model Salut+Social in patients with chronic conditions: A mixed methods study protocol. *Medicine*, *99*(19), e19994. https://doi.org/10.1097/MD.0000000000019994

Gierisch, J. M., Hughes, J. M., Edelman, D., Bosworth, H. B., Oddone, E. Z., Taylor, S. S., Kosinski, A. S., McDuffie, J. R., Swinkels, C. M., Razouki, Z., & Masilamani, V. (2017). *The Effectiveness of Health Coachin*. https://www.ncbi.nlm.nih.gov/books/NBK487702

Govender, K., Beckett, S., Reddy, T., Cowden, R. G., Cawood, C., Khanyile, D., Kharsany, A. B. M., George, G., & Puren, A. (2022). Association of HIV Intervention Uptake With HIV Prevalence in Adolescent Girls and Young Women in South Africa. *JAMA Network Open*, *5*(4), e228640. https://doi.org/10.1001/jamanetworkopen.2022.8640

Goverwa, T. P., Masuka, N., Tshimanga, M., Gombe, N. T., Takundwa, L., Bangure, D., & Wellington, M. (2014). Uncontrolled hypertension among hypertensive patients on treatment in Lupane District, Zimbabwe, 2012. *BMC Research Notes*, *7*(1), 703. https://doi.org/10.1186/1756-0500-7-703

Hypertension. (2021). *World Health Organization*. https://www.who.int/news-room/fact-sheets/detail/hypertension

Johnson, L. F., Meyer-Rath, G., Dorrington, R. E., Puren, A., Seathlodi, T., Zuma, K., & Feizzadeh, A. (2022). The Effect of HIV Programs in South Africa on National HIV Incidence Trends, 2000–2019. *JAIDS Journal of Acquired Immune Deficiency Syndromes*, *90*(2), 115. https://doi.org/10.1097/QAI.0000000000002927

Joshi, R., Alim, M., Kengne, A. P., Jan, S., Maulik, P. K., Peiris, D., & Patel, A. A. (2014). Task Shifting for Non-Communicable Disease Management in Low and Middle Income Countries – A Systematic Review. *PLOS ONE*, *9*(8), e103754. https://doi.org/10.1371/journal.pone.0103754

Kagee, A., Le Roux, M., & Dick, J. (2007). Treatment Adherence among Primary Care Patients in a Historically Disadvantaged Community in South Africa: A Qualitative Study. *Journal of Health Psychology*, *12*(3), 444–460. https://doi.org/10.1177/1359105307076232

Kamran, A., Ahari, S. S., Biria, M., Malpour, A., & Heydari, H. (2014). Determinants of patient's adherence to hypertension medications: Application of health belief model among rural patients. *Annals of Medical and Health Sciences Research*, *4*(6), Article 6.

Kandala, N.-B., Nnanatu, C. C., Dukhi, N., Sewpaul, R., Davids, A., & Reddy, S. P. (2021). Mapping the Burden of Hypertension in South Africa: A Comparative Analysis of the National 2012 SANHANES and the 2016 Demographic and Health Survey. *International Journal of Environmental Research and Public Health*, *18*(10), 5445. https://doi.org/10.3390/ijerph18105445

Kirby, S. E., Dennis, S. M., Bazeley, P., & Harris, M. F. (2012). What distinguishes clinicians who better support patients for chronic disease self-management? *Australian Journal of Primary Health*, *18*(3), 220–227. https://doi.org/10.1071/PY11029

Koffi, J., Konin, C., Gnaba, A., NGoran, Y., Mottoh, N., & Guikahue, M. K. (2018). [Usefulness of patient education in antihypertensive treatment compliance in black Africans]. *Annales de cardiologie et d'angeiologie*, *67*(1), 9–13. https://doi.org/10.1016/j.ancard.2017.04.012

Kohli-Lynch, C. N., Erzse, A., Rayner, B., & Hofman, K. J. (2022). Hypertension in the South African public healthcare system: A cost-of-illness and burden of disease study. *BMJ Open*, *12*(2), e055621. https://doi.org/10.1136/bmjopen-2021-055621

Kusuma, Y. S. (2010). Migrants' Perceptions on Barriers to Treatment Seeking for Hypertension: A Qualitative Study from Delhi, India. *Studies on Ethno-Medicine*, *4*(3), 173–176. https://doi.org/10.1080/09735070.2010.11886377

Kwarisiima, D., Atukunda, M., Owaraganise, A., Chamie, G., Clark, T., Kabami, J., Jain, V., Byonanebye, D., Mwangwa, F., Balzer, L. B., Charlebois, E., Kamya, M. R., Petersen, M., Havlir, D. V., & Brown, L. B. (2019). Hypertension control in integrated HIV and chronic disease clinics in Uganda in the SEARCH study. *BMC Public Health*, *19*(1), 511. https://doi.org/10.1186/s12889-019-6838-6

Lall, D., Engel, N., Devadasan, N., Horstman, K., & Criel, B. (2018). Models of care for chronic conditions in low/middle-income countries: A 'best fit' framework synthesis. *BMJ Global Health*, *3*(6), e001077. https://doi.org/10.1136/bmjgh-2018-001077

Legido-Quigley, H., Lopez, P. A. C., Balabanova, D., Perel, P., Lopez-Jaramillo, P., Nieuwlaat, R., Schwalm, J.-D., McCready, T., Yusuf, S., & McKee, M. (2015). Patients' Knowledge, Attitudes, Behaviour and Health Care Experiences on the Prevention, Detection, Management and Control of Hypertension in Colombia: A Qualitative Study. *PLOS ONE*, *10*(4), e0122112. https://doi.org/10.1371/journal.pone.0122112

Lekoubou, A., Awah, P., Fezeu, L., Sobngwi, E., & Kengne, A. P. (2010). Hypertension, Diabetes Mellitus and Task Shifting in Their Management in Sub-Saharan Africa. *International Journal of Environmental Research and Public Health*, *7*(2), Article 2. https://doi.org/10.3390/ijerph7020353

Ma, C. (2018). An investigation of factors influencing self-care behaviors in young and middle-aged adults with hypertension based on a health belief model. *Heart & Lung*, *47*(2), 136–141. https://doi.org/10.1016/j.hrtlng.2017.12.001

Magrin, M. E., D'Addario, M., Greco, A., Miglioretti, M., Sarini, M., Scrignaro, M., Steca, P., Vecchio, L., & Crocetti, E. (2015). Social Support and Adherence to Treatment in Hypertensive Patients: A Meta-Analysis. *Annals of Behavioral Medicine*, *49*(3), 307–318. https://doi.org/10.1007/s12160-014-9663-2

Mahomed, O., Asmall, S., & Voce, A. (2016). Sustainability of the integrated chronic disease management model at primary care clinics in South Africa. *African Journal of Primary Health*

Care & Family Medicine, *8*. https://doi.org/10.4102/phcfm.v8i1.1248

Mash, B., Fairall, L., Adejayan, O., Ikpefan, O., Kumari, J., Mathee, S., Okun, R., & Yogolelo, W. (2012). A Morbidity Survey of South African Primary Care. *PLOS ONE*, *7*(3), e32358. https://doi.org/10.1371/journal.pone.0032358

Mcfarlane, S., Jean-Louis, G., Zizi, F., Whaley-Connell, A., Ogedegbe, G., Makaryus, A., & Maraj, I. (2011). Hypertension in the High-Cardiovascular-Risk Populations. *International Journal of Hypertension*, *2011*, 746369. https://doi.org/10.4061/2011/746369

Mitchell, G. K., Burridge, L., Zhang, J., Donald, M., Scott, I. A., Dart, J., & Jackson, C. L. (2015). Systematic review of integrated models of health care delivered at the primary-secondary interface: How effective is it and what determines effectiveness? *Australian Journal of Primary Health*, *21*(4), 391–408. https://doi.org/10.1071/PY14172

Mothiba, T. M., Malema, R. N., & Lekhuleni, M. E. (2013). The experiences of the newly diagnosed hypertensive patients admitted into tertiary hospital campus in Limpopo Province, South Africa. *African Journal for Physical Health Education, Recreation and Dance*, *19*(sup-1), 213–221. https://doi.org/10.10520/EJC135195

Mshunqane, N., Stewart, A. V., & Rothberg, A. D. (2012). Type 2 diabetes management: Patient knowledge and health care team perceptions, South Africa : original research. *African Journal of Primary Health Care and Family Medicine*, *4*(1), 1–7. https://doi.org/10.10520/EJC133863

Muchiri, J. W., Gericke, G. J., & Rheeder, P. (2011). Needs and preferences for nutrition education of type 2 diabetic adults in a resource-limited setting in South Africa: Original research. *Health SA Gesondheid*, *17*(1), 1–13. https://doi.org/10.4102/hsag.v17i1.614

Muddu, M., Tusubira, A. K., Nakirya, B., Nalwoga, R., Semitala, F. C., Akiteng, A. R., Schwartz, J. I., & Ssinabulya, I. (2020). Exploring barriers and facilitators to integrated hypertension-HIV management in Ugandan HIV clinics using the Consolidated Framework for Implementation Research (CFIR). *Implementation Science Communications*, *1*(1), 45. https://doi.org/10.1186/s43058-020-00033-5

Musinguzi, G., Bastiaens, H., Wanyenze, R. K., Mukose, A., Geertruyden, J.-P. V., & Nuwaha, F. (2015). Capacity of Health Facilities to Manage Hypertension in Mukono and Buikwe Districts in Uganda: Challenges and Recommendations. *PLOS ONE*, *10*(11), e0142312. https://doi.org/10.1371/journal.pone.0142312

Nkeh-Chungag, B. N., Engwa, G. A., Businge, C., Kutllovci-Hasani, K., Kengne, A. P., & Goswami, N. (2021). Assessment of the Cardiovascular Risk Profile of Infants Exposed to Pre-eclampsia in-utero: A Prospective Case-Control Study in South African Children of African Ancestry. *Frontiers in Cardiovascular Medicine*, *8*. https://www.frontiersin.org/articles/10.3389/fcvm.2021.773841

Noncommunicable Diseases—PAHO/WHO | Pan American Health Organization. (n.d.). Retrieved April 9, 2023, from https://www.paho.org/en/topics/noncommunicable-diseases

Omoronyia, O. E., Okesiji, I., Uwalaka, C. H., & Mpama, E. A. (2021). Reported self-management of hypertension among adult hypertensive patients in a developing country: A cross-sectional study in a Nigerian tertiary hospital. *African Health Sciences*, *21*(3), 1191–1200. https://doi.org/10.4314/ahs.v21i3.28

Patel, P., Speight, C., Maida, A., Loustalot, F., Giles, D., Phiri, S., Gupta, S., & Raghunathan, P. (2018). Integrating HIV and hypertension management in low-resource settings: Lessons from Malawi. *PLOS Medicine*, *15*(3), e1002523. https://doi.org/10.1371/journal.pmed.1002523

Pires, J. E., Sebastião, Y. V., Langa, A. J., & Nery, S. V. (2013). Hypertension in Northern Angola: Prevalence, associated factors, awareness, treatment and control. *BMC Public Health*, *13*(1), 90. https://doi.org/10.1186/1471-2458-13-90

Quigley, A., Baxter, L., Keeler, L., & MacKay-Lyons, M. (2019). Using the Theoretical Domains Framework to identify barriers and facilitators to exercise among older adults living with HIV. *AIDS Care*, *31*(2), 163–168. https://doi.org/10.1080/09540121.2018.1499860

Rabkin, M., de Pinho, H., Michaels-Strasser, S., Naitore, D., Rawat, A., & Topp, S. M. (2018). Strengthening the health workforce to support integration of HIV and noncommunicable disease services in sub-Saharan Africa. *AIDS*, *32*, S47. https://doi.org/10.1097/QAD.0000000000001895

Risso-Gill, I., Balabanova, D., Majid, F., Ng, K. K., Yusoff, K., Mustapha, F., Kuhlbrandt, C., Nieuwlaat, R., Schwalm, J.-D., McCready, T., Teo, K. K., Yusuf, S., & McKee, M. (2015). Understanding the modifiable health systems barriers to hypertension management in Malaysia: A multi-method health systems appraisal approach. *BMC Health Services Research*, *15*(1), 254. https://doi.org/10.1186/s12913-015-0916-y

Ritchie, J., & Spencer, L. (1994). Qualitative data analysis for applied policy research. In A. Bryman & R. G. Burgess (Eds.), *Analyzing qualitative data* (pp. 173–194). Taylor & Francis. https://doi.org/10.4324/9780203413081_chapter_9

Rocks, S., Berntson, D., Gil-Salmerón, A., Kadu, M., Ehrenberg, N., Stein, V., & Tsiachristas, A. (2020). Cost and effects of integrated care: A systematic literature review and meta-analysis. *The European Journal of Health Economics*, *21*(8), 1211–1221. https://doi.org/10.1007/s10198-020-01217-5

Roth, G. A., Johnson, C., Abajobir, A., Abd-Allah, F., Abera, S. F., Abyu, G., Ahmed, M., Aksut, B., Alam, T., Alam, K., Alla, F., Alvis-Guzman, N., Amrock, S., Ansari, H., Ärnlöv, J., Asayesh, H., Atey, T. M., Avila-Burgos, L., Awasthi, A., … Murray, C. (2017). Global, Regional, and National Burden of Cardiovascular Diseases for 10 Causes, 1990 to 2015. *Journal of the American College of Cardiology*, *70*(1), 1–25. https://doi.org/10.1016/j.jacc.2017.04.052

Struckmann, V., Leijten, F. R. M., van Ginneken, E., Kraus, M., Reiss, M., Spranger, A., Boland, M. R. S., Czypionka, T., Busse, R., & Rutten-van Mölken, M. (2018). Relevant models and elements of integrated care for multi-morbidity: Results of a scoping review. *Health Policy*, *122*(1), 23–35. https://doi.org/10.1016/j.healthpol.2017.08.008

Suter, E., Oelke, N. D., Adair, C. E., & Armitage, G. D. (2009). Ten Key Principles for Successful Health Systems Integration. *Healthcare Quarterly (Toronto, Ont.)*, *13*(Spec No), 16–23.

Tan, F. C. J. H., Oka, P., Dambha-Miller, H., & Tan, N. C. (2021). The association between self-efficacy and self-care in essential hypertension: A systematic review. *BMC Family Practice*, *22*(1), 44.

https://doi.org/10.1186/s12875-021-01391-2

Taylor, N., Lawton, R., & Conner, M. (2013). Development and initial validation of the determinants of physical activity questionnaire. *International Journal of Behavioral Nutrition and Physical Activity*, *10*(1), 74. https://doi.org/10.1186/1479-5868-10-74

Ulasi, I. I., Ijoma, C. K., Onwubere, B. J. C., Arodiwe, E., Onodugo, O., & Okafor, C. (2011). High Prevalence and Low Awareness of Hypertension in a Market Population in Enugu, Nigeria. *International Journal of Hypertension*, *2011*, e869675. https://doi.org/10.4061/2011/869675

Yuyun, M. F., Sliwa, K., Kengne, A. P., Mocumbi, A. O., & Bukhman, G. (2020). Cardiovascular Diseases in Sub-Saharan Africa Compared to High-Income Countries: An Epidemiological Perspective. *Global Heart*, *15*(1), Article 1. https://doi.org/10.5334/gh.403