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# Effects of implementation of a community health worker programme on HIV testing, treatment initiation, and patient retention in a rural South African District

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# EFFECTS OF IMPLEMENTATION OF A COMMUNITY HEALTH WORKER PROGRAMME ON HIV TESTING, TREATMENT INITIATION, AND PATIENT RETENTION IN A RURAL SOUTH AFRICAN DISTRICT

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A thesis submitted to the Faculty of Health Sciences, University of the Witwatersrand, Johannesburg, in fulfilment of the requirements for the degree of Doctor of Philosophy

Johannesburg, April 2019

**DECLARATION**

I, Nireshni Naidoo declare that this thesis is my own work. It is being submitted for the Degree of Philosophy at the University of the Witwatersrand, School of Public Health, Johannesburg. It has not been submitted before for any degree or examination at any other University.



Nireshni Naidoo

30th April 2019

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## ABSTRACT

### Introduction

This study evaluated the fidelity of implementation (FOI) of the South African community-based HIV programme (CBHP), which is part of its primary healthcare re-engineering (PHC) strategy to improve public healthcare delivery including human immunodeficiency virus (HIV) testing, treatment initiation and patient retention. FOI is the degree to which an intervention was implemented as prescribed. Assessment of FOI can improve health programmes. This study evaluated FOI of the South African CBHP in a rural district to strengthen service delivery and to inform policy design.

### Methods

This PhD research study was conducted in 12 wards of the Mopani district of Limpopo province, South Africa from May 2016 through September 2017. The contextual framework for implementation fidelity by Carroll and colleagues was used to assess FOI of the CBHP using quantitative and qualitative methods. Three elements of this framework were evaluated in three separate studies: adherence, potential modifiers to adherence, and outcomes.

1) Adherence was assessed in a community survey of 900 randomly selected households by measurement of coverage, frequency, duration, and content of CHW visits in comparison to the appropriate guidelines.
2) We used an exploratory study to assess potential modifiers: in-depth interviews were conducted with community members, team leaders, community leaders, and social workers whereas focus group discussions were conducted with CHWs and facility nurses. Thematic content analysis was conducted and the Consolidated Framework for Implementation Research (CFIR) was used to interpret the findings. The CFIR consists of five domains related to the intervention or programme, including 1) the intervention characteristics, 2) the outer setting, 3) the inner setting, 4) characteristics of individuals, and 5) the implementation process. The qualitative data collected was also used to assess contextual factors that affect CBHP implementation.
3) Third, we assessed the outcomes element defined as the impact of HIV services delivered by the CBHP on the overall HIV programme including case identification, adherence support to individuals on ART and tracing of individuals lost to the ART programme. This was done through collection of service provision data from the daily activity register of CHWs and verification of the personal identifiers in these registers against routine data sources at the facilities.

Lastly, the Carroll framework was revised by assessing the individual elements of the framework in relation to our findings from three studies and other available literature. We then propose an overall adapted conceptual framework for implementation fidelity.

**Results**

In the community survey, with regards to adherence, good content (67%) and duration (100%) of CHW visits was reported, but there was room for improvement of the CBHP coverage (47%) and frequency (39%) of visits. Individuals reporting a CHW visit were more likely to know their HIV status than those not visited (OR = 2.0; 95% CI 1.06–3.8; $p$ = 0.032). Among those visited by the CHW discussion of HIV was associated with knowing the HIV status (OR = 2.2; 95% CI 1.02–4.6; $p$ = 0.044); in particular for women (OR = 2.9; 95% CI 1.5–5.4; $p$ = 0.001).

In the second study, we used the CFIR framework to assess for potential modifiers to implementation of the CBHP. In terms of intervention characteristics, community members generally valued the HIV services provided. However, the varying needs impacted on programme implementation. Outer setting challenges include inability to meet the need of patients as a result of stigma, nondisclosure of HIV status, and social factors. In terms of the inner setting, CHWs were grateful for the equipment and training received but expressed the need for better support from management and the provision of additional resources. With regard to characteristics of the implementers, the CHWs expressed the desire for further training despite reporting having sufficient knowledge to conduct their HIV work. Finally, in terms of the implementation process, the importance of relationship building between CHWs and community members was emphasised.

Six critical contexts affecting the implementation of the CBHP were identified in our data analysis. These contexts provide the background to the programme, and vary in the extent to which they can be influenced by management and policy makers. Contexts include: 1) geographic, 2) social, cultural, and economic, 3) local community, 4) personal and inter-personal relationships, 5) local governance and authority, and 6) local organisational.

In the third study, with regard to outcomes, CHWs assessed 13% of the study population for HIV risk; only 290 (2%) were referred for HIV testing services of whom 213 (73%) went to the facility. Adherence support to individuals on antiretroviral therapy (ART) was provided during 5 657 visits; only one individual was referred for complications. CHWs managed to trace 452/864 (52%) of individuals lost to the HIV programme; of these 241 (53%) were (re)initiated on ART.

Bringing together all the results of these studies and combined with available literature, we adapted the framework for assessment of implementation fidelity to be more feasible for evaluation of the South African CBHP. The following modifications/adaptations were made: a) the core and modifiable components should be identified a priori to allow for the precise measurement of adherence and b) additional potential moderators such as organisational readiness to implement the intervention, contextual factors, and stakeholder involvement were included. The element outcome was retained.

**Discussion and conclusions**

This PhD study demonstrates high value of using a systematic approach to evaluate the CBHP using a conceptual framework. Implementation science is a relatively novel field. This unique study assessed FOI of a fully operational rural CBHP in the context of HIV. Evaluating the fully operational CBHP enabled the assessment of the impact of CHW activities on programme outcomes. Various positive attributes, barriers and challenges were identified that can be used to strengthen the programme. Some of these reflect in the new policy published in 2018, but several gaps still remain as discussed in the general discussion section of this thesis. The adapted conceptual framework for implementation fidelity provides an important, feasible approach to guide and strengthen FOI evaluations of CBHPs across Africa. The actionable findings will inform policy makers to optimise the CBHP and contribute to ending the HIV epidemic in South Africa.

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## LIST OF ABBREVIATIONS

| | |
|---|---|
| AIDS | Acquired immunodeficiency syndrome |
| ANM | Auxiliary nurse midwife |
| ART | Antiretroviral therapy |
| ASHA | Accredited Social Health Activist System |
| BRAC | Bangladesh Rural Advancement Committee |
| CBHP | Community-based HIV programme |
| CFIR | Consolidated Framework for Implementation Research |
| CHVs | Community health volunteers |
| CHWs | Community health workers |
| CLOs | Community linkage officers |
| COPC | Community Oriented Primary Care |
| DHIS | District Health Information Systems |
| DOTs | Directly observed treatment support |
| EBIs | Evidence-based interventions |
| EPWP | Expanded Public Works Programme |
| FGDs | Focus group discussions |
| FHP | Family Health Programme |
| FOI | Fidelity of implementation |
| GP | General practitioner |
| GPS | Global Positioning System |
| HEP | Health Extension Programme |
| HEWs | Health Extension Workers |
| HIV | Human immunodeficiency virus |
| HTS | HIV testing services |
| LHW | Lady Health Worker |
| LMICs | Low- and middle income countries |
| NDHSC | National District Health Systems Committee |
| NDoH | National Department of Health |
| NGOs | Non-government organisations |
| NHI | National Health Insurance |
| NPOs | Non-profit organisations |
| NRHM | National Rural Health Mission |
| OPMs | Operational managers |
| OSS | Operation Sukuma Sakhe |
| PARIHS | Promoting Action on Research Implementation in Health Services framework |
| PAs | Patient advocates |
| PHC | Primary healthcare |
| PHCRE | Primary Healthcare Re-engineering Strategy |
| PMTCT | Prevention of mother-to-child transmission |
| PRECEDE-PROCEDE | Predisposing, Reinforcing and Enabling Constructs in Educational Diagnosis and Evaluation-Policy |
| PrEP | Pre-exposure prophylaxis |
| REAIM | Reach, Effectiveness, Adoption, Implementation, Maintenance |
| REDCap | Research Electronic Data Capture |
| StatsSA | Statistics South Africa |
| STIs | Sexually transmitted infections |

| | |
|---|---|
| TB | Tuberculosis |
| TIER.Net | Three Interlinked Electronic Register |
| UNICEF | United Nation's International Children's Emergency Fund |
| UNAIDS | United Nations Programme on HIV/AIDS |
| VL | Viral load |
| WBOTs | Ward-based outreach teams |
| WHO | World Health Organisation |

# CHAPTER 1

## INTRODUCTION AND OUTLINE OF THESIS

## CHAPTER 1: INTRODUCTION AND OUTLINE OF THESIS

Human immunodeficiency virus (HIV) remains a public health challenge worldwide [1]. In December 2013, the United Nations Programme on HIV/AIDS (UNAIDS) established targets for HIV treatment scale up to ultimately achieve HIV epidemic control in 2030. The three-tiered target aims at ensuring that by 2020, 90% of all people living with HIV know their status, 90% of all people with diagnosed HIV infection will receive sustained antiretroviral therapy (ART) and 90% of all people receiving ART will have viral suppression. Achieving this three-tiered target means that at least 73% of all people living with HIV worldwide are virally suppressed and a possibility of ending the acquired immunodeficiency syndrome (AIDS) epidemic by 2030 which will result in immense health and economic benefits [2].

South Africa has the largest HIV programme in the world [1]. In 2017, there were over 7 million people living with HIV, of which over 4 billion (61%) were on antiretroviral therapy (ART) [3]. Despite the larger availability of ART in the recent years, it is uncertain as to whether epidemic control can be achieved in resource-limited settings due to human resource and other systemic challenges. Therefore, further strengthening of the HIV programme is required to achieve epidemic control and end HIV/AIDS. Many models and innovative methods have been employed to support HIV programme expansion including community-based approaches. Community-based programmes in low- and middle- income countries (LMICs) have the potential to extend health services to vulnerable and underserved communities, thus improving equitable health services [4]. As for HIV, the community-based HIV programme (CBHP) in South Africa is delivered through ward-based outreach teams (WBOTs), each comprising a professional nurse that serves as team leader and up to five community health workers (CHWs) [5]. The local guidelines stipulate that the team of five CHWs should support a population of 7 660 individuals in total [5]. The services provided by the CHWs include general health education, health status monitoring, and referral of individuals in need of care to the primary healthcare (PHC) facility [5].

There is robust evidence of the positive impact of CHWs on disease prevention, healthcare access, and healthy behaviour adoption in resource-constrained settings. In the context of HIV, CHWs have been successful in promoting HIV testing and counselling, linkage to HIV treatment, and adherence to ART [6-8]. However, although CBHPs are operational, programme implementation could be strengthened to achieve maximum impact. To the best of our knowledge there is no record of a comprehensive assessment of implementation of the CBHP in South Africa [9]. Implementation science is a relatively novel field. It is “the scientific study of methods to promote the systematic uptake of research findings

and other evidence-based interventions (EBIs) into routine practice, and hence, to improve the quality and effectiveness of health services [10].” Implementation is a “critical bridge” between evidence-based programmes, and their impact on the intended recipients [11]. It is therefore imperative to evaluate fidelity of implementation (FOI) to enable good programme implementation and implementation outcomes. FOI is the degree to which an intervention was implemented as prescribed [12]. There are several frameworks that can be used to evaluate FOI. The conceptual framework for implementation fidelity proposed by Carroll and colleagues was identified to be most appropriate in our setting/context as it identifies aspects of implementation that could be evaluated to determine implementation success, and is ideal for assessing community-based health programmes [13]. The framework assesses both the intervention and its delivery by measuring adherence, potential moderators to adherence and outcomes of the intervention [13].

This PhD research study aims to assess FOI of the South African CBHP and to measure its effect on HIV testing, HIV treatment initiation and patient retention in care. The objectives of this study are as follows:

- To measure fidelity as defined in local guidelines of CBHP implementation by CHWs from the community’s perspective
- To explore and identify barriers and facilitators to the successful implementation of the CBHP
- To describe the effect of contextual factors on CHWs’ ability to support the CBHP
- To characterise HIV services delivered by CHWs and to assess the impact of these services on the CBHP

The study used various quantitative and qualitative research methods. We interviewed several stakeholders including CHWs, team leaders, facility staff, community leaders, social workers and the community. A limitation to this study is that we did not interview members of the provincial and national department of health for operational reasons and due the fact that our study focused on ground-level activities. Assessing FOI of the CBHP is crucial to identify barriers and facilitators to implementation that can be used to improve the CBHP. This in turn will result in improved health service provision and outcomes of the programme. Moreover, lessons learned from this evaluation can be used to guide future evaluations of the CBHP, inform policy design and implementation, and to support strengthening of programme delivery and implementation.

We evaluated FOI of the fully operational CBHP delivered by CHWs in rural Mopani District of Limpopo province, South Africa in order to strengthen programme delivery and implementation as well as to guide policy design. Using the Carroll conceptual framework for implementation fidelity, we assessed

the framework elements adherence, potential modifiers and outcomes in rural Mopani District with data collection from May 2016 through September 2017. Evaluation results are described and discussed for each individual framework element separately and were then combined to adapt the Carroll framework for future measurement of FOI of the CBHP. These results will assist programme implementers and policy-makers in future strengthening and effective implementation of CBHPs in Africa.

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# CHAPTER 2

## LITERATURE REVIEW

# CHAPTER 2: LITERATURE REVIEW

## 2.1 INTRODUCTION

This chapter explores the literature in detail with regard to the South African human immunodeficiency virus (HIV) epidemic, the positioning of ward-based outreach teams (WBOTs) and community health in the health system, and the concept of implementation fidelity and science. It details the South African HIV epidemic and the potential role that community health workers (CHWs) could play to improve access to HIV. Successes and failures of global CHW programmes are discussed, which guided this PhD research study. In addition, the South African community-based HIV programme (CBHP) is discussed, detailing the scope of work of CHWs as per guidelines. In addition, the implementation of the CBHP is described. Finally, several potential frameworks to guide this PhD research study are discussed and the reason for adopting the Carroll framework that was used to evaluate FOI is introduced.

## 2.2 THE HIV EPIDEMIC IN SOUTH AFRICA

South Africa has the largest HIV epidemic and antiretroviral therapy (ART) programme in the world; this programme has expanded substantially in the recent years with the implementation of 'test and treat' guidelines [1]. In 2016, there were 270 000 new infections in children and adults, and 110 000 individuals died from HIV-related illnesses compared to 353 700 (31% reduction) new infections and 157 300 (43% reduction) deaths 6 years earlier [1]. South Africa invests more than $1.34 billion annually to run its HIV programme [1]. This large-scale ART programme has resulted in an increased national life expectancy from 61.2 years in 2010 to 67.7 years in 2015 [2]. HIV prevalence varies between the nine provinces of South Africa **(Figure 2.1)**. Limpopo province had an estimated HIV prevalence of 8.3% in men and women between 15-49 years as at mid-2016, which is the third lowest HIV prevalence after Northern Cape (6.8%) and Western Cape (6.6%) [3]. As at mid-2016, an estimated 785 253 individuals over the age of 15 years were on ART in Limpopo province [4]. This PhD research study was conducted in the Mopani district in Limpopo province where there were 118 249 individuals living with HIV [4], 72 421 individuals on ART and the ART retention rate was 71% [5]. The sub-districts of Greater Giyani and Greater Letaba were selected for this study as they have a similar catchment population. The estimated HIV prevalence for the Greater Giyani and Greater Letaba sub-districts is 13% [6]. The only marked difference between the two sub-districts is that Greater Giyani has a more mountainous and rocky terrain, affecting mobility and access to healthcare, with more traditional and informal dwellings compared to Greater Letaba [7].

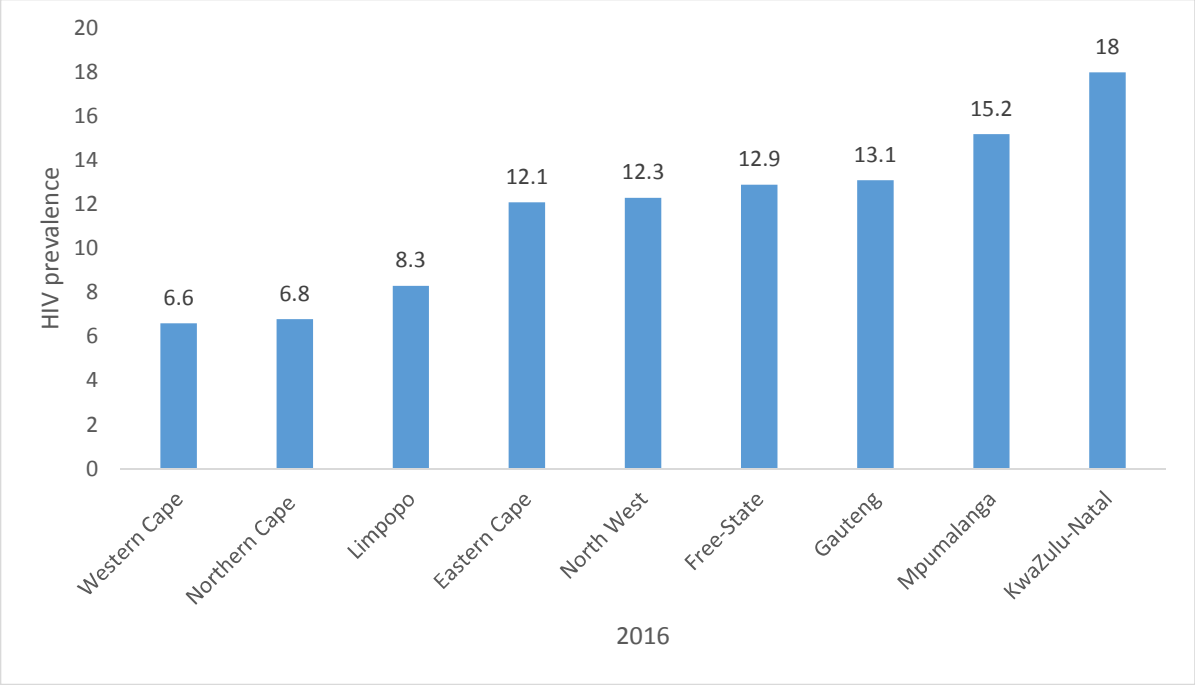



**Figure 2.1: Adult HIV prevalence in South Africa (15-49 years) adapted from 2016 (Thembisa Model estimates)**

In December 2013, the United Nations Programme on HIV and AIDS (UNAIDS) established new objectives for HIV treatment scale up beyond 2015 to ultimately achieve HIV epidemic control by 2030. The three-part target aims at ensuring that by 2020, 90% of all people living with HIV know their status, 90% of all people with diagnosed HIV infection will receive sustained ART and 90% of all people receiving ART will have viral suppression. Achieving the three-part target will result in at least 73% of all people living with HIV worldwide being virally suppressed **(Figure 2.2)** [8]. These three targets are set to increase to 95% by 2030. In order to achieve the 90-90-90 targets and epidemic control, it is imperative that South Africa develop effective, affordable and sustainable strategies to diagnose, initiate, and retain HIV-infected individuals in care [9]. However, efforts to scale up HIV care are challenged by poor health systems and a critical shortage of skilled healthcare workers. In addition, retention of patients in care remains a challenge to the sustained success of HIV treatment [10]. Studies by Rosen and colleagues in sub-Saharan Africa show that less than two-thirds of patients initiated on ART were retained in care two years after ART initiation [11]. In addition, a systematic review of 39 cohorts and 226 307 patients by Fox and colleagues show a 70% 24 month retention rate and a 65% 36 month retention rate that is indicative of difficulties in patient retention in care [12]. Strategies to overcome these challenges are warranted in order to reach HIV epidemic control. The integration of community health programmes within health systems could play a significant role in addressing the aforementioned challenges [13].




**Figure 2.2: The UNAIDS 90-90-90 targets [14]**

## 2.3 COMMUNITY HEALTH PROGRAMMES IN RESOURCE-CONSTRAINED SETTINGS

Community health programmes, run by community health workers, have been deployed in several developing countries to improve communities' access to healthcare services, especially in rural and underserved areas [15]. There are several models of CHW programmes have been implemented globally, which differ in approaches such as positioning of the programme within the healthcare system and methods of CHW remuneration. The various models for community health with their successes and challenges are discussed below.

## 2.4 GLOBAL CHW PROGRAMMES

During the late 1960's and 1970's CHW programmes were seen by developing countries, as the centrepiece of the "Health for All" agenda in light of the Alma Ata declaration. The first distinguished large-scale CHW programmes were implemented in Latin America, Tanzania, Mozambique, and China. The term "primary health care" emerged from these programmes [16]. The WHO and the United Nation's International Children's Emergency Fund (UNICEF) adopted this new concept which addressed the need for the delivery of affordable prevention and curative healthcare services in developing countries. The newly recognized primary healthcare (PHC) concept aimed at providing universal coverage services such as disease prevention and control, promotion of proper nutrition and food security, maternal and child care, and safe water supply and sanitation [16]. There are several CHW programme models that have been implemented globally. Countries such as Brazil, Pakistan, India, and Ethiopia have implemented the most successful CHW programmes using various approaches [17]. These successful CHW programmes have grown and evolved over time after several phases of ongoing learning, quality improvement, adaptation, and the expansion of approaches of the various CHW models adopted by the different countries are discussed below, detailing their successes and failures **(Table 2.1)**.

**Table 2.1: Global CHW models and their successes and challenges**

| Country/ Programme | Programme position in the health system | Services provided | Programme successes | Programme challenges | Evidence-based studies showing successes and challenges |
|---|---|---|---|---|---|
| *Brazil, Family Health Programme* | - Linkage to GPs and nurses<br>- Collect census data<br>- Remunerated by municipal health authority | - Breast feeding counselling<br>- PMTCT<br>- Family planning<br>- Chronic disease<br>- TB testing referrals<br>- STI screening | - Improved health screening<br>- Increased breastfeeding<br>- Improved antenatal care<br>- Increase in immunization coverage<br>- Reduced mental health problems | - Lack of resources<br>- Poor management support<br>- Lack of electronic health records<br>- Interventions restricted to counselling and referrals<br>- Lack of HIV training | Harris et al. [18]<br>Macinko et al. [19]<br>Giugliani et al. [20] |
| *Pakistan, Lady Health Worker Programme* | - Main focus is referral to PHC facility or Basic Health Unit<br>- Remunerated by stipends | - Low-cost interventions<br>- Maternal and child health<br>- Family planning<br>- Immunizations<br>- HIV/AIDS | - Reduction in neonatal mortality | - Long travelling distance<br>- Inadequate stipends<br>- Inadequate medical supplies<br>- Communication barriers | Harvard et al. [21]<br>Afsar et al. [22]<br>Bhutta et al. [23]<br>Haq et al. [24] |
| *Bangladesh, Bangladesh Rural Advancement Committee with Community Health Volunteers* | - Income and incentive structure<br>- Microloan provision<br>- Sell health supplies for a profit and charge a minimal fee for antenatal service | - Pre- and postnatal care<br>- Management of acute respiratory infections<br>- Management of diarrhoea<br>- Oversee TB treatment | - Identifying acute respiratory infections in children <5 years<br>- Improved cure rate in TB patients | - Unsupportive families<br>- Large workload<br>- Communities dissatisfied with interest charged on microloans | Chowdhury et al. [25]<br>Hadi et al. [26]<br>Islam et al. [27]<br>Alam et al. [28]<br>Perry et al. [29] |
| *India, Accredited Social Health Activist System* | - Linkage to facility-based auxiliary nurse midwife and facility-based workers<br>- Incentivised payments for facilitated referrals | - Ante- and post-natal care<br>- Child birth<br>- Immunizations<br>- Chronic disease testing<br>- Provision of drugs for TB, malaria and diarrhoea | - Improved antenatal care and home deliveries<br>- Improved immunization, family planning and disease control<br>- Improved curative services for TB and malaria patients | - Inadequate linkage to facility workers and government<br>- Unclear roles<br>- Inadequate knowledge and skills<br>- Inadequate supervision | Gopalan et al. [30]<br>Scott et al. [31]<br>Bajpai et al. [32]<br>Sarin et al. [33]<br>Shrivastava et al. [34] |
| *Ethiopia, Health Extension Workers* | - Local health posts<br>- Full-time and part-time HEWs | - Disease prevention and control<br>- Hygiene and environmental sanitation<br>- Family planning services<br>- Health education | - Increased immunizations<br>- Improved antenatal care<br>- Increased HIV testing | - Inadequate human resources<br>- Inadequate infrastructure<br>- Lack of supervision<br>- Inadequate training<br>- Inadequate resources and medical supplies<br>- Lack of proper health recording system | Admassie et al. [35]<br>Medhanyie et al. [36]<br>Teklehaiman et al. [37] |

### *2.4.1 Brazilian Family Health Programme*

The Brazilian Family Health Programme (FHP) is one of the most successful CHW programmes worldwide. In this model, each community health team is composed of a general practitioner (GP), a nurse auxiliary, a nurse, and at least four CHWs who are allocated approximately 100-150 households. They conduct monthly household visits to every house regardless of the need or demand. The CHWs are recruited and remunerated by the municipal health authority from the community in which they reside and are trained on the basics of primary healthcare for three months [18].

During each monthly visit, the CHW undertakes several prevention and health mobilization activities including identification of children with incomplete immunization, breast feeding counselling, prevention of mother-to-child transmission (PMTCT) of HIV, family planning, chronic disease adherence support and referral, TB direct observed treatment support (DOTs) service, screening of infectious diseases such as sexually transmitted infections (STIs), cervical, bowel and breast screening awareness, as well as water and sanitation improvement [18]. The CHWs also conduct two activities including the collection of household census-level data which is updated monthly and they inform GPs about domestic settings to help them ascertain the health needs of the population as a whole. These activities have resulted in improved clinical care and chronic disease management through timeous identification and referral of patients with health problems [18]. Moreover, the FHP has been associated with substantial improvements in public health at a national level [18, 38], such as an increase in STI screening uptake, breastfeeding uptake, antenatal care, immunization coverage, and mental health problems [20].

Despite several accomplishments, Brazil's health system faces challenges in terms of availability of basic equipment, physician shortages, as well as inadequate management and support systems [19]. The lack of national electronic health records and enhanced access to diagnostic tools in primary healthcare also poses as a challenge [38].

### *2.4.2 Pakistan's National Programme for Family and Primary Health Care*

Pakistan's National Programme for Family and Primary Health Care, also known as the Lady Health Worker (LHW) Programme entails the primary focus of CHWs on facilitated referrals to health care facility. This programme was implemented in 1993 and is one of the largest in the world. The programme utilizes referral services as an integral part of a well-functioning health system to address the problem of low utilization of existing facility-based health services [39]. The programme employed LHWs to deliver PHC services in nearly all districts in Pakistan and each LHW is assigned to 100 to 200

households (approximately 1 000 people) [39]. Each LHW is linked to a government health facility within the community where she is trained for 15 months, and receives a stipend and medical supplies. The LHWs main focus is low-cost interventions, maternal and child health, family planning, immunizations, HIV/AIDS care through linking of patients to the nearest PHC facility or Basic Health Unit. A Basic Health Unit is a minimum degree of healthcare services considered to be necessary to maintain adequate health and protection from disease. LHWs also provide regular treatment for diarrhoea, malaria, and acute respiratory tract infections [21, 39]. Surveys show that the LHW programme has improved key health indicators such as access to antenatal services, family planning methods, and improved vaccination rates [39]. In addition, a pilot programme integrating LHWs in new-born care showed a reduction of 15% in neonatal mortality rate [23]. The phased scale up of the LHW programme resulted in its successful integration into the public health system following defined policy planning. However, even with the successful phased roll-out, the LHW programme faces a few challenges. A cross-sectional study shows several factors influencing job dissatisfaction and attrition of CHWs in this programme. These include long travelling distances, socio-economic status, inadequate stipends, lack of career structure, inadequate medical supplies, and communication barriers [24, 39, 40].

### *2.4.3 Bangladesh Rural Advancement Committee*

The Bangladesh Rural Advancement Committee (BRAC) began in 1972, and was known as a small relief organization [41]. BRAC is now one of the largest NGOs in the world, providing healthcare to more than 110 million people worldwide, with approximately 117 000 staff [25, 41]. Community health volunteers (CHVs) were deployed and allocated approximately 250 households and are linked to the local PHC facilities. CHVs provide a basic package of health services including communicable diseases, maternal and newborn health, child health and immunisation, mental health and supply of essential drugs [25]. BRAC consists of an income and incentive structure that enables CHWs to receive a loan as they are volunteers. The money received is used by the CHVs to purchase health products including contraceptives, sanitary napkins, and safe birth delivery kits for mothers, which are then sold for a small profit. The CHWs also receive incentives for good performance.

Studies show that well-trained CHVs in this programme were significantly more efficient at identifying acute respiratory infection in children under the age of five [26]. Moreover, BRAC CHVs were able to obtain a similar cure rate among TB patients by observing patients taking their treatment, as compared to government health workers, but at a lower cost (US$64 versus US$96) [27]. Studies also show that the most common reason for CHVs dropping out of the programme is inadequate

remuneration and family members being unsupportive of their workload in light of incentives received, and communities being dissatisfied with the "interest" charged on the microloans [42].

### *2.4.4 India Accredited Social Health Activist System*

India adopted a programme known as The India Accredited Social Health Activist (ASHA) programme in 2005 by the National Rural Health Mission (NRHM), in 17 states [30]. The main goal of the community-based female ASHAs was to link the poor and vulnerable community members to PHC facilities and to improve the PHC facility-based auxiliary nurse midwife (ANM) and facility-based workers (Anganwandi) system. The ASHAs receive incentivized payments from the sub-district level government for facilitating referrals for ante- and post-natal care, immunizations, institutional deliveries, and chronic disease testing. In addition, they provide patients with drugs for TB, malaria and diarrhoea. In some cases CHWS are offered incentives in the form of non-monetary benefits including radios, bicycles, and saris, thus positively influencing their families to grant permission for women to volunteer as CHWs [42].

Evaluations show that mothers reported satisfaction with ASHA's work in improving antenatal care and home deliveries and that most ASHAs were able to interact with midwives on a weekly basis. ASHAs have also contributed to immunization, disease control, and family planning. In addition, they have contributed to undertaking curative services for patients suffering from TB, malaria, as well as elderly care [43, 44]. However, as with other CHW programmes, ASHAs experienced operational challenges including missing links to the advanced facility workers and government, unclear understanding of responsibilities of ASHAs, inadequate knowledge and skills, lack of supervision, and the lack of motivation due to inconsistent funding [32]. Scott and colleagues conducted a qualitative study to provide insight on how to support the ASHA programme, especially in relation to HIV [31]. Findings revealed issues surrounding: a) outcome-based remuneration structure, b) poor institutional support, c) hierarchical structure of the health system, and d) the lack of participation at the community level. This impacts policy decision-making for any CHW programme in terms of the sustained support required from formal health institutions and community engagement.

### *2.4.5 Ethiopia's Health Extension Programme*

Ethiopia implemented the Health Extension Programme (HEP) in 2004 where CHWs are based at local health posts to provide a package of primary care health interventions including disease prevention and control, hygiene and environmental sanitation, family planning services, and health education [45]. The programme aims to provide a package of basic health promotion preventative, and curative

health services at the community level by incorporating female health workers, known as Health Extension Workers (HEWS) [45]. Each HEW is assigned at least one *kebele* (village) and in order to rapidly scale-up the training of HEWs, the training-of-trainers approach is employed. The HEWs are remunerated and report to a point person in each *woreda* (district) who work with *woreda health offices* (WorHos). The HEW programme is an example of a CHW programme with both full-time and part-time volunteer CHWs.

Evaluations show that the programme resulted in the increase of immunizations and proportion of households using sponsored insecticide-treated bed nets [35]. Studies also show that HEWs have made a substantial contribution to family planning, antenatal care, and HIV testing [46]. The impact of the HEP depended largely on number of HEWs in the area, quality of health posts, and education levels of caregivers in the village [35]. The success and scale up of the HEP is attributed to sustained support from the Ministry of Health and the prime minister, the national-scale training of HEWs, the coordination of HEWs with health post facilities, and the infrastructure of health workers [47]. The rapid scale up of the HEP also highlighted a major gap with regard to human resources capacity, infrastructure, management capacity, and training [48, 49]. Studies show that the health posts require strengthening of services including drugs and supplies, medical equipment, logistics support, referral systems, and health information recording. A lack thereof could result in in patients becoming frustrated with the CHWs thus adversely impacting on the adoption of CHWs within the population and CHW productivity and effectiveness [36, 46, 49, 50].

## 2.5 IMPACT STUDIES OF GLOBAL CHW PROGRAMMES

In the past decade, there has been a renewed interest in CHWs and their potential to improve healthcare access to marginalized populations [51]. The renewed interest in CHWs has resulted in several studies globally that assessed the impact of CHW programmes on population health and provide context-specific recommendations to improve programme outcomes [19, 24, 52-55] **(Table 2.2)**. The findings from these studies provide useful information about the successes and challenges of implementation of global community health programmes, and was used to inform this study in terms of research questions and questionnaire design.

**Table 2.2: Summary of evidence-based studies and recommendations to improve CHW programmes**

| Country and study reference | Implementation barrier addressed | Intervention implemented | Recommendations following evaluation |
|---|---|---|---|
| - Brazil [19]<br>- Global [56]<br>- Benin [57]<br>- South Africa [53]<br>- Swaziland [54] | - Challenges with providing adequate health information and addressing questions from patients<br>- Training gaps revealed from findings of household survey and qualitative study | Training | - Targeted training including refresher training on infectious diseases including HIV and TB, role of CHWs, referrals, and community mobilization – with the use of practical exercises and role playing |
| - Pakistan [24]<br>- Bangladesh [58]<br>- Global [56] | - Lack of supervision of CHWs and means to communicate challenges | Improved supervision of CHWs by team leaders | - Team leaders to use CHW monthly reports and reports generated from electronic patient records (TIER.Net) to address gaps in CHW performance<br>- Recruitment of nurse mentors to supervise CHWS and to assist with prioritizing household visits to vulnerable patients |
| - Western Kenya [55] | - Lack of stationery, bags and items to protect against weather ailments | Resource provision for optimal functioning of CHWs | - Continual supply of resources such as stationery, hats, and umbrellas |
| - Pakistan [24]<br>- Global [56]<br>- Malawi [59]<br>- sub-Sharan Africa [60]<br>- Iran, Ethiopia, India, Bangladesh, and Nepal [41] | - CHWs feeling demotivated to work optimally | Incentivizing CHWs | - Provide resources such as stationery, hats, and umbrellas to aid in job functions<br>- Recognition of CHWs by active participation and report backs at clinic meetings<br>- Explore possible career paths for CHWs |
| - USA, Columbia [61]<br>- Uganda [62] | - Patients loss to initiation and defaulting in treatment taking<br>- Challenges with reaching vulnerable community members in a timely manner<br>- Challenges with male community members resisting interaction with female CHWs | Employment of community linkage officers (CLOs) | - CLOs to telephonically contact patients that are lost to initiation and defaulting in treatment taking and refer back to clinic<br>- Introduction of CLOs to telephonically follow-up on stable patients to relieve CHWs to visit vulnerable patients more frequently<br>- Male CLOs to provide health information and advice to male community members that feel uncomfortable interacting with female CHWs |

## 2.6 THE SOUTH AFRICAN COMMUNITY HEALTHCARE MODEL

The emergence of the CHW programme in South Africa began in the mid-1990s in response to the HIV epidemic [63]. Non-government organisations (NGOs) were paid by the government to deploy community-based carers to support voluntary HIV testing and ART services [63]. By 2004, there were approximately 40 000 community-based carers in South Africa. The community-based carers were adopted under the Expanded Public Works Programme (EPWP) which detailed training and remuneration of CHWs. By 2006, the National Department of Health (NDoH), registered four CHW qualifications in the National Qualifications Framework [64]. These policies governed the CHW programme although several gaps were highlighted over the years such as the lack of training strategies, career growth, and alignment of the programme to the South African Labour Laws [65].

The community health programme implemented by CHWs is the prime component of the PHC re-engineering strategy introduced in South Africa in 2012, and is one of the key pillars of the National Health Insurance (NHI) as a long-term goal for providing universal coverage and equitable access to healthcare [66]. The Provincial Guidelines for the Implementation of the Three Streams of PHC-Re-engineering was released in 2012 [2]. The South African CHW programme was implemented using the provincial guidelines whilst the national policy framework and strategy was still being drafted. The programme aims to shift tasks from vertical programmes to an integrated team-based approach at the community level [67] **(Figure 2.3)**.

The term CHW in the South African perspective refers to any worker who is selected from the respective community, is trained in community health, and works in the community. They are the first line of support between the community and various health and social development services. They empower community members to make informed choices about their health and psychosocial wellbeing and provide ongoing care and support to individuals and families who are vulnerable due to chronic illnesses [68]. CHWs function as a link between communities and health systems in resource-constrained settings. The South African CHW model is similar to that of the FHP in Brazil and Pakistan's LHW programme in terms of the services provided, including family planning, PMTCT, chronic disease management, TB testing, HIV services, and STI screening [18, 39]. The South African CHW model also mimics Pakistan's LHW with regard to remuneration, where CHWs are given stipends. In terms of training, the South African CHW model has a markedly shorter training for CHWs of approximately 20 days as compared to 3 months for Brazil's FHP and 15 months Pakistan's LHW [18, 39]. The South African CHWs are employed by the NDoH, and managed by NGOs. Each CHW team is also linked to a PHC facility with a nurse in each facility employed as a team leader [69].

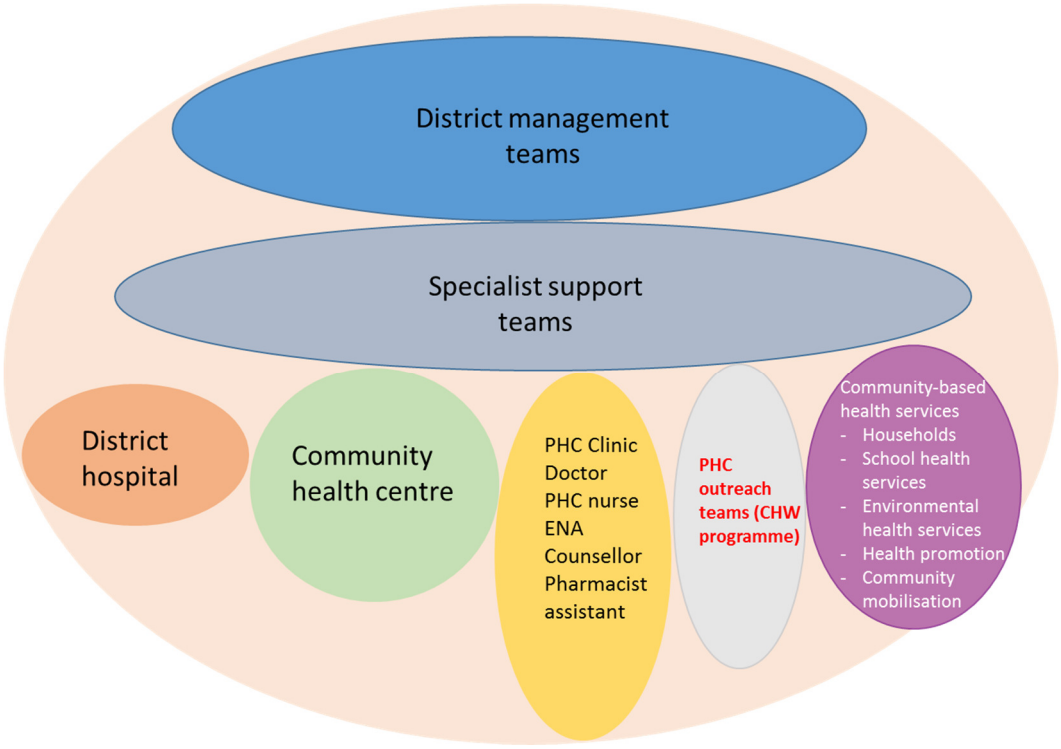



**Figure 2.3: Positioning of the CHW programme in the South African PHC re-engineering strategy (Adapted from Re-engineering Primary Health Care in SA, Discussion document, Nov 2010)**

The provincial guidelines were developed by the NDoH and adapted to each province. The guidelines stipulate that up to five community health workers (CHWs) combined with a professional nurse should form a ward-based outreach team (WBOT) [69]. The team of five CHWs should support a population of 7 660 individuals, or the equivalent of 1 619 households, in total. In practice, there is a large variation in the number of households supported by a team of CHWs due to geographic factors such as terrain and the distance between the households and the nearest PHC facility. The services provided by the CHWs include general health education, health status monitoring, and referral of individuals in need of care to the PHC facility [69]. The CHWs visit the household and completes a household registration form and are responsible for identification of vulnerable members that warrant intensified support. These include pregnant and postpartum women, children under the age of five years, and individuals on chronic medication for illnesses including HIV, TB, hypertension and diabetes mellitus. CHWs also provide TB screening, directly observed treatment support (DOTs), education on prevention of mother-to-child transmission of HIV and weigh infants and babies to check for malnutrition. Bedridden individuals, child-headed households and the elderly are also classified as vulnerable [70]. There are several CHW programmes implemented in South Africa to date including the WBOTs in Limpopo, Community Oriented Primary Care (COPC) in Tshwane, Operation Sukuma Sakhe (OSS) in KwaZulu-Natal, and HOPE in Cape Town.

**Table 2.3: Summary of the South African CHW Programmes**

| CHW Programme | Province | Description |
|---|---|---|
| Community Oriented Primary Care (COPC) | Tshwane | - Health posts consisting of professional nurse and 20 to 40 CHWs<br>- Health assessments done on a continuous basis - Captured electronically on mobile phones (web-based)<br>- Used to allocate daily tasks<br>- Provides links between health services, universities, and funding agencies [71] |
| HOPE | Western Cape | - Support ART adherence by after patient discharge<br>- Make appointments for patients, visit patients at their homes, and accompany patients to the clinic<br>- Distribution of hypertension and diabetes medication<br>- Measuring of blood pressure<br>- Conducting physical activity sessions [72] |
| Operation Sukuma Sakhe (OSS) | KwaZulu-Natal | - Disease management of HIV and TB, child and maternal health, infancy mortality rate, and orphan and vulnerable child care<br>- Community partnerships, behaviour change, integration of government services, economic activities, and environmental care [73] |
| Ward-based outreach teams (WBOTs) | Limpopo | - Promoting health and preventing illness at household level<br>- Registration of health needs in a household<br>- Provision of psychosocial support at community level<br>- Identification and management of minor health problems<br>- Support continuum of care through service co-ordination with other relevant service providers<br>- Provide adherence support and counselling for chronic conditions<br>- Health education<br>- Identifying at-risk individuals for HIV testing services (HTS)<br>- Adherence support for individuals on ART<br>- Tracing of individuals lost to the ART programme<br>- Referral of individuals with complications, co-infections, and side effects [74] |

### *2.6.1 Scope of practice of CHWs*

The scope of work of CHWs can be summarized into six generic roles according to the Limpopo provincial guidelines, which apply to various health programmes, i.e. maternal and child health, HIV, TB and chronic diseases. These include: [69]

- Promoting health and preventing illness at household level
- Registration of health needs in a household
- Provision of psychosocial support at community level
- Identification and management of minor health problems
- Support continuum of care through service co-ordination with other relevant service providers
- Provide adherence support and counselling for chronic conditions

Provision of HIV services constitutes an important component in South Africa's community health programme [75]. With specific regards to HIV services, the scope of practice includes:

- Health education
- Identifying at-risk individuals for HIV testing services (HTS)
- Adherence support for individuals on ART
- Tracing of individuals lost to the ART programme
- Referral of individuals with complications, co-infections, and side effects

### *2.6.2 Implementation of community health programme in Limpopo Province*

WBOTs have been fully operational in the Limpopo Province, Mopani district since 2013. Mopani district is one of the most rural districts in the country and is considered to be one of the main infrastructure intervention areas for economic transformation in South Africa [76]. The Department of Health in Mopani District has made concerted efforts in establishing a strong WBOT structure within their public health services. As of 2018, there are 149 active WBOTs in 123 of the 125 wards in Mopani district. This study took place in 12 of the 48 wards in the sub-districts of Greater Giyani and Greater Letaba. At the time of conceptualisation of this study, all 48 wards had active WBOTs (37 and 24 WBOT teams in Greater Giyani and Greater Letaba, respectively) **(Figure 2.4)**. These cover an estimated 83 225 and 54 228 households in Greater Giyani and Greater Letaba, respectively.

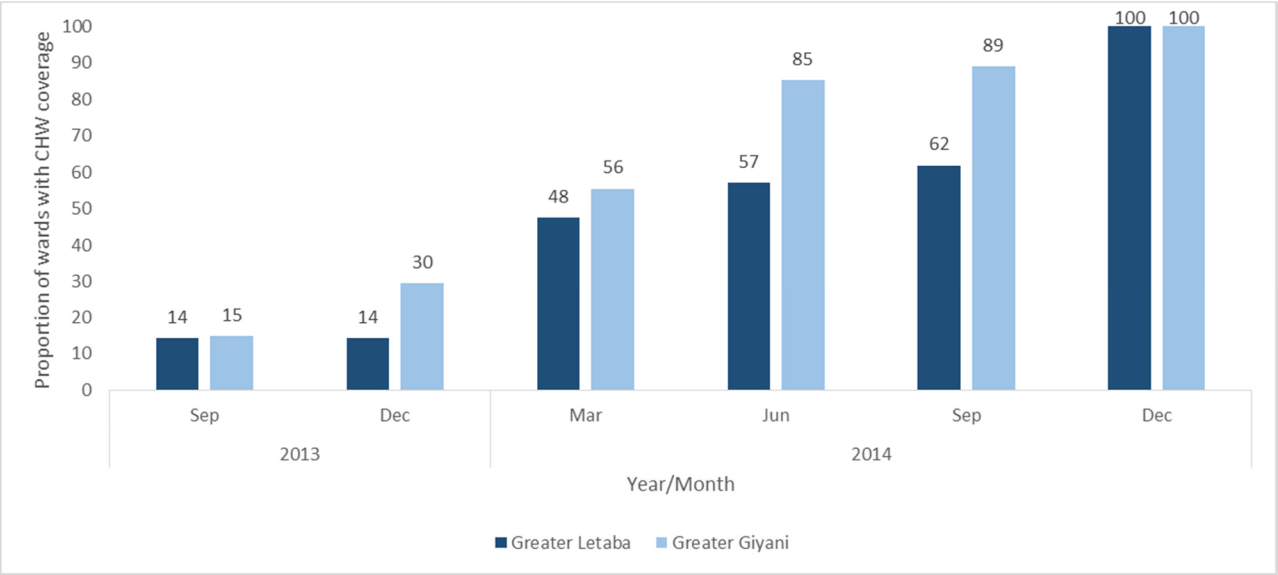



**Figure 2.4: Proportion of wards with CHW coverage per quarter in the Greater Giyani (n=31 wards in total) and Greater Letaba (n=30 wards in total) sub-districts**

## 2.7 THE ROLE OF IMPLEMENTATION SCIENCE IN STRENGHTENING HEALTH SERVICES

### *2.7.1 Introduction to implementation science*

Implementation is defined as a "critical bridge" between evidence-based programmes, and their impact on the intended recipients [77]. It is imperative to evaluate the processes that enable successful implementation outcomes and impact. There are three main theoretical approaches used in implementation science. These include: 1) process models which aim to describe or guide the process of translating evidence-based research into practice; 2) determinant frameworks, classic theories, and implementation theories that aim to understand and explain factors that influence implementation outcomes; and 3) evaluation frameworks that aim to evaluate an implementation [78].

### *2.7.2 Overview of frameworks*

The focus of this PhD research study was to measure implementation outcomes of the CBHP. There are several evaluation frameworks that specify aspects of implementation that should be evaluated. The most common frameworks are RE-AIM (Reach, Effectiveness, Adoption, Implementation, Maintenance), which evaluates the degree to which an intervention can be delivered broadly at reasonable cost [79]; PRECEDE-PROCEDE (Predisposing, Reinforcing and Enabling Constructs in Educational Diagnosis and Evaluation-Policy, Regulatory, and Organizational Constructs in Educational and Environmental Development) [80]; the Promoting Action on Research Implementation in Health Services framework (PARIHS), which posits key, interacting elements that influence successful implementation evidence-based interventions [81]; and the Realist Evaluation Method which evaluates impact of an intervention, with the main focus on participants' reaction to interventions [82].

However, there is a lack of consistent implementation terminology in the literature, which is much needed to guide evaluations and the selection of frameworks for these evaluations. Proctor and colleagues aimed to address this gap by proposing eight implementation outcomes including acceptability, adoption, appropriateness, feasibility, fidelity, implementation cost, penetration, and sustainability [83]. For this study, we have found it opportune to measure fidelity of implementation (FOI) as primary research into interventions and their outcomes should involve an evaluation of implementation fidelity to gauge the true effect of the intervention [84]. A literature review of implementation outcomes by Proctor and colleagues found that FOI has been measured more often as compared to other implementation outcomes [83].

### *2.7.3. Fidelity of implementation*

FOI is the degree to which an intervention was implemented as prescribed [84]. FOI may be a potential moderator of the relationship between the intervention and the planned outcomes, as depicted in the figure below **(Figure 2.5)**. Therefore, it is important to measure FOI as it helps to gauge whether outcomes are a result of the intervention itself or of its application [85, 86].

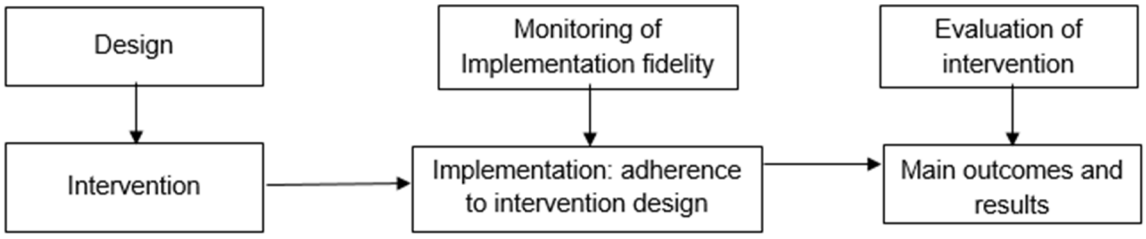



**Figure 2.5: Fidelity of implementation as a moderator between project design and outcomes [87]**

### *2.7.4. Rationale for selection of the conceptual framework for implementation fidelity*

The conceptual framework for the assessment of implementation fidelity proposed by Carroll and colleagues **(Figure 2.6)** was chosen to assess FOI in this PhD research study. The Carroll framework for implementation fidelity specifies aspects of implementation that could be evaluated to determine implementation success [88]. The framework is multifaceted in that it assesses both the intervention and its delivery. Monitoring implementation of an intervention using this framework will enable better evaluation of the actual intervention on outcomes. However, empirical research is required to test the framework and to clarify the moderating impact of its components [88].

The measurement of FOI has three components including: 1) adherence, 2) potential moderators and 3) outcomes. Adherence is how far those responsible for carrying out the intervention adhere to the intervention as prescribed. This includes the subcategories of: a) content, b) frequency, c) duration, and d) coverage [88]. The potential moderators to this process include: a) comprehensiveness of policy description, b) strategies to facilitate implementation, c) quality of delivery, and d) participant responsiveness. In addition, the framework considers the function of each element and their relationship to each other. The dashed line in the framework suggests that the relationship between the intervention and its outcome is external to FOI. Findings from this evaluation will provide much needed information about the FOI of the CBHP. It will also add to the limited existing knowledge on implementation research and outcomes.

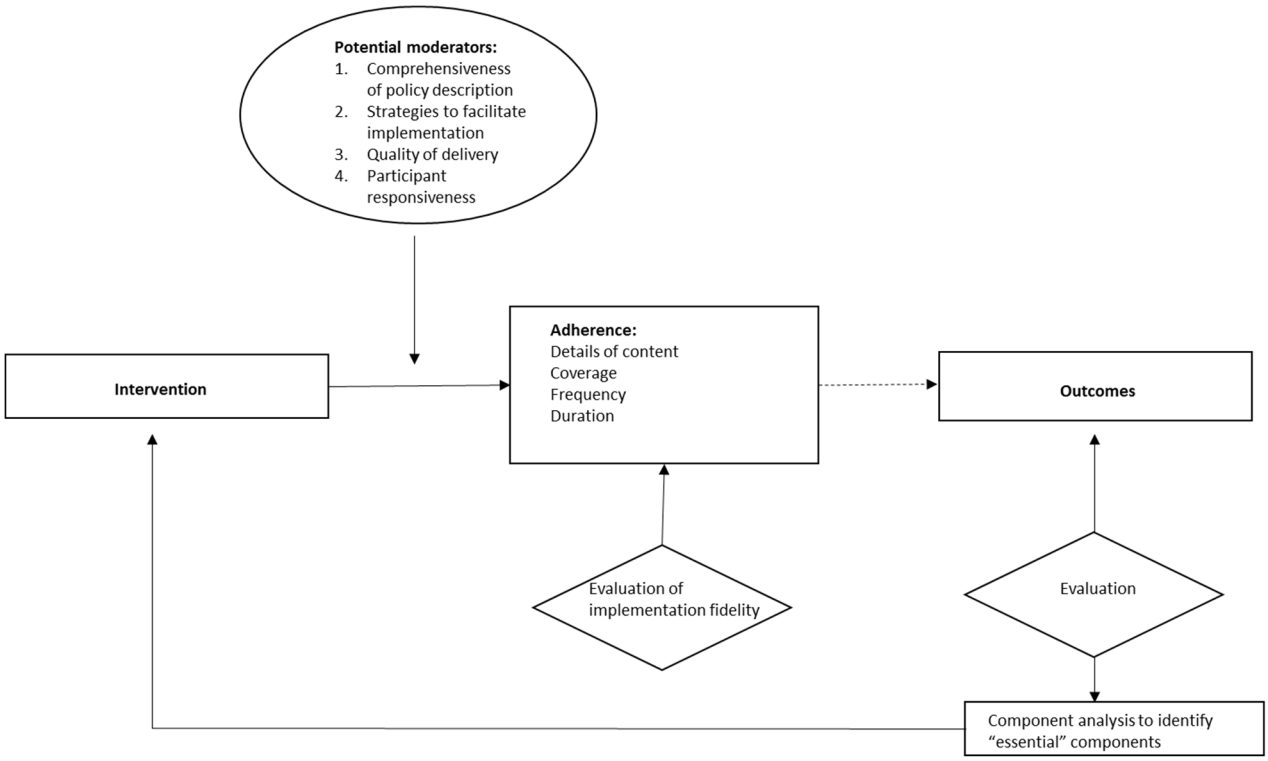



**Figure 2.6: Conceptual Framework for Implementation Fidelity by Carroll et al. (2007)**

The evaluation of the different components of the Carroll framework are addressed in the proceeding chapters as follows **(Figure 2.7)**:

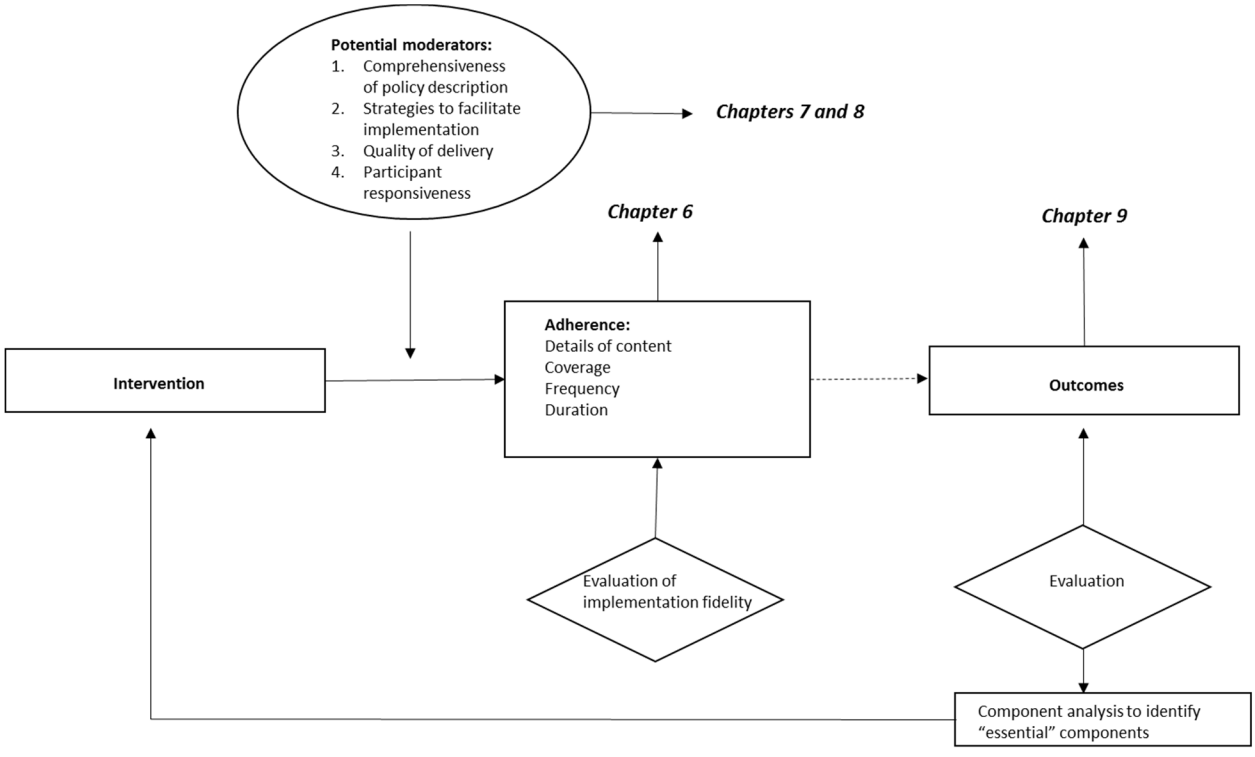



**Figure 2.7: Chapters addressing the different components of the Carroll framework**

## 2.8 CONCLUSION

HIV remains a public health challenge worldwide with South Africa having the largest ART programme globally [1]. Innovative approaches including strong and comprehensive involvement of the community-based healthcare programme is warranted to achieve HIV epidemic control. The review of the literature on global CHW models provides useful information with regard to the successes and challenges of implementation of global programmes, which was used to inform this study. It also introduces the South African CHW model, explaining the scale-up of the CBHP and the scope of work of the CHWs which was evaluated in this study which is detailed more in **CHAPTER 5**. Assessing the implementation of the CBHP is crucial to improve health services and outcomes of the programme. Finally, although there are various frameworks available for evaluation of implementation processes, justification for using the Carroll framework for the current study was provided. According to this framework, in order for the CBHP to be effective in meeting its intended outcomes, measuring and understanding implementation fidelity of the programme is imperative. This will enable researchers and implementers to gauge how and why the programme works and the extent to which programme outcomes can be strengthened [88].

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# CHAPTER 3

## RATIONALE FOR THE PhD RESEARCH STUDY

## CHAPTER 3: RATIONALE FOR THE PhD STUDY

There is a high burden of human immunodeficiency virus (HIV) in South Africa with a high societal and socio-economic impact through morbidity and mortality [1]. The community-based HIV programme (CBHP) has the potential to play an important role in improving access of HIV services in underserved communities and thus improving health outcomes. However, despite the huge capital investment in the CBHP to date and its critical role in HIV prevention and management, substantial strengthening is required for the programme to reach its full potential. An important approach to strengthening health programmes such as the CBHP is to assess the fidelity of programme implementation (FOI). Therefore, this PhD research study evaluates implementation fidelity of the CBHP, while identifying barriers and facilitators to successful implementation in the South African context. It is imperative to measure FOI of the CBHP to ensure that the CBHP is implemented according to the policy guidelines and meets its intended goals, to provide a framework for future and continuous assessments of programme implementation fidelity, and to inform policy design and implementation. In this thesis, this is done using the Carrol framework for implementation fidelity in order to conceptualize a model and vision of evidence-based ways to improve the HIV programme delivery by CHWs and to ultimately achieve epidemic control [2].

### 3.1 AIM

This PhD research study aims to assess implementation fidelity of a CBHP in a rural South African sub-district and to measure its effect on HIV testing, HIV treatment initiation and patient retention in care. The study used various quantitative and qualitative research methods.

### 3.2 OBJECTIVES

1) To measure fidelity as defined in local guidelines of CBHP implementation by CHWs from the community's perspective

2) To explore barriers and facilitators to the successful implementation of the CBHP

3) To explore the contexts in which the CBHP is implemented and how these contexts affect the CHWs' ability to support the CBHP

4) To characterise HIV services delivered by CHWs and to assess the impact of these services on the CBHP

## 3.3 GENERAL METHODOLOGY

This study took place in the rural Mopani district of Limpopo Province. The Greater Giyani and Greater Letaba sub-districts in this district were chosen as they have a similar size HIV programme and catchment population. We purposively selected 12 wards linked to 12 WBOTs, six from each sub-district. The WBOTs comprised of 90 CHWs are attached to 12/49 facilities in the 12 wards. The community survey **(CHAPTER 6)**, exploratory assessment **(CHAPTERS 7 and 8)**, and the cross-sectional study **(CHAPTER 9)** were conducted with a variety of stakeholders in these districts. The stakeholders interviewed for the various components of this study (community, CHWs, facility nurses, CHW team leaders, social workers, and community leaders) resided in the 12 selected wards and were randomly selected. All interviews were conducted in the local language (Tsonga or Sotho) using translated interview guides. Translation of the interviews into English and back-translation into Tsonga or Sotho were conducted to ensure accuracy and consistency.

For the cross-sectional study (**CHAPTER 6)** interviews were conducted with the community. We randomly selected three of the sections in each ward (36 in total). We then randomly selected 25 households in each section by manually pinning households in Google™ Earth Pro. The Global Positioning System (GPS) coordinates of each selected household was recorded and given to the study team. We used coverage, i.e. report of a CHW household visit by the participant, as the main measure of outcome. Based on an estimated coverage of 80%, using a confidence level of 95%, and power of 80%, we calculated a sample size of 734 individuals as adequate. Assuming a response rate of 80%, a sample size of 900 was used. To calculate the distance from the participant's household to the nearest facility, we used Google™ Earth Pro to measure the straight-line distance. Coverage was measured by the proportion of participants that reported CHW visits ever. Frequency of CHW visits was defined as the proportion of households that received a visit in the last month, three months or six months. Duration was defined as high in the case of a CHW visit less than six months ago and low in the case of a CHW visit more than six months ago. CHW's knowledge of HIV was based on the self-report of CHWs. Content was measured by the proportion of individuals reporting HIV services delivered by CHWs including HIV health education and referrals (core components).

**CHAPTER 7 and CHAPTER 8:** For the exploratory study focus group discussions (FGDs) were conducted with the CHWs and facility nurses and in-depths interviews were conducted with the community, CHW team leaders, social workers, and community leaders residing in the 12 wards selected for this study. We generated codes, sub-codes, and broader themes. Inter-rater reliability was ensured through the continuous comparing of codes between the coders. In the final stages of inductive coding, the

number of codes and themes were further re-arranged and reduced to formulate the final themes. Following thematic content analysis, based on the final themes reported by participants in this study, we identified the Consolidated Framework for Implementation Research (CFIR) as the most suitable model to provide a theoretical basis to interpret the findings. The CFIR is a conceptual framework developed to guide the systematic assessment of different implementation contexts to identify key factors that may influence the implementation and effectiveness of a given intervention [3].

**CHAPTER 9:** To assess HIV service provision we measured (i) at-risk individuals referred to the nearest facility for HIV Testing Services (HTS), (ii) HIV-infected individuals on antiretroviral therapy (ART) to whom adherence support is provided and (iii) tracing and referral back to the facility of individuals lost to the ART programme. CHWs identified individuals at-risk for HIV infection and individuals needing ART support by asking the specified questions related to risky and health-seeking behaviour. Individuals lost to the ART programme were determined by using a list from the facility staff. The above referrals were determined using the CHW daily activity registers. Successful referrals for HTS, initiation, and re-initiation were determined by manually matching the patient identifiers with the paper-based registers (headcount, HTS, and pre-ART) and electronic registers (the Three Interlinked Electronic Register (TIER.Net) at the nearest facility or referral facility, as recorded in the CHW activity register.

# CHAPTER 4

## STRUCTURE OF THESIS AND PUBLICATIONS

## CHAPTER 4: STRUCTURE OF THESIS AND PUBLICATIONS

The literature review presented in **CHAPTER 2** of this thesis has resulted in a detailed description of the CHW's potential contribution to the South African community-based HIV programme (CBHP). This resulted in the first publication (**CHAPTER 5**) in which an opinion of the potential and opportunities of the community health programme to contribute to the human immunodeficiency virus (HIV) programme in South Africa is presented.

This thesis evaluates FOI of the South African CBHP in rural Mopani District. After considering the different evaluation frameworks available, the conceptual framework for implementation fidelity by Carroll and colleagues was selected as the most appropriate to guide this study. The three core components of the conceptual framework for implementation fidelity include adherence, potential moderators to adherence and outcomes[2]. Following the literature review, **CHAPTER 6** describes the results of assessment of the adherence element of the framework. In **CHAPTERS 7 and 8**, potential moderators to adherence are explored in terms of: a) barriers and facilitators to the CBHP implementation and b) the contexts in which the CBHP is implemented, and how these contexts affect the CHWs' ability to support the CBHP. In **CHAPTER 9** the results of evaluation of the outcomes element of the framework, defined as the effect of the CBHP implementation on HIV programme outcomes, are discussed. Finally, the results of evaluation of the three individual elements were combined with available literature to present an adapted/revised framework to measure FOI of the CBHP in **CHAPTER 10**. The overall findings of this research dissertation, recommendations and a future vision of the CBHP are discussed in the final **CHAPTER 11**.

Ethical approval for conducting this PhD research study was obtained from the Human Research Ethics Committee at the University of Witwatersrand, Johannesburg, South Africa (Reference number: M1611111). The ethical clearance certificate is included in the Appendices **(Appendix A)**. The data collection tools and interview guides are included in the Appendices **(Appendix B to K)**.

My role in the above studies included training of research staff, designing interview guides, creating databases, overseeing data collection, conducting data quality checks, data analysis and the writing of the manuscripts.

Details of the publications that have emanated thus far from this PhD research study **(Table 4.1)** and conference presentations held **(Table 4.2)** are provided below. My specific role in the second-author publication was training of research staff, designing interview guides, overseeing data collection, data coding, data analysis, and reviewing the manuscript.

**Table 4.1: Summary of publications presented in this thesis**

| Manuscript | Component of Carroll framework | Journal | Status |
|---|---|---|---|
| 1. **Naidoo N**, Railton J, Jobson G, Matlakala N, Marincowitz G, McIntyre JA, et al. Making ward-based outreach teams an effective component of human immunodeficiency virus programmes in South Africa. | Review | South African Journal for HIV Medicine | Published. South Afr J HIV Med. 2018;19(1):778. |
| 2. **Naidoo N**, Railton J, Matlakala N, Marincowitz G, McIntyre JA, Struthers HE, Igumbor J, Peters RPH. Fidelity of HIV programme implementation by community health workers in rural Mopani district, South Africa: a community survey. | Adherence | BMC Public Health | Published. BMC Public Health. 2018;18(1):1099. |
| 3. **Naidoo N**, Zuma N, Khosa NS, Marincowitz G, Railton J, Matlakala N, et al. Qualitative assessment of facilitators and barriers to HIV programme implementation by community health workers in Mopani district, South Africa. | Potential moderators to adherence | PLOS ONE | Published. PLoS One 2018;13(8):e0203081. |
| 4. Jobson G, **Naidoo N**, Matlakala N, Marincowitz G, Railton J, McIntyre JA, Struthers HE, Peters RPH. Contextual determinants of community health worker HIV outreach activities in Limpopo Province, South Africa. | Potential moderators to adherence | International Health | Submitted. |
| 5. **Naidoo N**, Railton J, Matlakala N, Marincowitz G, McIntyre JA, Struthers HE, Igumbor J, Peters RPH. Provision of HIV services by community health workers should be strengthened to achieve full programme potential: a cross-sectional analysis in rural South Africa. | Outcomes | Tropical Medicine and International Health | Published. Trop Med Int Health. 2019; 24(4):401-8. |

**Table 4.2: Conference presentations arising from the PhD research study**

| Date | Name of conference/seminar | Place (city, country) | Title of presentation | Oral/poster |
|---|---|---|---|---|
| 12 October 2018 | Provincial Research Day (Limpopo) - 2018 | Polokwane, Limpopo | Scale-up of the CHW programme is required to deliver on its full potential for HIV service provision | Oral |
| 10-12 September 2018 | Public Health Association of South Africa Conference 2018 | Parys, Free-State | Scale-up of the CHW programme is required to deliver on its full potential for HIV service provision | Oral |
| 27 November 2017 | Wits Research Day | Johannesburg, South Africa | Experiences in implementing a community health worker programme to contribute to HIV care in Mopani district, South Africa | Oral |
| 27 November 2017 | Wits Research Day | Johannesburg, South Africa | Evaluating a community health worker's programme contribution towards HIV care in Mopani district, South Africa | Poster |
| 7 November 2017 | Provincial Research Day (Limpopo) -2017 | Polokwane, Limpopo | Experiences in implementing a community health worker programme to contribute to HIV care in Mopani district, South Africa | Oral |
| 4-7 September 2017 | Public Health Association of South Africa Conference 2017 | Johannesburg, South Africa | Experiences in implementing a community health worker programme to contribute to HIV care in Mopani district, South Africa | Oral |
| 4-7 September 2017 | Public Health Association of South Africa Conference 2017 | Johannesburg, South Africa | Evaluating a community health worker's programme contribution towards HIV care in Mopani district, South Africa ***(won first prize for best oral presentation)*** | Oral |
| 13-15 June 2017 | 8th South African AIDS Conference | Durban, South Africa | Experiences in implementing a community health worker programme to contribute to HIV care in Mopani district, South Africa | Poster |
| 13-15 June 2017 | 8th South African AIDS Conference | Durban, South Africa | Evaluating a community health worker's programme contribution towards HIV care in Mopani district, South Africa | Poster |

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# CHAPTER 5

## MAKING WARD-BASED OUTREACH TEAMS AN EFFECTIVE COMPONENT OF HUMAN IMMUNODEFICIENCY VIRUS PROGRAMMES IN SOUTH AFRICA

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# CHAPTER 5: MAKING WARD-BASED OUTREACH TEAMS AN EFFECTIVE COMPONENT OF HUMAN IMMUNODEFICIENCY VIRUS PROGRAMMES IN SOUTH AFRICA

## 5.1 INTRODUCTION

Ward-based outreach teams (WBOTs) are becoming an increasingly important part of primary healthcare (PHC) in resource-constrained rural settings across the globe [1]. In addition to district clinical specialist teams and integrated school health services, WBOTs are one of three components of the PHC re-engineering programme introduced in South Africa in 2012 to improve communities' access to health services and the quality of care provided [2]. In South Africa, each WBOT is linked to a PHC facility and consists of a team leader, usually a professional nurse, plus five or more CHWs. Each CHW is allocated 250-400 households to support [3].

Several approaches have been initiated to improve outcomes of the HIV programme in South Africa including HIV counselling and testing and adherence clubs [4]. Specifically, these approaches have been either community-based or facility-based. WBOTs, provide a means of bridging the gap between health facilities and the communities they serve, a role which may be especially valuable in rural areas where communities are impoverished and under-served and where individuals have to travel excessive distances to seek medical care [1]. CHW's primary activities include registration of household's health needs, provision of health education, and the provision of adherence support for individuals on ART or with other chronic illnesses. In this article, we identify and discuss key opportunities for effectively integrating WBOTs in the HIV response in South Africa, while noting various challenges that need to be addressed in order to maximise impact.

## 5.2 KEY OPPORTUNITIES FOR WBOTs IN SOUTH AFRICA'S HIV PROGRAMME

The WBOTs are well positioned at the interface of the community and facility to contribute to the HIV programme in the following ways **(Table 5.1)**:

a) provision of information to educate individuals on how to prevent transmission of HIV infection
b) identification of individuals at risk for HIV infection who should be tested for HIV
c) provision of adherence support and tracing of individuals with missed appointments to improve retention in care
d) early identification of individuals with deteriorating health while on ART to reduce further morbidity and mortality

**Table 5.1: Summary of potential contributions of WBOTs to the HIV programme**

| Opportunities | Activities of WBOTs | Expected outcomes |
|---|---|---|
| 1. Provision of information to educate individuals on how to prevent transmission of HIV infection | - Educate community about HIV prevention during household visits | - Reduction in newly HIV infected individuals |
| 2. Identification of individuals at risk for HIV infection who should be tested for HIV | - Re-educate individuals about HIV<br>- Refer individuals to the PHC facility for HIV testing | - Increased uptake of HIV testing and ART initiation |
| 3. Provision of adherence support and tracing of individuals with missed appointments to improve retention in care | - Refer defaulting individuals back to the PHC facilities<br>- Implement adherence health clubs to support ART maintenance for groups of HIV-infected stable individuals | - Reduction in number of individuals defaulting in treatment taking |
| 4. Early identification of individuals with deteriorating health while on ART to reduce further morbidity and mortality | - Refer individuals with deteriorating health due to chronic diseases to the clinic for treatment<br>- Distribute medication to bedridden patients | - Reduction in mortality and morbidity of HIV-infected individuals with deteriorating health and chronic diseases |

### *5.2.1 Prevention of human immunodeficiency virus infection and its complications*

There is evidence showing the effectiveness of using CHWs in large-scale health promotion and disease prevention programmes in low income countries such as Haiti, Ethiopia, Uganda, and Malawi [5, 6]. This preventive aspect of CHWs' work could also play a critical role in South Africa's HIV programme. CHWs could support the programme specifically not only by providing health education on how to prevent HIV infection, but also by distributing condoms and potentially assisting in the identification of individuals that may benefit from pre-exposure prophylaxis (PrEP) [7-10]. CHWs, through adherence support, could contribute to lowering community viral load (VL) and thereby reducing transmission in the community [11, 12]. However, it has not yet been documented how well the above roles are performed and whether CHWs' efforts positively impact on the reduction of HIV incidence. To our knowledge, there are so far no South African studies undertaken that assess the impact of preventative aspect of CHWs' work.

### *5.2.2 Identification of human immunodeficiency virus-infected individuals*

CHW's link between communities and facilities makes them well placed to support and appropriately refer vulnerable individuals to health facilities. Amongst those classified as vulnerable by the NDoH are individuals at risk for HIV infection and those already infected [3]. As such, discussion of HIV status

and HIV risk with individuals, their partners and children is an important component of CHW activity. South Africa is one of the first countries to formally adopt the Universal Test and Treat approach recommended in the updated World Health Organisation (WHO) guidelines on HIV treatment. The guidelines state that all HIV-infected individuals should start ART within 2 weeks of an initial CD4 count being performed [13]. There is limited data about the feasibility of HIV case identification by CHWs in South Africa, but a study by Uys et al. (2002) conducted at 7 sites in South Africa shows that community caregivers, who provide psychosocial and household support may have a positive impact on HIV case identification through mobilisation and referral of individuals to HIV services for testing. CHWs on the contrary, focus on providing medical aspects of care. Although this study was conducted in the setting of a home-based AIDS care model, and community caregivers are not the same as CHWs, the results are encouraging and support the involvement of a structure such as WBOTs that bridge the gap between community and healthcare facility by complementing services provided by community caregivers [14].

CHWs could also make an important contribution to the HIV response by supporting home based HIV testing. This approach to HIV testing and counselling was used in a cluster randomised controlled trial in KwaZulu-Natal Province, South Africa, which found significantly higher rates of HIV testing amongst participants in the home-based testing arm than those testing at facilities (69% vs 47%; 95%CI 1.32 – 1.81). Other results included a higher uptake of couple counselling and testing as well as a reduction in multiple partners [15]. In light of this, to strengthen the impact of CHWs in the HIV programme, home-based testing by CHWs should be considered. There is also potential for HIV testing during community-based campaigns [16] and HIV self-testing as recommended by the WHO [17].

### *5.2.3 Tracing non-adherent individuals and provision of adherence support to improve retention in care*

A high level of patient retention on antiretroviral treatment is imperative for good HIV programme outcomes. CHWs can improve retention in care directly by tracing individuals who missed their appointments or defaulted treatment and linking them back into care at the healthcare facility. Although tracing is an important part of the CHW's activities, the effectiveness of this approach remains undocumented. Defaulter tracing should not become so time consuming that it prevents CHWs from effectively undertaking their other duties. In the South African WBOT programme we suggest that defaulter tracing should combine an initial attempt to contact non-adherent individuals telephonically, followed by physical tracing at their homes by CHWs if they are not reachable via telephone. This was shown to be successful in other studies [18] and preliminary data from Mopani

District, Limpopo Province is promising suggesting that there is value in using a combination of telephone and physical tracing as a routine CHW activity [19].

Another way in which CHWs could contribute to improving retention in care is through adherence support. Grimwood et al. (2012), in a multicentre cohort study, demonstrated that community-based adherence support is an effective way to improve patient retention on ART. In that study, patient advocates (PAs) were tasked with providing adherence support to the community. Clinical, virological, and immunological outcomes were compared between children who did and did not receive community-based adherence support from PAs in Western Cape, KwaZulu-Natal, Eastern Cape, and Mpumalanga province. They showed a significant difference in patient retention after three years: 92% (95% CI: 76.7% - 97.6%) amongst children with PAs and 74% (95% CI: 65.4% - 81.0%) amongst children without PA support. In addition, multivariable analyses showed that children with PAs had reduced probability of HIV-related programme attrition and mortality [20]. Similarly, Igumbor et al. (2011) found that a significantly higher proportion of patients (70% vs. 30%) with a community-based adherence supporter had a VL of less than 400 copies/ml at six months of treatment [12]. In the context of the WBOT programme, adherence support entails regularly visiting patient's households to supervise medication taking, educating patients about the importance of taking treatment exactly as prescribed by the healthcare workers, provision of tips and tools such as diary record cards to aid in timely treatment taking, and referrals of non-adherent individuals to the nearest PHC facility for follow-up.

The positive value of adherence support in retaining individuals on ART in South Africa was also documented in the study by Igumbor et al. which evaluated the effect of community adherence support on ART programme retention. They observed that a significantly higher proportion of patients with a community-based adherence supporter (89%) had a treatment pick-up rate of over 95% [12]. Adherence support by CHWs may also play an important role in reducing health facility workloads through monitoring and supporting HIV-infected patients who are stable on ART [21-23]. Grimsrud et al. for example, found that task-shifting to CHWs can successfully support and improve ART adherence and encourage patient self-management [4]. Over a period of 12 months, more than 2000 stable ART patients were successfully decentralised from a doctor-driven PHC clinic to a community-based model of care including CHWs, while maintaining ART retention rates of 97% after 6 months, and 94% at 12 months [4]. The ongoing scale up of the ART programme in South Africa, particularly as test and treat becomes routine, makes it increasingly important to find effective ways to involve CHWs in novel

systems of alternative distribution of ART and long-term ART retention, especially in resource-limited settings.

### *5.2.4 Early identification of individuals failing treatment*

Finally, CHWs have a critical role to play in maintaining HIV viral suppression and hence reducing HIV related morbidity and mortality through ongoing monitoring of individuals on ART. In this role, CHWs essentially provide a means for the early detection of individuals at risk of defaulting or treatment failure through symptom screening. By enhancing treatment literacy, early identification of ART side-effects, awareness of psychosocial and poverty-related factors that may impact the likelihood of patient's virological failure, CHWs can be an essential link in the HIV treatment cascade. Grimwood et al. (2012) demonstrate this potential, by finding that the presence of community-based patient support reduced mortality of children after three years of ART: 3.7% of children died in a setting with PAs whereas 8.0% of children died without community-based support [20].

## 5.3 BARRIERS AND CHALLENGES TO SUCCESSFUL WBOT SUPPORT

Despite the promise of the WBOTs in improving programme outcomes, there are several key barriers and challenges to their successful implementation in South Africa's healthcare system. These include general operational challenges and HIV programme-specific challenges as discussed below.

### *5.3.1 General challenges*

#### 5.3.1.1 Varying perceptions of community health worker roles

The health system identifies CHWs as volunteers who manage patients within the community in which they reside and usually receive a stipend for their services [24]. Some community members perceive CHWs to be peers, while others are knowledgeable about CHW roles in communities such as promoting primary health services and encouraging testing for several health conditions [25].CHWs generally perceive themselves as being a part of the community, while providing services and making a difference to the lives of people. Some even have an elevated perception of their roles as being teachers, social workers, and doctors as they are given access to privileged medical information of patients and are linked to the formal health system [26]. However, this empowerment may be challenged by difficult working environments. A recent multi-country comparative study shows that CHWs are often left feeling unsupported and undervalued as organisational and relational challenges hindered their work. Therefore improving organisational support and helping the community better understand and appreciate the roles of CHWs could possibly mitigate these challenges faced by CHWs [27].

#### 5.3.1.2 Lack of stakeholder and community support

A fundamental challenge that limits the effectiveness of WBOTs in South Africa is their poor integration into local health systems, which in turn undermines the role of CHWs in community healthcare [7]. Effective integration of WBOTs requires PHC facilities in the CHW programme to adopt a co-ordinating role [28], and to facilitate ongoing contact with CHWs for the purposes of feedback, training, and monitoring. A study in Uganda, for example, found that creating a bidirectional feedback loop by holding monthly meetings and using data collected timeously improved CHW activities and ensured that the continuum of services from community to facility is maintained [29]. The integration of CHWs into a well-established community-based PHC system with facility nurses, doctors, a proper referral system, and adequate financing and resources is essential in relieving pressures of health service delivery [1, 30].

In addition, support from community leaders and social workers as well as community acceptance play an important role in the success of the CHW programme. Evaluating the interaction of CHWs and the community from a cultural and gender perspective is therefore imperative, for example male community members may resist interaction with female CHWs [31]. Gender inequalities have also been shown to negatively impact HIV counselling and testing, HIV status disclosure and ART adherence as well as the ability of female CHWs to work with male community members [32]. In this regard, the introduction of male CHWs may be necessary to address these gender-related challenges, and may result in improvement in health outcomes of male community members [33]. However, the introduction of male CHWs may be thwarted by existing norms of hegemonic masculinity where male CHWs assert dominance over their clients, limiting male community member's ability to be open about being sick and vulnerable [34]. This could also result in female community members feeling intimidated and withdrawn. When making these decisions to introduce male CHWs into the programme, it is imperative to adopt an approach that is conducive to developing supportive relationships between CHWs and community members that improve health-seeking behaviour [34].

#### 5.3.1.3 Challenging work environments and operational barriers

Minimal, inconsistent or irregular payments of stipends remain a critical challenge in maintaining CHWs interest and involvement in community-based programmes [7, 28]. Common reasons for CHWs resigning include inadequate compensation for their time and family members being unsupportive of their workload in light of the minimal incentive received [23, 35]. Limited practical resources can also inhibit the effectiveness of CHW programmes. For example, a lack of comfortable footwear and umbrellas to protect CHWs from harsh weather elements may prohibit them from conducting

household visits. The fact the CHWs have not been provided with official uniforms or name tags may also present a problem with regard to identification and authority of the CHWs in the community and health systems. Funding constraints also mean that CHWs often lack resources to travel to households, meetings and training sessions [28]. Evaluations of CHW programmes show that CHWs become overwhelmed by their broad range of tasks resulting in poor performance and work overload. Hermann et al. note that CHWs with a large number of tasks tend to select a few that they perceive as the most important or feasible to prioritise [6]. The tasks they prioritise may or may not align with programmatic goals. Therefore, clearly defined management and reporting channels are essential to ensure that WBOTs are effectively used in the South African HIV programme. Moreover, the use of mobile technology should be considered to assist CHWs with their tasks and to improve communication. Studies show that the use of mobile technology by CHWs to collect field-based health data, receive reminders and alerts, facilitate health education, and conduct person-to-person communication improved quality of care, service efficiency, and programme monitoring [36, 37].

### *5.3.2 Human immunodeficiency virus programme challenges*

#### 5.3.2.1 Lack of knowledge and skills

In South Africa, the NDoH developed a curriculum for CHWs, with the ultimate goal of national certification [38]. CHWs are currently trained on HIV prevention and treatment including provision of health education, screening community members for health problems, and referrals to local facilities, included in the phase one training. They are therefore expected to have adequate knowledge to do their work. However, sustaining and updating knowledge through continual training is a challenge [28]. Continuous education and support is therefore a requirement to sustain quality of the programme. Phase two training is currently underway, which will address knowledge gaps [38].

#### 5.3.2.2 Socio-cultural barriers

In a context where HIV is stigmatised, CHWs may be seen as a marker of HIV or AIDS as they are known to support individuals who are HIV-positive. This, in turn, can arouse a feeling of stigmatisation in community members which may result in individuals refusing to talk to CHWs, providing incorrect contact information, pretending to be someone else when visited by CHWs, and asking to change the location of CHW visits. For example, there has been a report of CHWs specifically providing ART adherence support trying to conceal their identities when visiting households by refraining from wearing uniforms given to them by their NGOs and pretending to be selling various commodities [31]. Implementing community awareness and education campaigns aimed at reducing HIV-related stigma may therefore be an important factor facilitating the effectiveness of WBOTs. This may enable

individuals to feel more comfortable to provide accurate medical information to their CHWs and details regarding treatment options can be shared with them by CHWs. This will also enable individuals to build relationships with external sources of support such as CHWs and PHC facilities in order to obtain healthcare advice and treatment [31]. A formal WBOT policy is still in the process of being finalised. The policy may include ethical guidelines governing their roles such as the requirement of registration with health bodies (currently not required), ethics training, and the legal framework in which the CHWs operate [38]. The policy may also stipulate the extent to which CHWs are qualified to provide health advice. This may improve CHWs credibility in the community.

### 5.4 PERSPECTIVE

There is great potential for CHWs to have a substantial impact on HIV programmes as evidenced above. We have presented several examples of successful CHW initiatives. CHW efforts can lead to improved health outcomes by improving community access to primary healthcare in terms of health education, patient linkage to and retention in care. Expanding the CHW programme will further increase the potential to address large healthcare gaps. However, health system barriers such as human resource capacity, inconsistent remuneration, lack of nationally recognised training, and a failure to mainstream WBOTs are important factors that limit the effectiveness of the WBOT programme. These need to be addressed for WBOTs to have maximum impact on the HIV and other health programmes [23]. A particular point of concern is that CHWs may be overloaded with expectations and activities. In that regard, it is essential that the workforce size and quality of services provided must match the programme deliverables. Further investment in the WBOT programme would be essential to expand it, however, this is not easily achieved without a broad-scale documented impact. To our knowledge, there is no comprehensive data available on the impact and contribution of the WBOT structure on HIV programme outcomes in South Africa. Such impact would likely be highest in rural settings with high poverty and low education rates, but at the same time the operational barriers may be larger in those areas [23]. Several initiatives are currently underway to document the impact that CHWs have on health programmes in general, and the HIV programme in particular, as well as to assess practical ways to improve their contribution. Community healthcare provides an important component of the South African healthcare system with high promise to support the usually overcrowded healthcare facilities, but strengthening of the structure is warranted to obtain maximum impact.

## 5.5 CONCLUSIONS

There is evidence that WBOTs have a positive impact on healthcare. However, despite the strong potential, there are limited data on the impact of WBOTs on the South African HIV programme. Therefore, evaluations to determine operational barriers and opportunities for improvement are urgently warranted. This will provide much needed information to stakeholders regarding areas that need improvement and strengthening in order for WBOTs to become a sustainable structure in the South African healthcare system.

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# CHAPTER 6

## FIDELITY OF HIV PROGRAMME IMPLEMENTATION BY COMMUNITY HEALTH WORKERS IN RURAL MOPANI DISTRICT, SOUTH AFRICA: A COMMUNITY SURVEY

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# CHAPTER 6: FIDELITY OF HIV PROGRAMME IMPLEMENTATION BY COMMUNITY HEALTH WORKERS IN RURAL MOPANI DISTRICT, SOUTH AFRICA: A COMMUNITY SURVEY

## 6.1 BACKGROUND

Community health programmes have strong potential to strengthen primary health services in low- and middle-income countries (LMICs) [1]. The value of these programmes has been demonstrated for maternal, child, and mental healthcare in various settings in LMICs. For example, studies from South Africa show that CHWs have been successful in improving maternal and child health outcomes [2], and providing a social support system [3]. Reviews of quantitative and qualitative studies show that CHWs can provide an important human resource capacity and have the potential to contribute to HIV services in sub-Saharan Africa [4, 5]. There is growing evidence on successful scale up and integration of community-based programmes into national health systems [6-8]. However, despite its strong potential, only limited data are available with regard to provision of HIV services at community level [9, 10].

South Africa, the country with the largest HIV programme in the world, has implemented a community health programme since 2012 with the aim to improve access to and provision of high-quality primary healthcare (PHC) services [11]. South Africa's community health programme is delivered through ward-based outreach teams (WBOTs), each comprising a professional nurse that serves as team leader and up to five community health workers (CHWs) [11]. The local guidelines stipulate that the team of five CHWs should support a population of 7 660 individuals in total [11]. The services provided by the CHWs include general health education, health status monitoring, and referral of individuals in need of care to the PHC facility [11].

There is a strong programmatic focus on vulnerable populations, including individuals with chronic illnesses; HIV or tuberculosis (TB); pregnant women; as well as screening for malnutrition and gastroenteritis; and checking immunisation, vitamin A and deworming status in children. Provision of HIV services constitutes an important component in the community health programme. The CHWs contribute to HIV programme delivery through providing health education to prevent HIV infection, identifying individuals that need to test for HIV, referring HIV-infected individuals not yet in care to start antiretroviral therapy (ART), providing adherence support to those on ART, tracing and referral of HIV-infected individuals that have been lost to the ART programme, and identifying individuals who have clinically failed on ART and require further assessment [11]. Visits to HIV-infected individuals

should happen on a monthly basis while assessment of HIV risk and potential referral for testing should happen at least annually [11].

Regular assessment and monitoring of implementation performance of any health programme is essential to obtain maximum impact of its implementation and to ensure that the programme meets its intended goals [12]. The same holds true for the HIV programme as provided by CHWs. However, to the best of our knowledge there is no record of a comprehensive assessment of implementation of this programme in South Africa [13]. Studies from other countries, not addressing HIV, show that lack of such information could negatively affect programme effectiveness [2-4]. Knowledge of how and why a community health programme works, or does not work, in terms of implementation is required to optimise programme implementation before successful scale-up [1, 6, 14].

An important method to assess implementation of health programmes is to measure fidelity to the intended programme specifics. Fidelity to programme implementation is generally measured on four aspects: 'coverage' (services provided to everyone that is supposed to receive these services), 'frequency' (services provided by the prescribed frequency), 'duration' (service delivery that is uninterrupted) and 'content' (the correct services provided) [15]. In our context, this means measurement of HIV programme implementation by CHWs of these four components against the programme specification in the local government guidelines [11]. In this study we aim to measure fidelity to HIV programme implementation as provided by CHWs from the community's perspective in rural Mopani District, South Africa. We conducted a community survey to obtain insight into the current status of programme implementation and to identify areas that warrant strengthening to improve effectiveness of HIV service delivery by CHWs.

## 6.2 METHODS

### *6.2.1 Study setting and design*

The community health programme was initiated in Mopani district in 2013 and, as of mid-2016, is provided by 149 WBOTs that cover 123 of the 125 wards (98%) and 75% of registered households. [16]. All CHWs are female. A cross-sectional study was conducted from May to July 2016 in two sub-districts (Greater Giyani and Greater Letaba) of the Mopani district, Limpopo province, South Africa. Mopani district is one of the most rural districts in the country and is considered to be one of the main infrastructure intervention areas for economic transformation in South Africa [17]. There are 83 225 and 54 228 households in Greater Giyani and Greater Letaba sub-district supported by 37 and 24

WBOTs, respectively. The WBOTs in these sub-districts have operational differences such as the number of CHWs deployed, workload, and team performance.

We purposively selected the communities living in twelve wards, six per sub-district. These wards were selected as each was the single ward draining to a PHC facility (some facilities have multiple wards draining into them) and the catchment population was of similar size (+/- 45 000 individuals). Each of the twelve wards is supported by a single WBOT that has divided the ward into sections. Households in each section are supported by an individual CHW. For this study we randomly selected three of the sections in each ward (36 in total). We then randomly selected 25 households in each section by manually pinning households in Google™ Earth Pro. The Global Positioning System (GPS) coordinates of each selected household was recorded and given to the study team. We used coverage, i.e. report of a CHW household visit by the participant, as the main measure of outcome. Based on an estimated coverage of 80%, using a confidence level of 95%, and power of 80%, we calculated a sample size of 734 individuals as adequate. Assuming a response rate of 80%, a sample size of 900 was used. Ethical approval was obtained from the Human Research Ethics Committee at the University of Witwatersrand, Johannesburg, South Africa (Reference number: M1611111) as well as the Limpopo Provincial Health Research Committee.

### *6.2.2 Study procedures*

The study team visited selected households using maps and GPS tracker to find the correct location. Individuals found at home were approached to participate and screened for eligibility. Individuals had to be adult (>18 years) to participate; in the case that there were multiple people at home, the most senior individual, as culturally appropriate, was interviewed. Following written informed consent, a questionnaire was administered that included questions about the individual's demographic details, interactions with and perceptions of their CHW as well as the services received from them.

### *6.2.3 Measurement of implementation fidelity*

Implementation fidelity was assessed by measuring content, coverage, frequency, and duration in relation to the provincial guidelines that are currently in place [11]. *Coverage*, 'reach', was measured by the proportion of households that reported CHW visits ever. *Frequency* was assessed by determining the proportion of households that received CHW visits according to the required schedule (at least once a month in case of vulnerable household). *Duration* of implementation refers to the need for ongoing service delivery, i.e. no major programme interruptions; we defined duration as high in case of CHW visit <6 months ago or low for CHW visit >6 months ago. Finally, *content* was measured

by the proportion of individuals reporting HIV services delivered by CHWs that were deemed by the researchers in line with the guidelines, including HIV health education and referrals [11].

### *6.2.4 Statistical analysis*

Data were collected using structured interview guides and double-captured into a database (EpiInfo™). Validity checks were done to ensure completeness and to identify consistency and range errors. Socio-demographic characteristics of the households are described using proportions with confidence intervals and means with standard deviation. We determined factors associated with a CHW visit using univariate logistic regression. Variables with a $p$ value ≤ 0.1 on univariate logistic regression were included in the multivariate logistic regression model as well as sub-district as expected confounding variable. We included social grant in our analysis as provided by the South African government to various groups (pensioners, disabled individuals, and child support).

## 6.3 RESULTS

### *6.3.1 Description of the study population*

The study team managed to visit 99% of the households (892/900) randomly selected for this study; in the other 8 cases there was no longer a house at the location identified on the map. Participants were enrolled at 534/892 (60%) households; there was no difference in enrolment between Greater Giyani (49.6%) and Greater Letaba (50.3%) sub-districts ($p$=0.79). At the non-included households (358), there was nobody at home in 275 (31%) cases or only a child at home (16; 1.8%). Participation was declined at 47 households (5.3%) for other reasons **(Figure 6.1)**. The majority of participants was female (410/534; 77%) and median age was 46 years (range 18-96) **(Table 6.1)**. Social grants were the main source of income reported by participants in both sub-districts, 52% (137/265) and 43% (117/269) in Greater Giyani and Greater Letaba respectively ($p$=0.028).

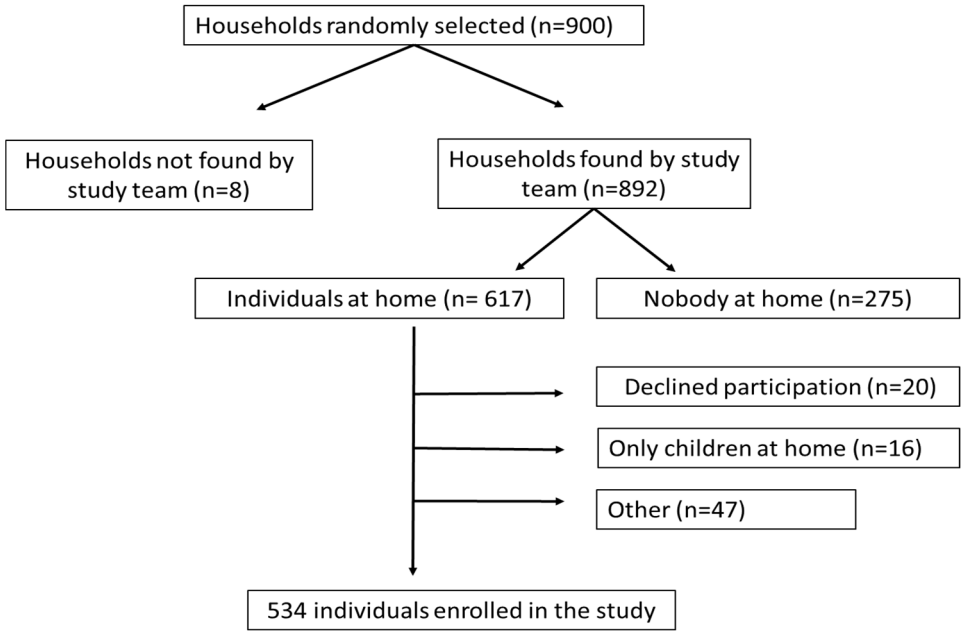



**Figure 6.1: Participant enrolment in study**

**Table 6.1: Characteristics of the study population (n=534)**

| Variable | | Greater Giyani (N=265) | Greater Letaba (N=269) | Total |
|---|---|---|---|---|
| Gender | Male | 61 (23%) | 63 (23%) | 124 |
| | Female | 204 (77%) | 206 (77%) | 410 |
| Source of income | Formal employment | 63 (24%) | 92 (34%) | 155 |
| | Informal work | 56 (21%) | 58 (22%) | 114 |
| | Social grants | 137 (52%) | 117 (43%) | 254 |
| | Other | 9 (3%) | 2 (1%) | 11 |
| Primary member in the household that takes of the children | Mother | 77 (29%) | 79 (29%) | 156 |
| | Father | 76 (29%) | 74 (28%) | 150 |
| | Grandmother | 50 (19%) | 60 (22%) | 110 |
| | Other | 62 (23%) | 56 (21%) | 118 |
| Age of participants (years) | 18-34 | 88 (33%) | 90 (34%) | 178 |
| | 35-59 | 90 (34%) | 119(44%) | 209 |
| | ≥60 | 87 (33%) | 60 (22%) | 147 |
| [#]Median number of individuals living in household | | 5 (0-10) | 6 (0-10) | 5.5 |
| [#]Median distance from participant's house to the clinic (km) | | 1.4 (0-13) | 1.6 (0-11) | 1.5 |

[#]Numbers presented in median (range).

### *6.3.2 Implementation fidelity: measurement of coverage, frequency, and duration*

In terms of coverage, participants from 253/534 (47%) households reported to have ever been visited by a CHW **(Table 6.2)**, of which 100% (253/253) were visited in the last 6 months. A CHW visit was more often reported in Greater Giyani (55%) than in Greater Letaba (45%) sub-district (OR=1.6; 95% CI 1.14-2.27; *p*=0.007). This is possibly due to the fact that there are 54 and 36 CHWs deployed on Greater Giyani and Greater Letaba, respectively, and that Greater Giyani has better organisational structures. Individuals 60 years and older were more likely to be visited by a CHW as compared to individuals 18 to 34 years of age (OR=1.7; 95% CI 1.08-2.77; *p*=0.022. There was no association of reporting a CHW visit with distance between household and nearest facility (1.4 km for visited vs. 1.6 km for not visited; *p*=0.93). We plotted households on the map by status of CHW visit reported, and did not observe any obvious patterns or clusters that could indicate other geographic factors. Most participants who reported a CHW visit were happy with such visit (192/253; 76%) whereas a large proportion of participants not visited by a CHW would have liked such a visit (206/278; 74%). Participants who had been visited by a CHW were more likely to know their HIV status (238/253; 94%) compared to those not visited (245/278; 88%) (OR=2.0; 95% CI 1.06-3.8; *p*=0.032); there was no statistically significant difference between whether or not a household was visited and gender (OR=1.4; 95% CI 0.92-2.08; *p*=0.118).

In terms of frequency, 39% (99/253) of participants overall reported that the CHW visit had occurred in the previous month as per provincial guideline. However, frequency of a CHW visit in the previous month was 47% (66/140) in Greater Giyani and only 29% (33/112) in Greater Letaba district (*p*=0.007). There was no association of any demographic factors with frequency. In terms of duration of HIV programme implementation, all participants who had been visited by a CHW (253/253; 100%) reported high duration in both sub-districts (last visit <6 months ago).

**Table 6.2: Univariate and multivariate analysis of factors associated with participant reporting CHW visit**

| Variable | | Visited by CHW | Not visited by CHW | Unadjusted OR (95% CI) | P-value | Adjusted OR (95% CI) | P-value |
|---|---|---|---|---|---|---|---|
| Number | | 253 (48%) | 278 (52%) | | | | |
| Sub-district | Giyani | 141 (55%) | 122 (44%) | **1.7 (1.14-2.27)** | **0.007** | **1.6 (1.14 – 2.27)** | **0.007** |
| | Letaba | 112 (45%) | 156 (56%) | Ref | Ref | Ref | Ref |
| Distance to clinic (km) | | 1.4 (0-13) | 1.6 (0-11) | 0.95 (0.94 - 1.05) | 0.934 | - | - |
| Gender | Male | 51 (20%) | 72 (26%) | Ref | Ref | - | - |
| | Female | 202 (80%) | 206 (74%) | 1.4 (0.92-2.08) | 0.118 | - | - |
| Age-group (years) | 18-34 years | 75 (30%) | 100 (36%) | Ref | Ref | Ref | Ref |
| | 35-59 years | 95 (37%) | 114 (41%) | 1.1 (0.74-1.67) | 0.610 | 1.2 (0.76-1.76) | 0.503 |
| | ≥60 years | 83 (33%) | 64 (23%) | **1.7 (1.11-2.69)** | **0.015** | **1.7 (1.08-2.77)** | **0.022** |
| Source of income | Formal | 70 (28%) | 83(30%) | Ref | Ref | - | - |
| | Informal | 49 (19%) | 65 (23%) | 0.9 (0.52-1.41) | 0.546 | - | - |
| | Grants | 129 (51%) | 124 (45%) | 1.2 (0.82-1.87) | 0.313 | - | - |
| Participant knowledge of HIV | Yes | 229 (91%) | 231 (83%) | **2.1 (1.08-3.90)** | **0.029** | **2.0 (1.06-3.8)** | **0.032** |
| | No | 15 (6%) | 31 (11%) | Ref | Ref | Ref | Ref - |
| | Unknown | 9 (4%) | 15 (5%) | - | - | - | - |

*Participants that refused to answer whether they had been visited by a CHW or not were omitted from the analysis (n=3). Statistically significant factors in bold. Abbreviations. CHW, community health workers; OR, odds ratio; CI, confidence interval.

### *6.3.3 Implementation fidelity: measurement of content*

Ninety-six percent (242/253) of participants visited by a CHW had discussed any type of health issue during the last visit: 67% (170/253) reported having discussed HIV with the CHW, 66% (167/253) TB, 74% (187/253) chronic illnesses other than HIV, 11% (28/253) pregnancy, and 55% (139/253) other health-related issues. Most participants, 89% (225/253), were satisfied with the content of services rendered by the CHW.

Participants were twice as likely to know their HIV status if HIV had been discussed with them by the CHW compared to those with whom HIV was not discussed (OR=2.2; 95% CI 1.02-4.60; *p*=0.044). Females were twice as likely to know their HIV status as compared to men (OR=2.9; 95% CI 1.5-5.4;

*p*=0.001). There was no association for women of knowing their HIV status and having discussed HIV with CHWs (OR=1.5; 95% CI 0.6-3.5; *p*=0.401); for men there was a positive trend (OR= 4.2; 95% CI 0.9-19.1; *p*=0.066). In terms of referring participants for further screening or treatment, 20% (51/253) of participants reported that a CHW had referred the participant or another household member to the nearest facility during the last visit for HIV testing (23/51; 45%), TB screening (7/51; 14%) or an assessment of other chronic illnesses (20/51; 39%) and pregnancy testing (1/51; 1%). Of these referrals, 88% (45/51) reported to have visited the clinic for healthcare.

## 6.4 DISCUSSION

This is the first study to measure fidelity of implementation of the HIV programme as provided by CHWs in rural South Africa. We are not aware of any other HIV programme with fidelity data from similar settings to provide a comparison to our observations. However, when compared to other South African and global studies measuring CHW chronic disease services other than HIV, we observed similar findings with regard to duration and content, and similarly found that coverage and frequency should be improved [18-20].

In terms of coverage and frequency, we measured a 47% coverage of households from which the participant reported a CHW visit at any point in time, despite the policy that all households ought to be visited on an annual basis to assess vulnerability status. This is lower than reported by studies of chronic diseases that showed coverage in the range of 57% to 74% [19, 20], but good compared to a systematic review of 38 studies that reported 18% coverage for community health programmes overall [18]. In addition, frequency of visits was relatively low at 39%, but this was similar to other studies [18]. Increasing coverage and frequency of CHW visits could directly impact on the HIV programme as participants who had been visited by CHWs were more likely to have discussed HIV and know their HIV status than those that had not been seen by a CHW. Various factors may have impacted on coverage and frequency in our area. First, operational factors may play a role: coverage was higher in Greater Giyani sub-district where in our opinion the programme stronger managed and where there are on average more CHWs employed in each community than in Greater Letaba (resulting in lower number of households covered by each CHW). Second, an important factor to consider is the capacity of an individual CHW to visit all allocated households in the section within the set timeframe. It is possible that in our rural area, the target number of 270 households, which in practice becomes 250-400 households, is too large to cover within the specific programme deliverables. Reduction of the number of households allocated to each CHW by increasing the number of CHWs per ward should be considered to improve coverage [11]. Third, geographic factors such as houses located in rocky and

mountainous areas may impact on accessibility of houses to CHWs. In addition, challenging terrain would likely take the CHW more time to reach a household, limiting the number of households that can be visited during a day. Although an effect cannot be ruled out, we did not observe any obvious patterns or clusters when looking at households reporting visits compared to those not visited. Distance between the household and nearest PHC facility was not associated with the report of a CHW visit as most houses were within walking distance to the facility. Despite the need to improve coverage and frequency, we observed high appreciation of CHW visits by the community; most participants were happy with the CHW visits and services provided, whereas most of those that had not been visited by the CHW would really appreciate a visit. We did not observe a difference between male and female respondents with regards to interest in and appreciation of CHW visits. This contradicts findings from another report from Pakistan that suggests that men are unwilling to interact with the female CHWs [21].

In terms of duration and content, we measured high duration (100%) of programme implementation among those visited by the CHWs as compared 39% reported the aforementioned systematic review of 38 studies [18]. This suggests that services are relatively continuous and uninterrupted once there is a structural relationship between household members and CHWs. In addition, the content of service provision for HIV was 67% and no major gaps were identified. This is good when compared to a systematic review of 38 studies that reported content provision of chronic diseases services in the range of 40% to 66% [18, 19]. This indirectly shows the impact of the intensive CHW training programme (phase one and phase two of the national curriculum) that was conducted in Mopani District [11]. Participants with whom HIV was discussed were more likely to know their HIV status suggesting a direct link between CHW activities and HIV programme performance. We did not distinguish between HIV-infected and HIV-uninfected participants. However, HIV should be discussed with all household members.

This study shows that despite limited resources, there is a reasonably good implementation of HIV programme activities by CHWs in our rural South African district. Although coverage and frequency should be improved, there is good content and duration of service provision to those that are reached by the CHWs. This supports the high promise of CHW implementation of the HIV programme on a structural basis. Resource investment in the CHW programme, through increasing the number of CHWs and strengthening operational structures, may have to be expanded to achieve the programme's full potential and effectiveness, the sub-district with the lower resources also scored lower in implementation fidelity. These findings are consistent with other studies showing that

adequate staffing, resource provision, and a human resource management approach are imperative for successful implementation of community-based programmes [22, 23]. In light of this, the use of human resource strategies such as clarification of roles, job satisfaction, and adequate remuneration should be considered to improve the South African CBHP. Although operational determinants may play a role, other factors that contribute to the programme success or provide a barrier to successful coverage and frequency need to be determined within a local context, in order to further improve implementation fidelity. Moreover, alternate strategies should be considered to reach the large proportion of households where we found no one at home, such as worksite wellness and local media initiatives [24].

This study has several limitations. Firstly, several types of bias may have occurred including recall and desirability bias. Selection bias may have also occurred as there was nobody at home at a substantial proportion of households. Possibly, these represent higher socio-economic group as they may be at work during the day. Although we recruited more women than men, there was no difference in their response. The response rate could have possibly been increased by visiting households multiple times instead of once. However, this was not feasible for operational reasons. Secondly, we have measured implementation fidelity from the community's (recipient) perspective. Triangulation of our findings with similar measurement from the CHW's perspective could have strengthened our findings, but resources did not permit this. We did not allocate a health vulnerability status to the households included in this study, which would have allowed for a more precise assessment of some components of implementation fidelity. This was due to the fact that household registration data, including vulnerability status, were not available through the CHWs at the time of study and could not be reliably collected as part of the questionnaire. For operational purpose, we collected data on CHW visits within the last 6 months as opposed to the recommended 12 months, which may have resulted in an underestimation of frequency. Finally, a time component was not included in the question where individuals were asked if they knew their HIV status.

## 6.5 CONCLUSIONS

In conclusion, this study shows that implementation fidelity of the HIV programme as provided by CHWs in a rural South Africa district is similar to other CHW programmes that report on chronic illnesses, other than HIV. There is room for improvement, in particular of coverage and resource investment is required to increase frequency of household visits. While this study informs policy makers on specific programme areas to improve this CBHP, further quantitative and qualitative

research in similar contexts is required to further gauge barriers and facilitators to the fidelity of CBHP implementation.

## 6.6 ETHICS APPROVAL AND CONSENT TO PARTICIPATE

Written informed consent was obtained from all study participants. Ethical approval was obtained from the Human Research Ethics Committee at the University of Witwatersrand, Johannesburg, South Africa (Reference number: M1611111) as well as the Limpopo Provincial Health Research Committee.

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# CHAPTER 7

## QUALITATIVE ASSESSMENT OF FACILITATORS AND BARRIERS TO HIV PROGRAMME IMPLEMENTATION BY COMMUNITY HEALTH WORKERS IN MOPANI DISTRICT, SOUTH AFRICA

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# CHAPTER 7: QUALITATIVE ASSESSMENT OF FACILITATORS AND BARRIERS TO HIV PROGRAMME IMPLEMENTATION BY COMMUNITY HEALTH WORKERS IN MOPANI DISTRICT, SOUTH AFRICA

## 7.1 BACKGROUND

Community health programmes can improve public healthcare delivery, particularly in underserved settings [1]. There is a large body of evidence that suggests that community health programmes can improve access to healthcare in the communities that they serve [2-4]. Several low-and-middle income countries (LMICs) including Brazil, Ethiopia, Bangladesh, Malawi and Nepal have successfully implemented community programmes with community health workers (CHWs) at scale [5]. These countries have shown substantial gain in their maternal and child health and malaria programmes [5]. There is to our knowledge, limited information available regarding the provision of Human Immunodeficiency Virus (HIV) services at a community level.

South Africa has included a community health programme in its primary healthcare (PHC) re-engineering strategy, which was introduced by the National Department of Health (NDoH) in 2012 [6]. This community health programme is delivered by ward-based outreach teams (WBOTs) led by a team leader, who is usually a professional nurse. Each team consists of up to six CHWs, and is allocated 250 to 400 households to support [7]. CHWs play an integral role in promoting good health and preventing ill health by improving access to quality care at the community level. Provision of community HIV services comprise an important component of this programme. As such, they function as a crucial link between community members and the PHC system [5].

CHWs contribute to the HIV programme in South Africa by: 1) provision of information to educate individuals on how to prevent transmission of HIV infection; 2) identification of individuals at risk for HIV infection that should be tested for HIV; 3) provision of adherence support and tracing individuals with missed appointments and defaulters to improve retention in care; and 4) early identification of individuals with deteriorating health while on antiretroviral therapy (ART) to reduce further morbidity and mortality [8].

We recently assessed the fidelity of the CBHP as implemented by the CHWs in Limpopo province, South Africa. The findings show that there is good reach of the programme as well as appreciation from the community which they serve. However, we also showed that there was room for improvement to enhance impact of the programme. Community programmes interface with health

systems and community systems, which require optimal integration on various levels. These relationships are complex and context-specific. Given this dynamic context, barriers and challenges to implementation may arise at different levels of healthcare delivery [9]. We therefore aimed to explore and better understand the facilitators and barriers that affect the CBHP implementation.

To our knowledge, there has been no formal exploratory assessment of the CBHP in Limpopo Province, South Africa. The aim of this study was to explore barriers and facilitators to the successful implementation of the CBHP to produce actionable findings to improve the programme.

## 7.2 METHODS

### *7.2.1 Study setting*

The study was conducted in the Greater Giyani and Greater Letaba sub-districts of Mopani District, Limpopo province, South Africa from January 2016 through August 2016. The communities in these sub-districts were similar in terms of socio-economic factors, but small local differences in ethnicity, cultural beliefs, and health practices are present. The CBHP was introduced and rolled-out from 2013. As of mid-year 2016, there were 149 active WBOTs covering 123 of the 125 (98%) wards in the districts. These support 222 261 registered households (75%) out of 296 321 households in the district [10]. The CHWs are employed by the NDoH, but are remunerated and managed by non-profit organisations (NPOs). A South African non-government organisation (NGO), Anova Health Institute provides technical support to the HIV programme in Mopani district, Limpopo.

### *7.2.2 Study design and participants*

We conducted an exploratory study to determine the facilitators and barriers to implementation of the CBHP. We used a comprehensive approach which entailed interviewing various stakeholders to obtain an all-inclusive viewpoint. This study was a part of a larger study conducted in twelve wards with a similar size catchment population, each served by one WBOT. The study sample includes a convenient sample (depending on availability of individuals at the time of three attempted visits) of community members, CHWs, team leaders, facility staff, community leaders, and social workers that reside in the twelve wards **(Table 7.1)**. Individuals had to be adult (>18 years) to participate in the study and informed consent was obtained before conducting the interviews. Interviews were conducted by research staff, who had not been involved in programme implementation, as follows: 38 with community members, 9 with team leaders, 21 with community leaders, and 10 with social workers. Focus group discussions (FGDs) were conducted as follows: 11 with CHWs and 12 with facility nurses. This was sufficient to reach saturation based on the responses received. The private interviews were conducted and audio recorded in the participant's home language (Tsonga or Sotho). The audio

recorded interviews were translated into English and back-translated to ensure accuracy and consistency. This was done before data analysis by the research staff who were fluent in the relevant languages.

**Table 7.1: Summary of study participants**

| Target group approached to participate | Inclusion criteria | Interview type |
|---|---|---|
| Community | Household members aged 18 years and older | In-depth interviews |
| CHWs | The CHWs that provide health services to the community in the 12 wards | Focus group discussions |
| Facility nurses | Facility nurses that are employed in the 12 wards | Focus group discussions |
| CHW team leaders | Team leaders of the CHWs in the 12 wards | In-depth interviews |
| Social workers | Social workers that provide services and support to the community in the 12 wards | In-depth interviews |
| Community leaders | Community leaders in the 12 wards | In-depth interviews |

### *7.2.3 Ethical approval*

Written informed consent was obtained from all study participants. Ethical approval was obtained from the Human Research Ethics Committee at the University of Witwatersrand, Johannesburg, South Africa (Reference number: M1611111) as well as the Limpopo Provincial Health Research Committee.

## 7.3 DATA ANALYSIS

The interviews were transcribed and imported into NVivo qualitative data analysis software [11]. Thematic analysis was used to analyse the data from the participant interviews and FGDs. Two of the authors (NN and GAJ) inductively generated codes, sub-codes, and broader themes. Inter-rater reliability was ensured through the continuous comparing of codes between the coders. In the final stages of inductive coding, the number of codes and themes were further re-arranged and reduced to formulate the final themes. Following thematic content analysis, based on the final themes reported by participants in this study, we identified the Consolidated Framework for Implementation Research (CFIR) as the most suitable model to provide a theoretical basis to interpret the findings. The CFIR is a

conceptual framework developed to guide the systematic assessment of different implementation contexts to identify key factors that may influence the implementation and effectiveness of a given intervention [12]. The CFIR consists of five major domains that may affect implementation including: 1) intervention characteristics; 2) outer setting; 3) inner setting; 4) characteristics of individuals; and 5) the implementation process **(Figure 7.1)**. Definitions of the five domains are further detailed in the results section. Within each domain we assessed key factors or constructs of the intervention that influence implementation [12].

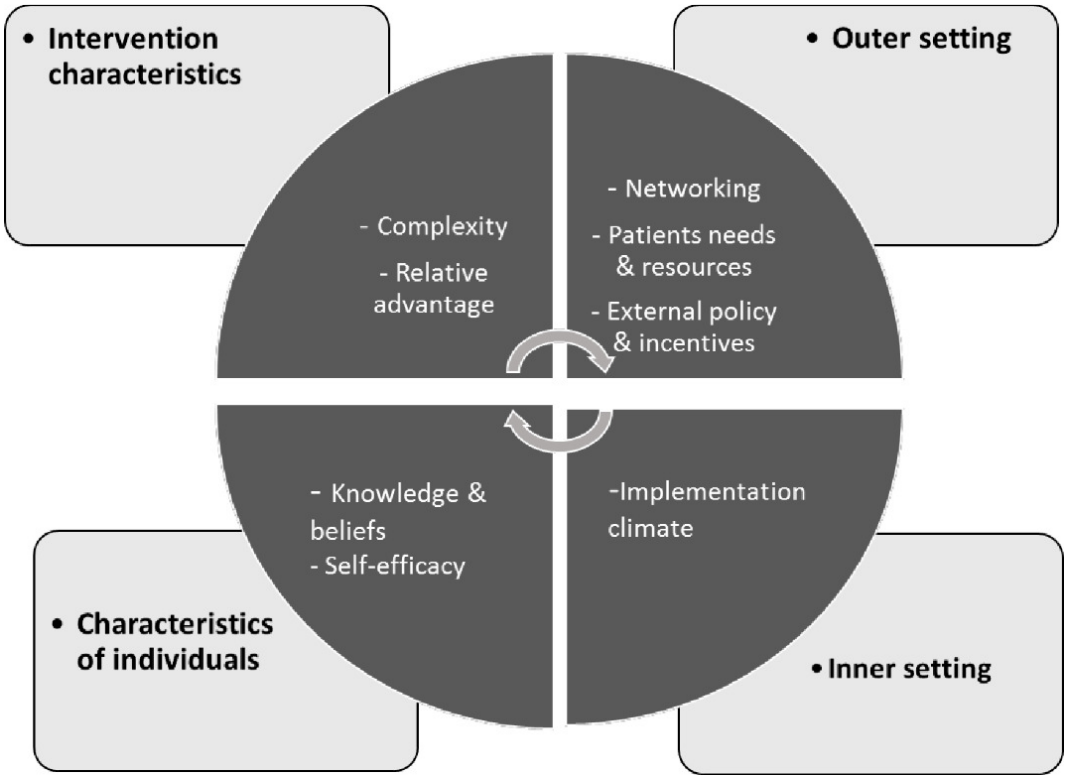



**Figure 7.1: Consolidated Framework for Implementation Research (CFIR) – Adapted from Damschroder et al. [12]**

## 7.4 RESULTS

Findings show that the CBHP was well received and there was an appreciation of the services provided by the CHWs. The CHWs reported to be very self-motivated and had adequate knowledge to impart to the community. This served as a facilitator to programme implementation. However, as with any intervention, barriers do exist which constrain programme implementation. The five CFIR domains and constructs of the CBHP are discussed below, detailing the way in which factors facilitate or constrain them and thus the implementation of the programme **(Table 7.2)**.

### *7.4.1 The intervention characteristics*

Intervention characteristics refer to the features of the intervention, and includes the constructs complexity and relative advantage in the CFIR [12].

Complexity is defined as the perceived difficulty of implementation of the programme by its implementers [13, 14]. An important factor related to the complexity of implementing the programme was the highly varying needs of individual patients. While some patients only require brief visits to ensure they are managing their ART adherence appropriately, others require significant amounts of assistance due to their poor states of health. This sometimes resulted in CHWs spending a large amount of time at each household, and being unable to achieve their daily targets. Another factor affecting intervention complexity is the large number of individuals to be visited by the CHWs and the limited number of CHWs deployed in the community, which also results in CHWs being unable to achieve their daily targets.

> *"Sometimes we find out that a person is staying alone we are able to clean for him/her and we even make soft porridge for the person to eat. Sometimes we are able to wash their clothes so that they can be clean."* [CHW 1]

> *"Our work is too much. I sometimes tell myself that today I should cover more households as possible. The NGO coordinator does not mind to phone you when you are at work and ask you to attend to a patient far from where you are currently working.*" [CHW 2]

Relative advantage refers to the stakeholders perception of the advantage of implementing the intervention versus an alternate intervention or no intervention [15]. Overall community members appeared to value the services and were open to the services provided by the CHWs. Individuals expressed the relative advantage of the programme on an individual, community, and facility level, based on their interactions with the CHWs. On an individual level a clear advantage of the programme discussed by the community members was the direct assistance provided to them by CHWs, such as education on health-related issues, reminding individuals to collect their medication and performing chores for sick individuals such as cooking, cleaning, and fetching water.

> *"They do their job very well. They help us with lot of things even things that we thought they are not possible to happen."* [Community member 1]

> *"We really appreciate their work. People talk positive about the work of CHWs."* [Community member 2]

Community members also felt comfortable enough to disclose medical information, including their HIV status with them. This makes it easier for CHWs to refer patients to their nearest facility for testing and treatment.

> *"What I like about visiting households, you find that a person is sick and he or she is scared to tell her family but when we get there the person is able to disclose to us."* [CHW 3]

CHWs perceived their activities as beneficial to the community and this served as a means of motivation for them to remain in the programme, despite challenges.

> *"We do have something rewarding, because when we find someone sick we are able to refer the person to the clinic, so he or she can receive suitable treatment."* [CHW 4]

CHWs also reported that community members are receptive to health education about HIV and other chronic illnesses such as diabetes and hypertension.

> *"Some people don't know their HIV status, when we are teaching we advise them to go to the clinic to test, because we don't carry anything to test. We see it significant because when we done teaching they go to the clinic to test."* [CHW 5]

> *"People see how important we are in the community, because we teach them about HIV and AIDS. We tell them that HIV does not kill. We advise them that when they test positive they should also check their CD4count so that if it is too low they can take treatment."* [CHW 6]

On the community level, most community members interviewed were of the opinion that the programme has a positive impact on the community.

> *"They have a good relationship with us, because they remind us with lot of things and they teach us things that we don't know. Even on things that we don't know that's why I say they are good people."* [Community member 3]

In addition, community leaders mostly expressed their gratitude for the contribution that CHWs make in the community, especially in the identification of at-risk individuals for HIV testing and adherence support. They appeared to be very supportive of CHWs and the services they provide.

> *"Yes they are useful because if we can look back people used to die a lot because no one knew that they were sick, and death would occur at any time. Since they have been working in the community we are experiencing less death. Death does not occur like it used to in the beginning."* [Community leader 1]

At a facility level, facility nurses and CHWs reported that the introduction of the community programme into PHC reengineering has improved workload at the facilities as a number of patients are being attended to at their homes. In contrast, the relative advantage of the community programme with CHWs was not universally accepted within the target communities, and CHWs noted that some community members refused to engage with them.

> *"Some when they open their door they say if I knew it was you I wouldn't have open the door. We are hoping that one day they will understand our significance. Hoping they will see that we are here to help them."* [CHW 7]

### *7.4.2 The outer setting*

The outer setting in the CFIR framework includes the economic, political, and social context within which a particular intervention is implemented [16]. In the context of this programme as implemented by CHWs, this refers to both formal and informal networks of support. In this regard we assessed the constructs networking, patient needs and resources, as well as external policies and incentives of the CFIR framework.

Networking is defined as the degree to which the implementers of the intervention in an organisation are acquainted with other external organisations [14]. Formal networks of support from the NDoH (the employer), NGOs, operational managers (OPMs) and social workers were reported to be limited. On a positive note, the CHWs more informal networks such as the community (the recipients) and community leaders largely played a role in supporting implementation of the programme.

> *"We want the NGO and the department of health to support us on our work. We would like the NGO to come to our campaigns with food and other things."* [CHW 8]

> *"PHC officers or OPMs at the clinic. They should not just buy in, they should buy in by supporting us and they should be involved in activities. There is no buy in. This program supports many different government departments, for example CHWs refer patients to social workers. Social workers when they are referred cases they do not do home visit to follow up because they have transport problem."* [Team leader 1]

Patient needs and resources refers to the extent to which patient needs, as well as barriers and facilitators to meet those needs, are accurately known and prioritised by the implementers [17]. A few factors were noted to pose as barriers meeting patient's needs. Denial and fear of stigma were among the most salient factors that emerged. As mentioned, community members mostly reported that they are being provided with health education and referrals to facilities for ART initiation and

retention in care. However, patient's denial of their HIV status, fear of stigma, and religious beliefs results in their avoidance of healthcare and support which renders CHWs referrals null and void. Patients sometimes also provide incorrect contact information at the clinic which makes it difficult for CHWs to locate them during defaulter tracing.

> *"Another challenge we have is people who are HIV positive, when we advise them to use condoms they refuse. They have unprotected sex. I don't understand why they continue, maybe it's because they are in denial."* [CHW 9]

> *"We find it difficult to get list of defaulters. In the area I work I had a case of someone who wrote wrong address and wrong age when registering a file. We found out later after looking for her that she lied."* [CHW 10]

Poverty also emerged as a critical barrier. The very limited resources available to some patients meant that CHWs were unable to provide the level of care necessary to help patients recover or manage their illnesses appropriately. Examples of this include the lack of money for transport for patients to access facilities as well as deteriorating health of patients which pose barriers to patients accessing care and collecting their medication. Some community members do not have food to take with their medication. CHWs reported that they therefore distribute medication to patients at their households if patients are unable to visit their nearest facility.

> *"There are some people who fail to go the clinic due to not having money for transport. Some become defaulters because of not having money for transport."* [CHW 11]

> *"Another challenge you find that a person stays alone and he uses a wheelchair. When the person has to come for treatment he has to find someone who can push him to the clinic."* [CHW 12]

> *"The most challenging thing we visit households that are poor and they do not have food to eat in order to take treatment. The reason people become weak is the result of taking pills without eating first, this is likely to create other sicknesses."* [CHW 13]

External policies and incentives encompass external strategies to spread interventions, including policy and regulations , external mandates, recommendations and guidelines, pay-for-performance, collaborative efforts, and public or benchmark reporting [18]. Guidelines are available which detail CHW activities and roles. However, there were several suggestions from WBOT team leaders for WBOTs to be formalised by integrating them fully into the NDoH. This is an important challenge and was linked to a high degree of uncertainty surrounding the roles of CHWs and their reporting

structures. Many CHWs appear to be undertaking roles that are not in their line of duty such as cooking and fetching water for community members.

> *"In situations that we have to cook for a person in order to take treatment, it can make us not to reach the targeted number of households that we need to visit for that day. Sometimes we try to sacrifice but we fail."* [CHW 14]

In addition, WBOT team leaders are professional nurses employed by the NDoH, which poses further challenges in terms of their workloads and reporting structures.

> *"We are currently working for an NPO and PHC re-engineering program. Every month end they both require a report. We combine our work and submit our work to both programs. I think we need to know who we basically working for."* [CHW 15]

> *"Truly speaking the workload is too much. At the beginning I tried to balance two local areas and I realised that it is too much for me. I had to leave one and concentrate on the other."* [Team leader 2]

In terms of incentives, there were also shared opinions by the CHWs, their team leaders, and community leaders that CHWs should be given increased stipends. The minimal stipends result in CHWs feeling demotivated to perform their duties. While the low stipends were viewed as problematic, CHWs reported finding their work satisfying due to the positive impacts they were able to make within their communities.

> *"The first thing is the stipend, I am not saying this means that they have raised complaints with us, it's not a matter of complaints but we know how much they get from the programme. At least that money should be increased in order to motivate them."* [Community leader 2]

### *7.4.3 Inner setting*

The inner setting in the CFIR framework relates to the structural characteristics and culture of the environment that may influence implementation [12]. The key CFIR construct relevant to inner setting in our study was the implementation climate. Implementation climate refers to the absorptive capacity for change, shared receptivity of involved individuals to an intervention [14], and the extent to which use of that intervention will be rewarded, supported, and expected within their organisation [19]. In light of this we assessed the sub-constructs compatibility and readiness for implementation of CFIR framework.

Compatibility refers to the degree of fit between the value attached to the intervention and the norms and perceived risks of individuals, as well as existing workflows and systems [12]. CHWs reported that they were not always welcomed by community members, and as a result sometimes struggled to perform household visits and were put in danger in terms of health and physical safety.

> *"Some of the households that we used to visit they would chase us and even swear at us that we must go away."* [CHW 16]

> *"We are challenged because we do not have things to protect us from infection when we visit households, things such as masks. There are houses that we need to help but we find it difficult because we do not have a kit to protect ourselves, we do not have hand gloves and aprons to use when assisting patients."* [CHW 17]

In terms of the programme fitting in with existing workflows and systems, a positive finding was that most CHWs reported that processes for defaulter tracing were clear and functional.

> *"It is not a problem to get list of defaulters, data captures or nurses they give us the list, then we start working. We always get the list on time."* [CHW 18]

A prominent challenge with regard to the CHWs integrating with existing workflows, is the insufficient involvement of social workers in the community and referrals to social workers not being dealt with. Social worker's roles may also may require clarification in the community as some community members were reported to expect the social workers to assist with health-related issues.

> *"I think the social workers should attend community meetings in order to speak to the community about their job roles. A lot of people don't know where to report their problems but if the social workers address them they would be able to go the social workers. When we fail to help people they end up not trusting us."* [CHW 19]

> *"People in this community come to me as a social worker and they are expecting me to visit them in their households but I am not trained to deal with an ill person and I don't even know where I should start."* [Social worker 1]

Readiness for implementation refers to leadership engagement. This consists of the commitment, involvement and accountability of leaders and managers, available resources, and access to information and knowledge [12]. Several factors were prominent in affecting readiness for implementation. Firstly, CHWs and team leaders expressed their desire for more involvement from their superiors and a stronger support system. Secondly, in terms of available resources and access to

information and knowledge, CHWs are grateful for the equipment (blood pressure machines and weight scales) and training received. However, other resources such as stationery and telephones are relatively limited and there is a need for the programme to be better supported and resourced in its entirety. Thirdly, CHWs expressed the desire for ongoing training from team leaders and NGOs in order to keep abreast with current HIV-related knowledge. Finally, there was also a consensus around the need for more space for the CBHP to operate from as the infrastructure within the facilities where CHWs work are limited.

> *"This thing of giving us BPs test it seems like you have done a great job. Because now they know that we have BP test and weight scales. It seems like they like it because when we pass they call us to come and test them even those who were not interested. It seems like it is a job well done."* [CHW 20]

> *"We don't have resources and sometimes we have to contribute money to buy stationery in order for us to be able to do the work. There is no stationery, no transport, no funds available, and even the mode of communication is so difficult because we don't have anything. We are just sacrificing our own to render the services to our community."* [CHW 21]

> *"Our infrastructure is very small, there is no office space for them, and we just put them next to the sluice room which is not conducive. Even when we are holding the meetings we use the postnatal, what will happen when we have deliveries? There is no place where we can place them."* [Facility nurse 1]

### *7.4.4 Characteristics of individuals*

Organisations are composed of individuals (implementers) that are responsible for and thus influence implementation of an intervention [13]. We examined the constructs knowledge and beliefs and self-efficacy of the CFIR framework.

Knowledge and beliefs refer to individual's (implementer's) attitudes toward and value placed on the intervention, as well as familiarity with facts, truths, and principles related to the intervention [20]. Most CHWs seemed highly motivated by their work as it is has a large impact on the health of the community which they serve.

> *"We do have something rewarding, because when we find someone sick we are able to refer the person to the clinic, so he or she can receive suitable treatment."* [CHW 22]

The CHWs also serve as a means of monitoring the health of the community they serve, and as a result they have a wealth of knowledge regarding the number of vulnerable patients in the community and

their health needs. CHWs report to have adequate knowledge and skills to conduct their HIV-related work.

> *"What I can say in relation to experiences is that by the time we started working with the CHW's they are able to manage our chronic clients and bedridden clients at home. Before they started doing this it was so difficult for us because they are the ones who are identifying problems."* [Facility nurse 2]

Self-efficacy refers to implementer's belief in their own capabilities to execute courses of action to achieve implementation goals [21]. We assessed CHWs belief in their own capabilities to conduct the implementation processes within their context. They found the initial trainings useful but also expressed the desire for additional training and new knowledge.

> *"After the trainings that we got we knew and understood what we are supposed to do when we visit households. It equipped us with enough information on how to work with people who are sick. The training really helped us."* [CHW 23]

### *7.4.5 Implementation process*

The implementation process in the CFIR framework requires individual and organisational use of the intervention as prescribed. Individuals such as the implementers play a role in promoting the intervention and this may be influenced by the inner and outer setting [16]. In addition, activities to involve the organisational use of the intervention require involving relevant stakeholders to ensure optimal organisational change. In this light we assessed the construct engaging of the CFIR framework. Engaging involves attracting and involving appropriate individuals in the implementation and use of the intervention through a combined strategy of social marketing, education, role modelling, training, and other similar activities [22]. An important area in which engaging played a role within the programme was the behaviour of patients in defaulting treatment taking. The CHWs express the importance of relationship building in order to try to mitigate these challenges.

> *"Another thing is to be close with them and talk about the importance of taking treatment, while talking to them they will tell us the reason why they do not go to the clinic and take their treatment. When we have spoken to them they will be able to come to the clinic and take their treatment in order to continue."* [CHW 24]

With regard to initiatives undertaken, it was reported that several campaigns and trainings were held with champions who drive the implementation, including CHWs and team leaders. Campaigns were also held with community members. External change agents were engaged during the implementation

process for buy-in and support. These include individuals affiliated with an outside organisation that support the intervention such as NGOs and NPOs. Individuals who have a great influence on the outcome of the intervention such as community leaders and traditional healers were also engaged. Traditional healers seem to have a substantial influence of healthcare preferences of some community members, and some participants indicated that they would rather go to their traditional healers for healthcare and medical advice as opposed to the local clinic.

> *"There are people who are sick who only go to traditional healers. This people think that they need ancestral ceremony they will be healed. People like this do not even come to the clinic."* [CHW 25]

Some traditional healers are knowledgeable about the importance of primary healthcare and acknowledged the CHWs and the services they provide, while others pose a challenge to the programme as they negatively influence the health-seeking behaviour of the community, making ongoing engagement by CHWs an essential component of the success of programme implementation.

> *"I wanted to add on traditional healers, the traditional healers that we have in the community they are educated; it is only the new traditional healers that are not educated. The traditional healers that are not educated maybe they are the ones who can cause problems."* [CHW 26]

**Table 7.2: Summary of CFIR domains, constructs, definitions and determining factors identified in this study**

| Domain | Construct *(Sub-construct)* | Definition | Factors affecting construct |
|---|---|---|---|
| **1. Intervention characteristics** | **Complexity** | Perceived difficulty of implementation reflected by duration, scope, radicalness, disruptiveness, centrality and intricacy and number of steps required to implement | Number of services required per patient |
| | | | Number of households to be visited |
| | | | Number of CHWs deployed in the community |
| **2. Outer setting** | **Networking** | The degree to which an organisation is networked with other external organisations | Formal: Lack of support from NGOs, NPOs, NDoH, OPMs and social workers |
| | | | Informal: Support or lack thereof from community, community leaders, and traditional healers |
| | | | Inadequate integration of HIV programme into the facilities |
| | **Patient needs and resources** | The extent to which patient needs, as well as barriers and facilitators to meet those needs, are accurately known and prioritised by the organisation | Denial and fear of stigma |
| | | | Poverty |
| | **External policy and incentives** | Broad constructs that encompass external strategies to spread interventions, including policy and regulations, external mandates, recommendations and guidelines, pay-for-performance, collaboratives, and public or benchmark reporting | Lack of a formal programme |
| | | | Unclear CHW reporting structures |
| | | | High workload |
| | | | Inadequate stipends |
| | | | Undefined roles of CHWs |
| | | | CHWs find their work satisfying due to the positive impact on communities. |
| **3. Inner setting** | **Implementation climate: *Compatibility*** | Compatibility refers to the degree of fit between the value attached to the intervention and the norms and perceived risks of individuals, as well as existing workflows and systems | Unacceptance of CHWs in the community |
| | | | Clear processes in place for defaulter tracing |
| | | | Lack of involvement and role clarification of social workers |
| | | | Poor integration into the PHC system in terms of existing workflows |
| | **Implementation climate: *Readiness for implementation*** | The tangible and immediate indicators of the organisation's commitment to its decision to implement an intervention. This consists of three sub-categories i.e. leadership engagement, available resources, and access to information and knowledge | Lack of involvement of OPMs with CHWs and team leaders |
| | | | Desire for ongoing training |
| | | | Inadequate resources and infrastructure (office space) |
| **4. Characteristics of individuals** | **Knowledge and beliefs** | Individuals' attitudes toward and value placed on the intervention, as well as familiarity with facts, truths, and principles related to the intervention | Motivated CHWs |
| | | | Wealth of knowledge of CHWs |
| | **Self-efficacy** | Individual belief in their own capabilities to execute courses of action to achieve implementation goals | Adequate knowledge and skills |
| | | | Good initial training |
| | | | Desire for ongoing training |
| **5. Implementation process** | **Engaging** | Attracting and involving appropriate individuals in the implementation and the use of the intervention through a combined strategy of social marketing, education, role modelling, training, and other similar activities | Lack of relationship building with the community and traditional healers |

## 7.5 DISCUSSION

In this study we used the CFIR framework for identifying and understanding the factors that influence the implementation of the CBHP in a positive and negative manner. The key barriers and facilitators to implementation were examined systematically across the CFIR domains and constructs. This enabled us to generate actionable findings that can be used to improve implementation of the programme.

In terms of the intervention's characteristics, challenges around the complexity of implementation can be addressed by employing additional CHWs, re-assessing CHW daily targets and staff workload, and provision of transport in order to increase the number of household visits in a day.

With regard to relative advantage findings show that the community value the services and were open to the services provided by the CHWs. Community leaders expressed their gratitude for the contribution that CHWs make in the community, with regard to health education and adherence support. Facility nurses also reported that the introduction of the community programme into PHC reengineering has improved workload at the facilities. However, there is room for improvement with regard to the acceptance of the programme. This can be addressed by undertaking community interventions such as campaigns to improve the community's and traditional healer's knowledge and acceptance of CHWs.

The success of the community programme depends on networking in order to gain buy-in, support, and involvement of the NDoH, PHC staff, and NGOs. It is therefore imperative to address the networking gaps by improving communication channels and creating a feedback loop to ensure that all stakeholders are appropriately involved and play their respective roles. Interventions such as campaigns to improve health education and stigma-related issues should be considered to address patient needs and resources. Strengthening linkages to social workers is needed to address the needs of patients and improve their well-being. In addition, the involvement of the NDoH and NGOs in the provision of food parcels and transport to healthcare facilities to poverty-stricken patients will also assist in alleviating the community resource-related problems.

The external policy and incentives barriers can be circumvented by designing and implementing formal NDoH policies which clearly stipulate roles of CHWs. In addition, the policy should ensure that the team leaders (professional nurses) are solely assigned WBOT duties. CHWs should be provided with an increased stipend to allow them to support their families and to provide motivation for them

sustain their role the HIV programme. Strengthening linkages between the community and social workers as well as clarification of social worker roles is needed to address the compatibility of the programme with existing workflows. This will in turn address the needs of patients and improve their well-being. Additional resource allocation and the improvement of existing infrastructures is needed to improve the readiness for implementation.

In terms of knowledge and beliefs and self-efficacy, CHWs had adequate knowledge to conduct their HIV-related work and were very enthusiastic to be a part of the programme. CHWs found the initial training very useful which equipped them to conduct their work. Ongoing training should be provided to keep CHWs abreast with current HIV-related knowledge which will, in turn, improve their working environment. Only some traditional healers are knowledgeable about the importance of primary healthcare and acknowledged the CHWs and the services they provide. Therefore, it is imperative to engage with them and to involve them in campaigns and regular meetings. This will provide education and knowledge on how to help sick community members and when to make necessary referrals to the facilities.

These findings are corroborated by a recent study consisting of four case studies in Lesotho, Mozambique, Swaziland, and South Africa. Findings show that the key facilitators to implementation of the community based programmes include recognition of the CHWs by the government, standardised training provided through the government, and the existence of a proper organisational structure dedicated to healthcare initiatives [23]. Suggestions for improvement of the community-based programmes include provision of adequate resources to support and sustain CHW services, hiring of more CHWs with better incentives and career prospects, developing better links with health facilities, and providing political stability and continuity for community-based HIV services [23]. Findings from our study in terms of the barriers to successful implementation of community-based programmes are further correlated with findings form other studies undertaken in LMICs [24-26].

The comprehensive exploratory approach of this study allowed for a well-defined study, including perspectives from several stakeholders. Participant interviews and FGDs were ideal for assessing factors surrounding the complexities of implementing an intervention. The limitations of this study include the context-specific nature of the results, which should be considered when applying the findings to other parts of South Africa. The convenience sampling of the community members may have introduced bias and the findings should not be taken to be representative of the population. In addition, the employers of the CHWs were not interviewed as they were unavailable due to

operational reasons. As with all research, another limitation is the possibility of respondents providing desirable answers as the researchers were affiliated with the Anova Health Institute.

## 7.6 CONCLUSIONS

This study provides actionable findings of factors that facilitate and constrain the successful and sustainable implementation of the CBHP. The reported barriers and challenges can be used to inform stakeholders on how to improve implementation of the programme. The key factors that contribute to the success of this programme include relationship building with the community and other stakeholders to promote buy-in as well as proper integration of the programme at the facility-level. These facilitators can be expanded on, to further improve the CBHP and also be used in other areas with similar contextual settings. Overarching barriers that can be improved upon include resource limitations and inadequate integration into the PHC system and workflows. More specific factors for improvement include formalising the WBOTs and increasing the CHW stipends. This approach has a broad application which adds value to research. We encourage others to use this CFIR as it allows researchers to use a common approach and language to systematically and comprehensively assess multicomponent interventions. This will enable researchers to compare findings from similar contextual settings to guide implementation of similar interventions.

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# CHAPTER 8

## CONTEXTUAL DETERMINANTS OF THE COMMUNITY HEALTH WORKER HIV PROGRAMME IN LIMPOPO PROVINCE, SOUTH AFRICA

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# CHAPTER 8: CONTEXTUAL DETERMINANTS OF THE COMMUNITY HEALTH WORKER HIV PROGRAMME IN LIMPOPO PROVINCE, SOUTH AFRICA

## 8.1 INTRODUCTION

Community-based HIV programmes (CBHPs) in South Africa have been re-invigorated since 2013 through the introduction of the National Department of Health's (NDoH's) Primary Healthcare Re-engineering strategy (PHCRE). The PHCRE consists of three core streams: ward based outreach teams (WBOTs), school health services, and district based specialist teams[1]. WBOTs consist of a team leader responsible for supervising at least five CHWs, with each team being responsible for supporting 250 – 400 households [1]. CHWs provide a range of services, acting as critical intermediaries between primary health clinics and their local communities. The CBHP has been specifically developed to assist with the NDoH's HIV treatment, care, and prevention activities [2]. Mottiar and Lodge found that CHWs in KwaZulu-Natal, Gauteng, and Limpopo Province reported performing a wide range of daily activities in support of the CBHP. These activities include: referring people to clinics for HIV testing and medical care; caring for very sick patients by cleaning, bathing, changing linen, and cooking for them; ensuring patients had sufficient food to take their medication; conducting directly observed treatment support (DOTs) taking for TB patients; monitoring and supporting adherence to anti-retroviral therapy (ART); accompanying patients to clinics; conducting information, education, and communication activities related to HIV and other health problems; and providing assistance to nurses at clinics in conducting basic screening processes, such as taking individuals' blood pressure.

CHWs thus provide a wide range of services within their communities, and are a particularly valuable cadre of health workers, especially in rural health districts. One key aspect of the value of CHWs within health systems is related to their in-depth knowledge of their local communities [3]. This allows CHWs to adapt their activities to local knowledge and understandings of disease [3]. Zulliger and colleagues argue that in doing so, CHWs are, "able to bridge the life worlds of the community and … formal services to expedite access and adherence to local clinics and other services". However, a range of challenges act to limit the effectiveness of the CBHP in South Africa. These challenges include: difficult working environments; poor integration into the formal health system; low and inconsistent payment of CHWs; fear of HIV-related stigma; poor leadership and planning; inadequate resources and equipment; and a lack of opportunities for career advancement [4-7]. CBHPs frequently seem to be effective in spite of this range of challenges, and rely heavily on the goodwill and commitment of CHWs to their communities [2].

Using the example of a CBHP in the Mopani District of Limpopo Province in South Africa, this article focuses on unpacking and understanding the contexts in which South African CBHPs are implemented, and how these contexts affect CHWs' ability to support the programme.

## 8.2 METHODS

We used a qualitative methodology to assess the functioning and perceived impact of WBOTs in rural Mopani District. The district consists of five sub-districts, and is characterised by high levels of poverty and unemployment. We conducted our study in Greater Letaba and Greater Giyani sub-districts, where the CBHP in its current form has been ongoing since 2013, and is hence well-established in the area. Participants were recruited from six primary healthcare (PHC) facilities in each sub-district and the communities they serve. Individuals had to be adult (>18 years) to participate in the study and informed consent was obtained before conducting the interviews. In-depth interviews and focus group discussions (FGDs) were conducted with community members (n=38), CHWs (11 FGDs), CHW team leaders (n=9), PHC staff (n=12) FGDs, community leaders (n=21), and social workers (n=10). Interviews and FGDs were conducted in the language of participants' choice, were audio-recorded, transcribed, and translated where necessary. The interviewers were not part of the implementation process. Findings were validated through reporting back to participants and NDoH staff after data analysis was completed. All participants provided signed informed consent prior to participating in research activities. Ethics approval was provided by the University of the Witwatersrand's Human Research Ethics committee, protocol number: M1611111.

We conducted a grounded theory style analysis, using a three stage coding process [8]. Two researchers independently read through the interview transcripts and identified basic themes, these themes were then combined into a working codebook using NVivo 11 qualitative data analysis software. A second stage of coding involved grouping basic themes into analytical categories by the two researchers. A final stage of coding resulted in our identification of the interacting contexts in which the CBHP operates in order to facilitate research and decision making as implementation of PHCRE continues.

## 8.3 FINDINGS

Six critical contexts affecting the implementation of the CBHP were identified in our data analysis. These contexts provide the background to the programme, and vary in the extent to which they can be influenced by management and policy makers. Contexts include: 1) geographic, 2) social, cultural,

and economic, 3) local community, 4) personal and inter-personal relationships, 5) local governance and authority, and 6) local organisational, which are summarised in **Table 8.1**.

### *8.3.1 Geographic contexts*

The main geographical factor affecting the programme was the long distances between PHC facilities and households in the communities they served, as well as distance between individual households that CHWs were expected to assist. This issue was repeatedly discussed by CHWs in terms of their need for transport in order to meet their monthly quotas of household visits, and was further complicated by the requirement that CHWs report to their respective PHC facilities on a daily basis to facilitate programme monitoring and management. Team leaders, social workers, and community members also discussed the difficulty of accessing care resulting from the long distances they needed to travel, and the lack of affordable and accessible transportation. This was a particularly difficult problem for CHWs as they reported having to use their own funds to pay for transport to visit households.

> *"Some of the houses that we visit are far we need to use transport. If we were to get transport we were going to cover houses that we are expected to. We spend lot of money travelling."* [CHW FGD2]

The lack of transport also negatively affected team leaders' ability to monitor the CHWs work, and provide on-site mentoring. This points to a broader problem with the under-resourcing of the CHW programme, which in turn leads to exploitative work situations relying on CHWs goodwill and commitment to their communities, rather than providing them with adequate support structures and reimbursement. Kane and colleagues, in their multi-country study of CHW empowerment, found similar results, noting that the empowering experiences of being a part of the formal health system and being able to do meaningful work were constantly frustrated by feeling of being "unsupported, unappreciated, and undervalued" [9].

### *8.3.2 Social, cultural, and economic contexts*

Mopani District is marked by high levels of poverty and unemployment, which in turn have direct effects on the CBHP. Firstly, CHWs and their families are generally very poor themselves, and the low levels of pay limit their own ability to access basic necessities. Even though they are poor themselves, CHWs reported sometimes having to pay help their patients to buy food and transport to clinics, placing further strain on their own households. Mottiar and Lodge report the same finding in their research on CHWs across three South African provinces, and note that this exemplifies the

commitment of CHWs to their roles and their communities. However, relying on the goodwill of an underpaid cadre of auxiliary health workers to support the NDoH's roll-out and scale up of primary health care is deeply exploitative [2]. The lack of adequate remuneration for CHWs was raised in interviews by community leaders, nurses, team leaders, and CHWs themselves.

A second important effect of the high level of poverty and unemployment in the study area was the frequency of circular migration between Mopani District and larger cities, such as Polokwane, Pretoria, and Johannesburg. This affected CHWs ability to support patients in adhering to their ART, and made it impossible for them to trace patients who were listed at clinics as defaulting on their treatment, which in turn decreased the time available to them to complete their other tasks. Migration also limited the development of the inter-personal relationships upon which the CBHP partially relies for its effectiveness. For example, CHWs noted that migration for seasonal farm labour led to people defaulting on their ART:

> *"The defaulters that we find they are those who are seasonal workers at farms. They come back after 6 months. When we visit those people they tell us that they were not around that's why they did to come and collect their treatment."* [CHW FGD1]

### *8.3.3 Local community contexts*

The contexts of the CHWs' local communities affected their work in a variety of ways. The most frequently discussed aspects of CHW's experiences in their local communities were the ongoing impact of HIV-related stigma, cultural beliefs about illness and community experiences of HIV. Stigma, and more specifically, the fear of being stigmatised was frequently mentioned by CHWs as an important barrier to being able to undertake their work. They discussed how patients were wary of having CHWs at their houses because they were afraid that their neighbours would assume that they were HIV positive if they saw them being visited. Participants also noted that HIV positive community members would hide their HIV status from CHWs out fear that the CHWs would disclose their statuses to other people in the community. Stigma also reportedly prevented people from accessing care at health facilities, and in some cases nurses noted that patients travelled long distances to collect medication from facilities outside their immediate communities.

The cultural context of Mopani District also presented challenges to the CBHP's effectiveness. This was particularly evident in reports from CHWs and clinic staff that community members would initially try to get help from traditional healers and churches, rather than access care from clinics. Delays in seeking care led to situations in which patients became bedbound due to their illnesses before

agreeing to seek medical care. These situations were particularly stressful for CHWs as patients required increased levels of care, including having food cooked for them and household cleaning, which in turn affected CHWs ability to meet their targets for visiting households.

In some cases people reportedly view their symptoms as being due to bewitchment rather than a physical illness. In these cases they also tended to be reluctant to access care from clinics, preferring the advice of traditional healers. The CHWs noted that they spent time educating traditional healers about HIV in the hope that they would refer people to them, or to clinics. In several cases this appeared to be happening.

> *"When we do door to door the traditional healers end up understanding, that there are some things that they cannot heal after we have explained to them. We do not undermine what they can heal. We do not stop them, we tell them that if there is something that you cannot do refer them clinic, so that the clinic can continue with them."* [CHW FGD3]

> *"There are some traditional healers that I trust, before they help someone they take their patients to the clinic and ask them test for HIV. Some of them you find that they are HIV positive. Traditional healers help us a lot, now we feel free to work with them than before. The trainings help us a lot; we take what we have learnt to the community before people used to die because of lack of information."* [CHW FGD4]

Finally, the high HIV prevalence of the district meant that knowing people living with HIV was an almost ubiquitous experience among community members, and many had family members infected with the virus. Some of these participants felt that HIV had become like any other disease, in that if you were taking medication consistently no-one would be able to tell that you were sick. However, the implication that they would be stigmatised if people did find out their HIV status remained, and other participants noted that HIV positive people would be unlikely to attend support groups as this would effectively broadcast their status to the community.

> "*That could bring a picture to the community that a group of people is sick. It is obvious that people who are sick won't want to attend such group, It is not like they are mentally ill is their blood that has the virus. They will think that the community is looking at them that they are sick. That are the some of the reasons that I think it won't work."* [Community member 5]

The community contexts in which CBHPs are implemented therefore have important impacts on programme effectiveness. As Busza and colleagues note, community contexts where HIV remains stigmatised, create additional difficulties in accessing patient populations for CHWs, and it is

important that stigma-related fears and barriers are explicitly discussed and managed from the outset of programmes [5].

### *8.3.4 Personal and interpersonal contexts*

The successful implementation of the CBHP depends on the interpersonal relationships between CHWs and community members, health care workers, social workers and NGOs. These interpersonal contexts are therefore critically important, but are also potentially volatile due to the sensitive nature of the issues that CHWs deal with daily, and external factors beyond CHWs control, such as the availability of food parcels. While CHWs and their patients generally viewed their relationships in a positive light, CHWs noted that they found it frustrating to not be able to do more for their patients. For example, several participants noted the futility in visiting people to conduct health education, when they were in desperate need of food and basic household goods. One of the key roles of CHWs is to refer patients to appropriate health and social services. However, these services were often not functioning effectively, leading CHWs, patients, and service providers to become increasingly frustrated. One social worker, for example, noted:

> *"We don't have much resource; we don't have resources to a point that in my office I am sitting on a list of more than 50 people who are in serious need of food parcels and some of them are being referred to me by CHWs. We are told that the department doesn't have a budget for food parcels. They are referring them to us but there is nothing we can do."* [Social worker 1]

Another challenge, was the reported denial of health problems among patients who would initially be receptive to CHW services, but eventually stop treatment and become hostile.

### *8.3.5 Contexts of local governance and authority*

Local systems of governance, and the enactment of authority in particular locales, can have both positive and negative effects on the implementation of health-related interventions. CHWs reported that where community leaders were supportive and engaged with them, this facilitated easier access to households in their communities. Community leaders also provided opportunities for CHWs to address community members at meetings which enabled them to encourage ongoing participation in the programme.

> *"They are useful because if we can look back people used to die a lot because no one knew that they were sick, and death would occur at any time. Since they have been working in the community we are experiencing less death. Death does not occur like it used to in the beginning."* [Community leader 3]

Although we did not find evidence of community leaders obstructing the work of CHWs, there were instances where community leaders stated that they had not been consulted or told about the CBHP.

> *"We don't have enough information about CHWs. What they do when they get to households I don't have enough information. There is no single day that they have visited me, so I cannot speak for them."* [Community leader 1]

These leaders felt that they should have been included in the roll-out of the programme, but did not express any further negativity about CHWs.

### *8.3.6 Local organisational contexts*

The management and organisational contexts of CBHPs in South Africa have frequently been found to be problematic by researchers focusing on community health [2, 10, 11]. In Mopani District, we identified several critical factors related to the organisational context of the CBHP. These included: tensions between the department of health NDoH and non-governmental organisations (NGOs) responsible for paying CHWs; staff shortages within the NDoH and the lack of formally designated WBOT leader posts; the overburdening of CHWs in terms of their reporting requirements; and the lack of effective integration of social workers into the WBOTs operational strategies.

Although policies have changed since this study was conducted, during the research process a common complaint among CHWs was that they were managed by separate organisations, with varying operational requirements and plans. They noted that they were required to compile reports for both the NDoH and the NGO that employed them, as well as having to juggle the sometimes conflicting instructions they received from their NDoH team leader and the NGO staff. The lack of formalisation of the CBHP within the NDoH also meant that team leaders were expected to manage CHWs on top of their duties as nurses at clinics. This led to excessively high workloads among team leaders, and several reported being unable to support CHWs adequately as a result. In some areas there were either insufficient staff at clinics to allocate a separate team leader to each team of CHWs, or no staff were willing to take on the extra workload. In these cases multiple teams ended up being managed by one centralised team leader which also limited the team leader's ability to support them. These difficulties point to broader problems in the governance of the PHCRE programme, as Schneider and Nxumalo note, governance of CBHPs is a complex and multi-level process that involves individuals and organisations spanning the continuum from the local to the national and international [11]. The WBOT strategy was detailed in an NDoH white paper, but was not allocated ring-fenced funding, and

implementation of the strategy was left up to individual provinces [11]. In Limpopo Province, the lack of a clear strategic vision for the implementation of WBOTs appears to have led to districts and sub-districts adopting a make-do approach to implementation, resulting in widely varying impacts between local areas. In our study, it was clear that due to the lack of formalisation of the WBOTs the relative impact of the programme depended to a large extent on the commitment and capacity of individual team leaders. For example, the team leaders quoted below report different levels of commitment to their teams:

> *"I feel their pain and sometimes I feel that I want to quit because of the way they are suffering. I don't want to quit, but imagine that you are working but you are not getting anything in return while they are serving a big community which goes all the way to H--. When I go with them I have to use my transport and then get them food because they don't have money these people, I buy food for them. I give money to the one who stays in G-- to buy chicken and I will cook pap for them and then we will eat."* [Team leader 1]

> *"So you can see that even if their have challenges I can't assist them. Sometimes they phone me and you will find that I can't go assist them at households. We have patients in M--, it's another village, it's far and I am unable to go that side."* [Team leader 3]

Without a formalised system of governance and leadership for WBOTs, their effectiveness relies on the altruism and commitment of individual CHWs and team leaders, and as Mottiar and Lodge note, after years of functioning this way "the system may be exhausting its stocks of altruism" [2].

Another challenge raised by CHWs relating to the governance of the WBOTs was the fact that they frequently encountered situations requiring intervention by social workers, but that social workers lacked the resources, time, or ability to follow up on their referrals. CHWs working in rural communities, such as Mopani District, function as an important link between community members and health and social services, and often bear the burden of blame when their referrals amount to nothing [11].

**Table 8.1: Summary of contextual factors affecting implementation of the CBHP**

| Contextual factors affecting implementation of the CBHP | Description |
|---|---|
| Geographic | - Long distances between the PHC facilities and households<br>- Lack of transport<br>- Under-resourcing of the CHW programme |
| Social, cultural, and economic | - Poverty<br>- Migration limits the development of inter-personal relationships and increases defaulter rate |
| Local community | - HIV-related stigma<br>- Cultural beliefs |
| Personal and inter-personal relationships | - CHWs frustrated as they can't do more for patients<br>- Inadequate social services<br>- Inadequate engagement with stakeholders<br>- Denial of health problems |
| Local governance and authority | - Supportive nature of supervisors<br>- Community leaders encourage ongoing participation |
| Local organisational | - Tension between NDoH and NGOs<br>- Varying operational requirements and plans<br>- Lack of formalised system of governance and leadership for WBOTs<br>- Extra workload for CHW team leaders limiting support for CHWs<br>- Inadequate involvement of social workers<br>- Inadequate resources |

## 8.4 CONCLUSIONS

The CBHP operates across a range of contexts, each with their own set of challenges and opportunities. While these challenges may be inter-related, as is the case with the lack of resources in the organisational context and the challenge of transport associated with the geographical context, it may be useful to use a contextual analysis of the programme's implementation as part of ongoing decision making processes. Kok and colleagues undertook a literature review of the contextual determinants of CHW effectiveness in low and middle income countries, and report similar results to ours [12]. They found that community, economic, environmental, and health system policy contexts had important effects on CHW performance, with community contexts playing the most important role [12]. While our analysis also identified community factors, and particularly the fear of stigma, as important determinants of the success of the CBHP, the organisational context was the most noteworthy impediment to the potential effectiveness of the CHWs. A limitation to this study is that we did not interview members of the provincial and national department of health for operational reasons and due the fact that our study focused on ground-level activities. Without a coherent, standardised, and adequately resourced organisational context, the implementation of CBHPs relies heavily on individuals' commitment to their communities and their own altruism, and risks becoming deeply exploitative.

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# CHAPTER 9

## PROVISION OF HIV SERVICES BY COMMUNITY HEALTH WORKERS SHOULD BE STRENGHTENED TO ACHIEVE FULL PROGRAMME POTENTIAL: A CROSS SECTIONAL ANALYSIS IN RURAL SOUTH AFRICA

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# CHAPTER 9: PROVISION OF HIV SERVICES BY COMMUNITY HEALTH WORKERS SHOULD BE STRENGHTENED TO ACHIEVE FULL PROGRAMME POTENTIAL: A CROSS SECTIONAL ANALYSIS IN RURAL SOUTH AFRICA

## 9.1 INTRODUCTION

South Africa has the largest Human immunodeficiency virus (HIV) programme in the world, with currently more than 3.9 million individuals on antiretroviral therapy (ART) [1]. HIV services are primarily delivered at primary healthcare (PHC) facilities [2]. Early HIV diagnosis, efficient linkage to care and a high rate of retention in care are important determinants of programme success [3]. Despite scale-up of access to HIV services and ART across the country, various barriers to programme success remain, such as operational, socio-cultural, and improper integration into the health system [4-6]. Ward-based outreach teams (WBOTs), run by community health workers (CHWs), are positioned at the community-facility interface and constitute an important component of the healthcare system to strengthen HIV programme implementation [7-10]. HIV services provided by CHWs include: 1) identification and referral of at-risk individuals for HIV testing, 2) treatment adherence support to individuals on ART and early identification of individuals with complications or side-effects to be referred to the facility for assessment, and 3) tracing and referral of HIV-infected individuals that have been lost to the ART programme. Tracing of individuals lost to the ART programme is done using reports generated by administrative clerks from the Three Interlinked Electronic Register (TIER.Net), South Africa's electronic ART register [11].

Several studies from sub-Saharan Africa have shown that community health programmes can be used to strengthen HIV service delivery at primary healthcare facilities, especially through mobilising of individuals in need of care [12-15]. For example, a systematic review of 34 studies from high, middle, and low income countries shows that community based programmes have the potential to improve the uptake of HIV services, and can contribute to more equitable uptake of referrals from communities to healthcare facilities [15]. There are only limited data available on the volume, type and effectiveness of HIV services routinely delivered by CHWs. It is imperative to understand the roles of CHWs in the CBHP and to assess the impact of HIV services provided by CHWs in order to ensure that the CBHP achieves maximum impact and delivers on its intended goals. We therefore undertook a cross-sectional study to characterise HIV services delivered by the CHWs in the CBHP and to assess the impact of these services on the overall HIV programme in a rural district of South Africa.

## 9.2 METHODS

### *9.2.1 Study setting and design*

This study was conducted in rural Mopani District, South Africa, where the community health programme was initiated in 2012; CHWs have been providing HIV services from its inception. A cross-sectional study to assess the contribution of the CBHP to the overall HIV programme was conducted from January through September 2017 in the sub-districts of Greater Giyani and Greater Letaba. We purposively selected the 12 WBOTs (comprised of 90 CHWs) attached to 12/49 PHC facilities in these two sub-districts (six each); these facilities were chosen for their similar size of catchment population (approximately 9 000 individuals each). Ethical approval was obtained from the Human Research Ethics Committee at the University of Witwatersrand, Johannesburg, South Africa (Reference number: M1611111) as well as the Limpopo Provincial Health Research Committee.

### *9.2.2 Study procedures*

We obtained demographic data for the 12 wards from the Statistics South Africa (StatsSA) community survey 2016 [16]. The estimated HIV-infected population in the 12 wards was calculated using the Thembisa model [17]. We used the activity registers completed by CHWs on a daily basis to collect information on the services provided to their community. In this register, each CHW records the particulars of all individuals attended to as well as which services were provided (using a code book). The services that are provided include screening and adherence support for HIV, TB, malnutrition, pregnancy, and non-communicable diseases. With regard to provision of HIV services, the following information is routinely recorded: a) at-risk individuals referred to the nearest facility for HIV Testing Services (HTS), b) HIV-infected individuals on ART to whom adherence support is provided, and c) tracing and referral back to the facility of individuals lost to the ART programme.

We used the patient identifiers (name, surname, and birth date) as recorded in the daily activity register to determine whether individuals who were referred to the PHC facility by CHWs actually visited the facility for services. The patient identifiers were triangulated with several data sources at each facility: the paper-based headcount register in which all facility visitors should be registered, the paper-based HTS and pre-ART register in which individuals with a positive HIV result are recorded, and TIER.Net, the electronic ART patient register of South Africa [11]. If an individual was found in at least one register within two weeks of CHW referral, we considered the referral as successful. In the case where an individual was found on TIER.Net, we looked at the ART initiation date to determine whether the individual was already on ART prior to CHW referral for HIV screening or that the individual was actually newly diagnosed as result of HIV screening, and subsequently initiated on ART. The CHW

referral and back-referral forms were not used properly as stipulated by the provincial guidelines due to operational constraints [18]. Individuals referred for HTS were considered HIV-uninfected if evidence of a facility visit was found in either the headcount or HTS register, but no record in the pre-ART or ART register. Facility staff identified individuals lost to the ART programme and the CHWs were asked to trace them.

### *9.2.3 Statistical analysis*

Data were captured into a Research Electronic Data Capture (REDCap) electronic database hosted by University of the Witwatersrand [19]. Validity checks were done to ensure completeness and to identify and correct consistency and logic errors. Descriptive statistics are provided as number with proportion and median with range. Logistic regression was used to compare demographic variables between individuals with and without successful facility referral. Variables with a $p$ value ≤ 0.1 on univariate logistic regression were included in the multivariate logistic regression model. A $p$ value <0.05 was regarded as statistically significant.

## 9.3 RESULTS

**Daily activities recorded by the CHWs**

The CHWs within the participating wards serve a population of 91 484 individuals with 6 917 individuals (8%) registered on TIER.Net to be on ART at the beginning of the study **(Table 9.1)**. Fifty eight per cent of the population in this area are within the working age-group (15-60 years of age) and 56% are female. CHWs recorded 18 927 household visits in the study period during which the following services were provided: HIV services (18 688 times), screening for TB (16 445 times), diabetes mellitus (11 143 times), hypertension (14 115 times) and antenatal care and pregnancy (1 553 times). Altogether HIV services constitute 30% (18 688/61 944) of the services provided. The breakdown of HIV services provided was as follows: 12 159 (65%) individuals were assessed for HIV risk and, when appropriate, referred for HTS, adherence support was provided to 5 657 individuals on ART (30%), and 864 individuals (5%) were traced because they were lost to the ART programme.

**Table 9.1: Demographics of the study population and HIV services provided in the twelve study wards in Mopani District, South Africa**

| | | Participation wards in Greater Giyani sub-district | Participation wards in Greater Letaba sub-district | Total |
|---|---|---|---|---|
| **Population** | | **46 959** | **44 525** | **91 484** |
| Gender | Male | 20 577 (44%) | 20 079 (45%) | 40 656 |
| | Female | 26 382 (56%) | 24 446 (55%) | 50 828 |
| Age | 0-14 years | 16 873 (36%) | 14 374 (32%) | 31 247 |
| | 15-24 years | 10 980 (23%) | 10 594 (24%) | 21 574 |
| | 25-44 years | 11 063 (24%) | 11 147 (25%) | 22 210 |
| | 45-60 years | 4 426 (9%) | 4 655 (11%) | 9 081 |
| | >60 years | 3 617 (8%) | 3 755 (8%) | 7 372 |
| **Estimated HIV-infected adult population** | | **6 035 (13%)** | **6 118 (14%)** | **12 153** |
| Gender | Male | 2 107 (35%) | 2 129 (35%) | 4 236 |
| | Female | 3 928 (65%) | 3 989 (66%) | 7 917 |
| Age | 15-24 years | 859 (14%) | 876 (14%) | 1 734 |
| | 25-44 years | 4 011 (67%) | 4 006 (66%) | 8 017 |
| | 45-60 years | 1 038 (17%) | 1 105 (18%) | 2 144 |
| | >60 years | 127 (2%) | 131(2%) | 258 |
| Number of PLHIV on ART | | 3 050 (51%) | 3 867 (63%) | 6 917 |
| **Services provided by CHWs during the study period** | | | | |
| No. of households visited for any type of service | | 11 339 (60%) | 7 588 (40%) | 18 927 |
| No. of individuals screened for HIV | | 6 329 (52%) | 5 830 (48%) | 12 159 |
| No. of individuals provided adherence support to | | 3 058 (54%) | 2 599 (46%) | 5 657 |
| No. of individuals lost to the ART programme to trace | | 406 (47%) | 458 (53%) | 864 |

### HIV case identification

CHWs verbally assessed 91 484 individuals for their HIV risk, resulting in a coverage of 13% (12 159/91 484). Only 290 (2.4%) were considered 'at risk' and referred to the facility for HTS. The median age of individuals referred for HTS was 36 years (range 0 – 98 years); the majority was female (72%). Evidence of a facility visit was found for 213/290 (73%) of individuals referred for HTS: in 90 cases (42%) the name was found in the headcount register, in 149 (70%) in the HTS register, and another 21 (10%) in TIER.Net. Of these 213 individuals that visited the facility for HTS following referral, 38 (18%) had a documented HIV-positive status in at least one of the registers; 175 (82%) were HIV-negative. When assessing those with a documented positive HIV status, 30/38 (79%) were already on ART prior to the CHW referral. This means only 8/213 (3.8%) of referrals were newly tested positive for HIV. Six individuals (16%), four of whom were male and two female, were newly HIV diagnosed and initiated on ART **(Figure 9.1)**. This amounts to an HIV testing yield of 3.3% (6/183) among individuals referred for HTS by CHWs. Individuals in the 15-24 years age-group were four times more likely to visit the PHC

facility for HTS as compared to individuals in the 25-45 years age-group (OR, 3.63; 95% CI, 1.65-7.98; *p*<0.001). Success of referral for HTS was not associated with gender (OR, 1.75; 95% CI, 0.99-3.11; *p*=0.056 for women compared to men), sub-districts (OR, 0.86; 95% CI, 0.38-1.92; *p*=0.709 for Greater Letaba compared to Greater Giyani sub-district), or with individuals referred for multiple indications compared to individuals referred for HTS only (OR, 1.09; 95% CI, 0.46-2.57; *p*=0.839). We also assessed for repeated referrals of individuals for HTS. Of the 290 referrals there were only five repeated referrals of individuals with ages ranging from 15 to 52 years and majority were female (4/5). Of these, four individuals accessed the facility for care.

**HIV treatment adherence support**

CHWs recorded providing HIV treatment adherence support of individuals on ART during 5 657 visits. An important component of adherence support is to identify and refer individuals early with side-effects or complications. However, there was only one record of an individual referred to the facility for TB screening; one woman on ART was referred for pregnancy testing **(Figure 9.1)**.

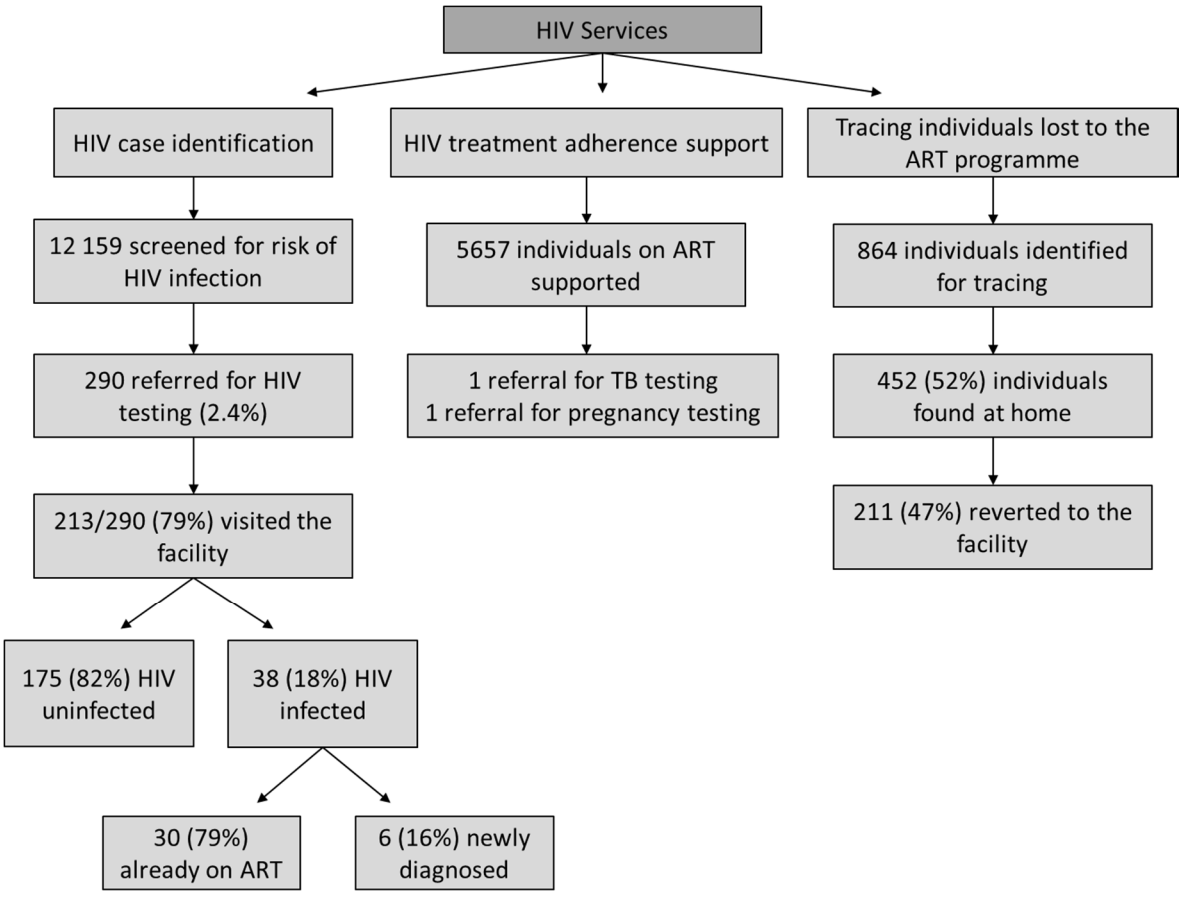



**Figure 9.1: Summary of HIV services provided by CHWs and uptake of referrals**

**Tracing of HIV-infected individuals lost to the ART programme**

A total of 864 individuals lost to the HIV programme were identified through the facility TIER.Net register and these individuals' details were given to the CHWs for tracing. Most of these individuals were female (73%); median age was 38 years (0-92 years). Of the 864 individuals to be traced, CHWs managed to find 452 (52%) at their home; majority being female (70%, 306/452); median age was 37 years (0-88 years). These individuals were referred back to the PHC facility **(Figure 9.1)**; 241/452 (53%) of these referrals had been recorded as having re-initiated ART at the facility. No evidence of a facility visit was found for the other 211 individuals (47%). Referral for re-initiation of ART was more successful in Greater Giyani compared to Greater Letaba sub-district (60% vs. 48%; OR 1.65; 95% CI, 1.14-2.40; *p*=0.009); there was no association with successful re-initiation of ART with females as compared to males (OR, 0.93; 95% CI, 0.60-1.43; *p*=0.725) or individuals in the 25-44 year age-group compared to other age-groups (<15 years; OR, 1.95; 95% CI, 0.92-4.12; *p*=0.082; 15-24 years; OR, 1.11; 95% CI, 0.61-2.03; *p*=0.082; 45-60 years; OR, 1.26; 95% CI, 0.76-2.09; *p*=0.368; >60 years; OR, 0.71; 95% CI, 0.33-1.56; *p*=0.398). In addition, we assessed for repeated referrals for tracing. Of the 452 individuals found and referred for tracing, there were only seven repeated referrals of individuals with ages ranging from 17 to 64 years, four of which were female and three male. Of these, four reverted to the facility for care.

## 9.4 DISCUSSION

This study shows that CHWs provide a range of HIV services on a daily basis and are instrumental in the functioning of the CBHP in a rural South African setting. However, the coverage of services, quality of service provision and effectiveness of referrals need to be strengthened for the programme to deliver on its full potential. To our knowledge, our study is among the first to assess community HIV service delivery by CHWs in a routine operational setting.

HIV services constituted an important component of CHWs' daily operations, in addition to providing TB screening, non-communicable disease, maternity and child health services. However, only 13% of individuals living in their catchment area were reached for HIV screening. Also, the vast majority of individuals reached for HIV services were female. This confirms findings from a previous study where interviews were conducted with community members in households to assess services rendered by the CHWs. It was found that majority of the participants was female (77%) and of those at home only 47% reported CHW visits [14]. Alternative strategies should be considered to reach individuals that are at work during the day, or stay elsewhere during the week. Provision of evening services is not feasible in our setting due to safety issues, but provision of services during the weekend may be

considered to scale-up and reach individuals that are normally not found at home by CHWs during the day.

The proportion of individuals considered at-risk for HIV through verbal screening and referred for HTS at the facility was relatively small (2%). Similarly, only one individual on ART was referred for TB screening as part of adherence support. These number of referrals appear very low for our setting, unless CHWs only visit low-risk individuals and those doing very well on ART. Although we did not measure fidelity to screening and referral guidelines, either way, further training of CHWs would be required to either make sure that they better identify at-risk individuals and those with treatment complications in their daily operations. Effective uptake of referral for HTS was good at almost 73%. Although we are not aware of any literature reporting the effectiveness of CHW screening and referral, the effectiveness in our study was higher than reported by others for cardiovascular disease in a similar setting [20]. The positivity rate of HIV testing was in line with that observed for other community-based HTS approaches (2.0-3.5%) in this district [21]. Surprisingly, there was a considerable number of individuals referred by the CHW for HTS, but who were already taking ART at the facility prior to referral. This suggests that not all HIV-infected individuals disclose their HIV-positive status to the CHW, possibly for reasons of stigma in the community and non-disclosure of HIV status within their household [6]. This observation suggests that yield of referral for HTS by CHWs may be overestimated as a result of individuals not disclosing their status. An important approach to strengthen the impact of CHWs on HIV case identification would be the implementation of home-based HTS services; such strategy has been demonstrated successful and acceptable in reaching individuals for HTS services in Botswana, Zambia, Kenya, Malawi and South Africa [22-25]. Another alternative strategy might be handing out HIV self-screening tests by CHWs to households deemed at risk [26]. A district-wide study conducted in KwaZulu-Natal, South Africa, assessing facilitated referrals for HIV care, shows that participants who reported ever visiting an HIV facility increased from 57% to 96% at six months, with 86% of these participants initiating ART within three months of being diagnosed, suggesting that facilitated referrals by CHWs is another approach that should be considered [27]. In addition, linking individuals to CHWs as soon as they are initiated on ART at the facilities, may also help decrease the number of individual lost to the ART programme.

Tracing of individuals lost to the ART programme showed room for improvement with 53% of those identified reverting back to the facility. An important explanation for this is that reasons for individuals becoming lost to the ART programme, such as work or stigma, also undermine the effectiveness of CHW-based tracing and referral. Of note is that the effectiveness of referral of individuals lost to the

programme by CHWs in Greater Giyani sub-district was more effective than in Greater Letaba. This may be the result of a higher density of CHWs in Greater Giyani sub-district, resulting in a smaller number of households allocated to each CHW, and the more rural and less-resourced character of the area, with more people at home during the day. To improve the effectiveness of tracing by CHWs initial telephone follow-up by the facility should be considered before physical tracing of individuals by CHWs. This approach was shown to be successful in other studies [28] and preliminary data from Mopani District, Limpopo province suggest that there is value in using a combination of telephone and physical tracing as a routine CHW activity [29]. Also, follow-up visits and repeat referrals for individuals that do not engage with care following initial referral, could be strengthened since most individuals lost to the programme were only visited once for tracing purpose. Tracing individuals over the weekend may be of value since it would mitigate some of the reasons underlying individuals' loss to the programme such as individuals working during the week. In addition, linking individuals to CHWs as soon as they are initiated on ART at the facilities, may also help decrease the number of individual lost to the ART programme.

Despite major progress in HIV services in recent years in South Africa, the country has to scale-up its HIV programme further to achieve HIV epidemic control. The CBHP has great potential to expand HIV services in underserved communities and to support the programme's goal. However, investment in human resources and skills is required to further scale-up the programmes impact on HIV care. This might be achieved by increasing the number of CHWs in the programme, thereby reducing the number of households that each CHW supports. Continuous training for both CHWs and their supervisors, and technical support is required to enhance targeting of individuals at high-risk for HIV and complications of ART. Our findings reflect a policy deficit at the time of the study as the provincial policy implemented lacked specific training schedules, CHW performance evaluations, and supervisory mechanisms. Adequate resources and infrastructure are also crucial needs that should be met for CHWs to effectively perform their duties, thus affecting programme outcomes [6, 30]. It is also critical that formal employment and context-appropriate remuneration packages for the CHWs be put in place [31]. Additionally, the CBHP should not exist in a silo as a vertical, disease-specific programme. Studies show that HIV service integration with maternal, newborn and child health, and family planning improved health coverage and outcomes [32]. Moreover, clinical and managerial integration of the CBHP into the formal health system and at the community-level is crucial for optimal functioning of the programme, as corroborated by other studies [33].

The CBHP initiatives could possibly be strengthened by exploring novel ways to increase CHW impact on the overall HIV programme such as working during the weekend, provision of home-based HTS services, handing out self-screening HIV tests, and fine-tuning models of tracing individuals lost to the ART programme. The use of mobile technology should be considered to strengthen the CBHP as studies show its potential value in collecting health data, facilitating health education, and conducting person-to-person communication, thus resulting in improved quality of care and services and programme monitoring [34, 35]. Finally, social factors and cultural beliefs may pose a barrier to successful programme implementation and these should be addressed where needed to strengthen the relationship between the community, its CHWs, and the healthcare facility [6].

In conclusion, this study highlights the potential of the CBHP to strengthen HIV services in South Africa towards achieving epidemic control. However, to deliver on its full potential, further scale-up of the programme is warranted whilst addressing barriers that may exist.

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# CHAPTER 10

## PROPOSAL FOR AN ADAPTED CONCEPTUAL FRAMEWORK TO ASSESS FIDELITY OF IMPLEMENTATION OF A COMMUNITY-BASED HIV PROGRAMME

## CHAPTER 10: PROPOSAL FOR AN ADAPTED CONCEPTUAL FRAMEWORK TO ASSESS FIDELITY OF IMPLEMENTATION OF A COMMUNITY-BASED HIV PROGRAMME

### 10.1 INTRODUCTION

South Africa has the largest antiretroviral therapy (ART) programme in the world [1]. Major initiatives have been adopted to scale-up human immunodeficiency virus (HIV) services, but further strengthening is required in order to achieve epidemic control and to end HIV/AIDS. South Africa has introduced a community-based HIV programme (CBHP) to support achievement of HIV epidemic control. It is imperative to measure fidelity of implementation (FOI) of the CBHP to ensure that the CBHP is implemented according to the policy guidelines and meets its intended goals.

There are various frameworks that can be used to measure FOI. In this thesis, we used a conceptual framework for implementation fidelity proposed by Carroll and colleagues to evaluate the implementation of the South African CBHP in a rural setting [2]. The conceptual framework for FOI by Carroll and colleagues was chosen because: a) it specifies aspects of implementation that could be evaluated to determine implementation success, and b) is the most comprehensive conceptual framework for assessment for FOI **(Figure 10.1)** [2]. The framework is multifaceted in that it assesses implementation both the intervention and its delivery. Monitoring implementation of an intervention such as the CBHP in a standardised manner and using this framework enables a better evaluation of how the actual intervention affects the outcomes of the intervention [2].

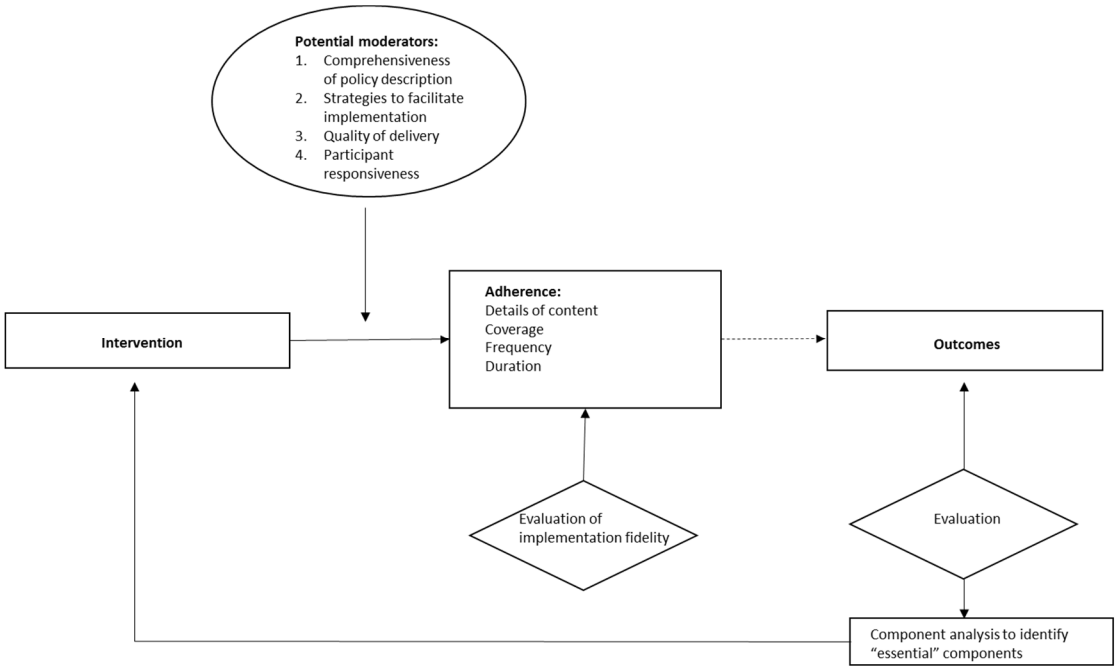



**Figure 10.1: Conceptual Framework for Implementation Fidelity by Carroll et al. (2007)**

## 10.2 RATIONALE FOR ADAPTING THE EXISTING CONCEPTUAL FRAMEWORK FOR IMPLEMENTATION FIDELITY

Conceptual frameworks provide a systematic means to assess whether interventions or programmes are implemented as intended by the designers [2]. By using the conceptual framework for implementation fidelity (Carroll Framework), we were able to gauge whether the CBHP was delivered as intended and determine the potential moderators to successful implementation outcomes [3, 4]. It is important to identify the elements that influence effective implementation, which can then be used to guide adaptation of the framework to specific contexts [5]. In this chapter the findings from this PhD research study (published and unpublished) as well as other published literature will collectively be used to revise the Carroll framework. We propose an adapted framework that can be used to systematically guide evaluations of FOI of interventions or programmes in rural contexts. The adapted framework can also be used to identify the elements that influence effective implementation and require further adaptation.

## 10.3 METHODS

In this chapter, the findings from this PhD research study (published and unpublished) and global published literature are related to the original Carroll framework to identify strengths and weaknesses of the framework. The findings from this PhD research study include qualitative and quantitative data as presented in **CHAPTERS 5 to 9** of this dissertation. We also present some additional observations made during data collection for those chapters. Factors that were found to be relevant as additional potential moderators, not included in the original Carroll framework, are also described. A literature search was done on PubMed to find studies related to CHW programmes implemented in similar contexts to that of the South African CBHP. Search terms included “community health workers”, “HIV”, “sub-Saharan Africa”, “primary healthcare”, and “low-and middle-income countries.” Published research from the reference lists were also used in the literature search.

In order to revise the Carroll framework, we assessed the individual elements of the framework including adherence, potential moderators, and outcomes in relation to our findings and global research. We then assessed other salient factors that emerged during the study and were not part of the original framework. Finally, we revised the framework by including the additional elements and propose an adapted conceptual framework for implementation fidelity.

## 10.4 RESULTS

### *10.4.1 Adherence*

The adherence element of the framework is the measurement of coverage, frequency, duration, and content of the intervention [2]. This study found that the CHWs adhered to the implementation of the CBHP in terms of content and duration as specified in the appropriate provincial guidelines. However, gaps were observed with regard to coverage and frequency of CHW visits [6]. Possible reasons for this observation is the large number of households allocated to each CHW. CHWs also attended to the multiple HIV-infected family members separately, which added to their workload. This finding is consistent with findings from other studies where CHWs complained about the excessive workload [7, 8]. This in turn has been shown to affect motivation and attrition of CHWs [8]. High attrition could negatively impact programme outcomes and the programme's credibility due to inconsistent interaction of the CHWs with the community [8]. There was no additional data from the PhD research available other than that included in the study referenced [6].

Measures for adherence are included appropriately in the framework, as content, frequency, duration, and coverage were all important factors that contribute to successful implementation, as seen in this study and other studies [9]. However, based on our experience, it was challenging to assess adherence without the core and modifiable components being identified a priori, to allow for the precise measurement of content. The core components are those that should not be adapted as these are the components without which the programme will not have its intended effect [10]. In the context of the CBHP an example of a core component would be HIV counselling and referral for HIV testing. The modifiable components are those that can be adapted according to the context in which the programme is implemented. Adaptation occurs when implementers change certain components of the programme with the intention of achieving improved outcomes [11]. Examples of such adaptations in the context of the CBHP is HIV health education, which can be adapted to suit the community needs. Adaptations may include holding campaigns and community gatherings in addition to household visits as prescribed by the programme. The importance of establishing and adhering to core components of the programme while adapting the intervention to essential contextual factors is corroborated by other researchers [12]. In light of this, we propose that the core (non-modifiable) and modifiable components should be clearly defined before the evaluation, to allow for the accurate measurement of adherence **(Figure 10.2)**.

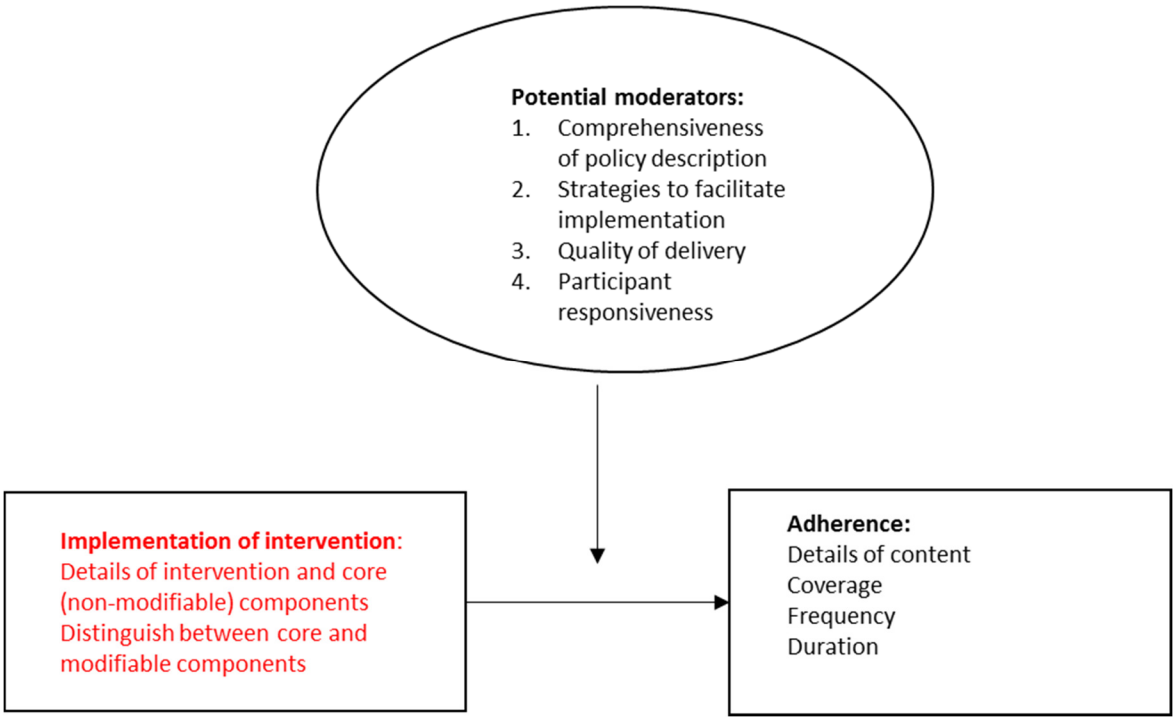



**Figure 10.2: The proposed inclusion of the details of core and modifiable components. Proposed adaptations are presented in red font.**

### *10.4.2 Potential moderators*

The potential moderators to adherence are detailed in relation to the conceptual framework for implementation fidelity in the paragraphs below. There is some degree of overlap amongst the themes that emerged from assessing the potential moderators.

The potential moderators included in the original Carroll framework explored are: a) comprehensiveness of policy description, b) strategies to facilitate implementation, c) quality of delivery, and d) participant responsiveness.

***Comprehensiveness of policy description***

The description of the policy guiding the CBHP implementation to be implemented may be simple or complex. Detailed or specific policies are more likely to be implemented with higher fidelity as compared to policies that lack a detailed description of how the intervention should implementation [2].

The CBHP activities stipulated in the provincial policy implemented at the time of this study included: health education; identifying at-risk individuals for HTS; adherence support for individuals on ART; tracing of individuals lost to the ART programme; referral of individuals with complications; co-infections, and side effects. However, there was a lack of a clear policy for implementation of the CBHP

which resulted in various challenges. A predominant factor seen as a challenge by the CHWs was unclear job descriptions. The lack of clear articulation of the responsibilities and expectations of CHWs, who are the implementers of the CBHP, is a key factor that prevents CHWs from reaching their full potential. The provincial policy implemented during the time of this study lacked specific training schedules, CHW performance evaluations, and supervisory mechanisms. Furthermore, the lack of a clear understanding of the positioning within the healthcare system results in miscommunication and the lack of accountability between CHWs, their supervisors, and the primary healthcare (PHC) facilities [13, 14]. There was no additional data from the PhD research available other than that included in the study referenced [15].

The Carroll framework assesses the comprehensiveness of policy description. We, however, based on the findings presented above, suggest the assessment of the comprehensive description of the intervention or policy. This suggestion stems from the fact that one may not be assessing a policy per se, but an intervention that could be eventually adopted as part of the policy.

***Strategies to facilitate implementation***

Facilitation strategies may be used to standardise and optimise FOI and to ensure the uniform delivery of the intervention. These include provision of guidelines, training schedules, and monitoring and feedback to the implementers [2]. However, the provincial policy implemented during the time of this study lacked specific training schedules, CHW performance evaluations, and supervisory mechanisms.

The data below are not included in the two published manuscripts, but were collected during the exploratory studies as described in **CHAPTERS 7 and 8**. Published literature is available to further support our findings. Several challenges and opportunities to enhance facilitation strategies emerged from the qualitative data. The most salient issues in this regard, were the need for ongoing supervision and training of the CHWs.

> *"My colleague explained it, if our team leader had time, to visit the households with us twice or ones a month. Where we teach and she also teaches so that they can see that we also part of the clinic. They can understand that we are hired by the clinic not an individual voluntary work. People will understand."* [CHW 1]

> *"What we would like to see improve, is to be trained about new information about different diseases and new discoveries about disease. As CHWs we are responsible to teach people about health issues so it is important that we are updated about new findings."* [CHW 2]

These results are corroborated by other studies in similar settings, where both CHWs and their supervisors strongly emphasised the need for ongoing training at regular intervals [16]. In other studies, CHWs in South Africa also expressed the critical need for the formal recognition of their training and skills, which are currently missing in the current system [16]. Another exploratory study found that peer-to-peer learning occurs among CHWs and this kind of learning lends itself to incorrect knowledge transfer among the CHWs and thus, the communities they serve [17]. Moreover, gaps in knowledge of health professionals who are tasked with training the CHWs exist and have been found to lead to poor outcomes in the individuals that the CHWs serve, as seen in a Malawian study [18]. Therefore, it is imperative to incorporate formal documentation of all training content for CHWs and their supervisors. Formal assessments of the training provided to CHWs and the health professionals responsible for training CHWs should also be documented, as shown in the additional data from the qualitative studies presented below.

> *"Another thing if it is possible that our team leader always get the same training like you do so that our leader is not behind or if it's possible that we go visit the households with our team leader at least once a month. The community will take us serious that we are not fooling them."* [CHW 3]

Strategies to facilitate implementation are appropriately included in the Carroll framework. However critical findings such as the need for supervision, training, and formal mechanisms to document and assess training emerged from the qualitative data. Therefore, we suggest that training and supervision be specified under strategies to facilitate implementation as these factors are key to successful implementation.

***Quality of delivery***

Quality of delivery is the manner in which the implementer delivers the intervention [2]. This can be achieved by using techniques prescribed by the programme itself, or by using techniques from similar programmes [2]. Examples in the context of the CBHP include providing manuals to CHWs and pamphlets to the community members to improve the quality of delivery of HIV education. It is imperative to measure the quality of delivery, as an intervention can be good but delivered with poor quality, which directly impacts FOI.

CHWs had sufficient knowledge to conduct their work, but also expressed the desire for further, ongoing training as evident in our published data [15]. The additional unpublished findings gathered during the qualitative interviews below show that the community and CHWs themselves were satisfied with the services provided by the CHWs.

*"I just don't know the others but those who work on this demarcation they do. There is nothing that you can ask that they do not know, they tell you the way they know it. They say that they are trained. They are good."* [Community member 1]

*"What I like about our job those who agree we are able to help them. We find that a person is sick and they listen to what we teach, take it and apply, some eventually get better."* - CHW 4

*"They visit people who are sick and for example they visit my next-door because there is someone sick."* [Community member 2]

Studies from other low-and middle-income countries show that various factors may affect the quality of delivery of services by CHWs. These include adequate training and supervision, increased workloads of CHWs, CHW motivation as discussed earlier [16, 19, 20]. Moreover, CHWs may also require psychosocial support and debriefing following experiences with community members exposed to poverty, physical and sexual abuse [21]. Interestingly, Carroll and colleagues propose that quality of delivery may be included with adherence as one of the discrete elements required to assess the FOI of an intervention [2]. However, the above findings corroborate the importance of the inclusion of quality of delivery as a potential moderator to successful implementation instead of as a component of adherence in the framework.

***Participant responsiveness***

Participant responsiveness refers to the manner in which the participants respond to, or engage with the intervention. It involves the opinions of the participants about the relevance and outcomes of the intervention [2]. Community members expressed appreciation for the direct assistance provided to them by CHWs. These include health education, fetching medication, and performing household chores [15]. Mixed perceptions were found to be barriers and facilitators to the CBHP implementation, resulting from stakeholders' perception of acceptability, adoption, and appropriateness. Acceptability is the perception among stakeholders that the intervention in question is agreeable in the given context. This should be assessed based on the stakeholder's perception of the intervention in relation to content, complexity, and comfort [22]. Adoption is the action, intention, or initial decision to employ a given intervention [22]. Adoption can be measured form the perspective of the organisation or provider [22]. Appropriateness is the perceived fit, compatibility, or relevance of the intervention for a given setting, and the perceived fit of the intervention to address a particular problem [22]. The mixed stakeholder perceptions are presented in the additional data below.

*"I don't know what they do. I think they visit people who are sick I have never asked them what they really do."* [Community member 3]

*"Some nurses don't understand the roles of CHW's and they don't give them support. When the patients come with the referral form from the CHW's the nurses misplace them or throw them away. They don't understand the reason why they should keep the referral forms. So the CHW's feel that they are not supported and when I am not around or I am on leave the CHW's don't come to the clinic to give reports because there is no one who will assist them."* [Team leader 1]

*"We have interaction because sometimes I see them passing by visiting people in the community and sometimes they come and inform us about households that do not welcome them. This can disturb their job because they work with people. We have a relationship. We encourage them to give us one or two report in a month so we can see know how they work."* [Community leader 1]

Studies show that factors affecting the community's acceptability and adoption of an intervention or programme is largely dependent on the community's perception that the CHWs are appropriately trained in terms of understanding the disease and the delivery of the programme [23]. Moreover, a number of other factors such as self-perceived level of competence of CHWs, acceptance of the programme by other healthcare workers, adequate resources, remuneration, and incentives also play a pivotal role in the acceptance and adoption of the programme, as seen in other studies [24].

Based on the salient findings above, we suggest that acceptability, adoption, and appropriateness should be explicitly specified under participant responsiveness as these are key elements to assess FOI as they will largely influence the success of programme implementation [22].

### *10.4.3 Additional potential moderators not included in framework*

In our studies and through literature review, we identified several other potential moderators that we think should be included in the framework for evaluation of FOI. The potential moderators not included in the original framework, but emerging from our research studies are: a) organisational readiness, b) contextual factors, and c) stakeholder involvement.

#### *Organisational readiness*

Based on findings from the qualitative research, the most noteworthy barriers to organisational readiness were human resource challenges and inadequate resources [15]. Inadequate number of CHWs deployed and sub-optimal attrition of CHWs not only affects CHW workload, as described in this study, but may result in long term effects. These include the loss of knowledge from the communities about CHWs and their roles and challenges with stakeholder relationship building, as shown in other published studies [25, 26]. In this study, CHWs also reported the inadequate supply of resources as a barrier, which directly impacts their ability to perform their duties, thus affecting

programme outcomes [15]. It is imperative for CHWs to have adequate resources and space allocated to them to conduct their duties. Studies show that scale-up of programmes often fail to yield successful outcomes due to the failure to identify and secure long term resources [27].

***Contextual factors***

The context in which the CBHP was implemented, and how different contexts affect the CHWs' ability to implement the CBHP were explored. Six critical contexts emerged, including: 1) geographic, 2) social, cultural, and economic, 3) local community, 4) personal and inter-personal relationships, 5) local governance and authority, and 6) local organisational [28].

Although not shown in the community survey that we conducted, [6] our qualitative findings show that the main geographic factors that affect the CHWs' performance are the long distances between the PHC facilities and the households where CHWs have to deliver their work, and the lack of accessible and affordable transportation [15]. This is consistent with findings from a study by Le roux and colleagues which found that the poor condition of roads with limited public transport make it difficult for the CHWs to reach individuals in the community, and also result in individuals having to walk long distances for several hours to access PHC facilities [29]. Another study showed that the lack transport also inhibited field supervision by the CHW supervisors. This reiterates the need for adequate logistics, resources, and transport, as previously mentioned, to be put in place during the planning stages of such programmes. The lack thereof, often results in CHWs becoming demotivated and unappreciated as seen in this study [28].

Social, cultural, and economic contexts were also identified to affect the effectiveness of the CBHP. High levels of poverty affect the CHWs in two ways. Firstly, they are not remunerated adequately and secondly, they report having to support the poverty-stricken patients that they visit by providing food and money for transport to the PHC facilities. This places further financial strain on the CHWs. The issues surrounding CHW remuneration is not unique to this CBHP [28].

The local community, personal, and interpersonal relationships affect the CHWs' work in various ways. The most salient factors related to the local community were HIV-related stigma, cultural beliefs about illness, and community experiences of HIV [28]. This finding is corroborated Busza and colleagues who noted that community contexts where HIV remains stigmatised result in difficulties in CHWs accessing patient populations. They reiterate the importance of explicitly discussing and managing stigma-related challenges from the outset of programmes [30]. Moreover, interpersonal relationships

between CHWs and community members, health care workers, social workers and NGOs also played a pivotal role in the successful functioning of the CBHP. This was evident in the unpublished data below:

> *"I think primary health care deals with health information, giving preventative and promotional information as the sister has mention campaigns, I think our role as primary health care is information giving. So we need to try by all means in various areas to improve our communication; can be mass campaigns, door to door campaigns, or through imbizos consulting each and every person including the stakeholders. They have to get the information and that is our basic role, and even if they come here at the clinic we do mass health education and individual health education during their consultation depending on the client's problem. So that information must include the issue of stigmatisation. You can find that the client has all the information but he or she decides to default on treatment. I think our key is to strengthen health information."* [Facility Nurse 1]

Themes that emerged in terms of local governance and authority and local organisational contexts as negatively affecting CBHP implementation include: a) tensions between the National Department of Health (NDoH) and non-government organisations (NGOs) responsible for paying CHWs, b) staff shortages within the NDoH, c) the lack of formally designated WBOT leader posts, d) the overburdening of CHWs in terms of their reporting requirements, and e) the lack of effective integration of social workers into the WBOTs operational strategies. The above mentioned challenges are largely due to the absence of a national policy. Each province has its own policy, which perpetuated the debate about recruitment of CHWs, stipend payment, CHW roles, and the management of CHWs [28, 31]. This corroborates the need for policies to be in place in order to prevent stakeholders from experimenting with different forms of the CHW programme, and to provide clear guidelines regarding programme implementation [32].

Contextual factors should be assessed as a potential moderator to FOI, as implementation outcomes are largely dependent on the contexts in which the programme is implemented [33]. Understanding these factors relevant to a primary healthcare setting before implementation is critical for translating evidence-based interventions into practice settings [34]. In addition, the systematic assessment of contextual factors affecting implementation throughout the implementation process is imperative for quality improvement and to translate lessons learned to other healthcare settings [34].

***Stakeholder involvement***

The published data from this study show that inadequate stakeholder involvement appeared to hinder successful implementation of the CBHP to a large extent [15]. Studies also show that key policy makers and healthcare staff need to strongly champion and support CHWs programmes to build credibility of CHWs within the communities they serve and within the health systems in which they are expected to function [16, 32]. Meetings were held with the relevant stakeholders before implementation of the CBHP, but buy-in was not obtained from all stakeholders. Formal networks of support from the NDoH (the employer), NGOs, operational managers (OPMs) and social workers were reported to be limited. The CHWs more informal networks such as the community (the recipients) and community leaders largely played a role in supporting implementation of the programme [15].

A limitation to this study is that traditional healers were not interviewed. However, it was reported that meetings were held with the traditional healers to inform them about the CBHP. Following these attempts, some traditional healers acknowledged the importance of primary health care, while others adversely affected the health-seeking behaviour of the community.

> *"There is no support from department of health, leadership of counsellors and other department stakeholders. How do you expect the program to run smoothly? The only person that I can say that they are supporting it is traditional leaders. When we have challenges traditional healers try by all means to help us."* [CHW 5]

> *"There should be a campaign that educates them. Lot of people do not believe that you can get healed at the hospital. They think what they do is the best. They need to be educated that the hospital can improve one's health…."* [CHW 6]

Community leaders were supportive of the CHWs and engaged with them. This facilitated easier access to households in their communities. Community leaders also provided opportunities for CHWs to address community members at meetings which enabled them to encourage ongoing participation in the programme. However, there were a few instances where community leaders stated that they had not been consulted or told about the CBHP. These particular community leaders felt that they should have been included in the roll-out of the programme, but did not express any further negativity about CHWs.

> *"We don't have enough information about CHWs. What they do when they get to households I don't have enough information. There is no single day that they have visited me, so I cannot speak for them"* [Community leader 2]

It is critical for all stakeholders to be engaged from the planning stages of the programme to establish trust, to gauge the commitment and capacity of stakeholders to participate in the implementation process, and to secure adequate resources and infrastructures to collaboratively address health problems. As such, stakeholder engagement should be consistent throughout all phases of the implementation process [35]. In addition, key policy makers and healthcare staff should strongly champion and support CHWs [16, 32]. Evidence from this PhD study and other studies warrant the inclusion of stakeholder involvement as a key potential moderator as stakeholder involvement is critical in adapting programmes for specific populations. The proposed inclusions to the measurement of potential moderators to implementation fidelity are proposed in **Figure 10.3**.

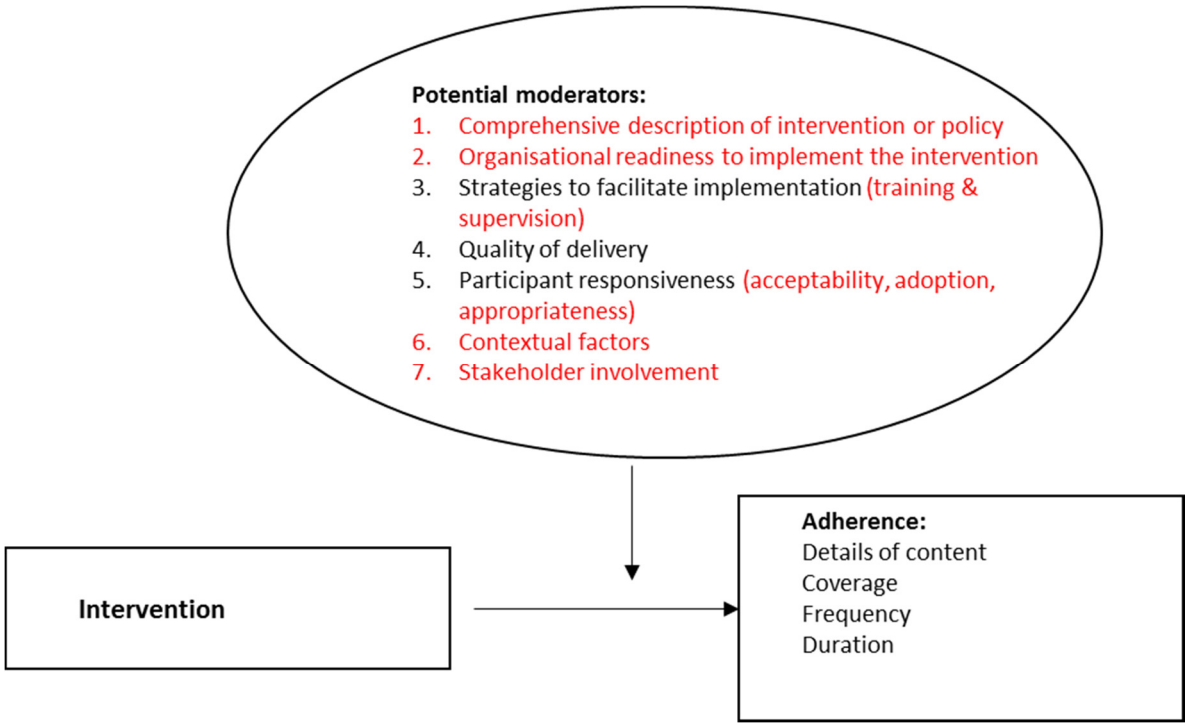



**Figure 10.3: Proposed inclusions to the measurement of potential moderators to implementation fidelity. Proposed adaptations are presented in red font.**

### *10.4.4 Outcomes*

Finally, we measured outcomes of the HIV services delivered by CHWs and the impact of these services on the CBHP. Measuring outcomes of CBHP assist in identifying components that are essential to the intervention and provides useful information to improve the programme [2]. The selection of outcomes to be assessed is dependent on the intervention or programme, and is therefore not specified in the framework. This programme-specific approach is appropriate. However, it is important to determine the outcomes that the intervention will be measured against before conducting the

evaluation. Outcomes should align with the programmes goals. In this PhD research study HIV-related health service outcomes of the CBHP were measured including case-finding, ART initiation and retention in care. These outcomes were measured by assessing the proportion of a) at-risk individuals tested for HIV after CHW referrals, b) HIV-infected individuals on ART to whom adherence support was provided, and c) HIV-infected individuals re-engaging care following tracing and referral back to the facility by CHWs.

The findings from this PhD research study indicate that CHWs have the potential to improve HIV services. However, referrals for HTS, coverage of ART support services, and quality of service provision need to be strengthened for the programme to deliver on its full potential [36]. We did not assess the number of individuals that remained in care after re-initiation on ART. This could be considered for future research. These results provide context-specific information which will allow policy makers to make informed decisions regarding alternative strategies to reach individuals that are at work during the day, or stay elsewhere during the week. Effective ways to strengthen HIV services include adequate resource provision, relationship-building, and improved training and supervision [37]. There was no additional data from the PhD research available other than that included in the study referenced [36].

### *10.4.5 Component analysis*

Carroll and colleagues suggest that we use the framework to identify the essential components at the end of the evaluation. However, experiences from this PhD research study such as the challenges in selecting criteria to assess adherence and outcomes indicate that it is imperative to identify the essential components before conducting evaluations in order to guide the evaluation.

The table below summarises the paragraphs above where the findings of this PhD research study and other global studies are related to the elements of the Carroll framework, followed by the proposed changes to the framework (**Table 10.1)**.

**Table 10.1: Findings of PhD research in relation to the conceptual framework for implementation fidelity and proposal of additional elements**

| Element of framework | Published findings from PhD | Unpublished findings from PhD | Findings from global literature | Proposed changes to framework |
|---|---|---|---|---|
| **Adherence** | - Coverage, frequency, duration, and content included appropriately in the framework<br>- Difficult to measure adherence without specifying core and modifiable components | None | - Adapt intervention to contextual factors while adhering to core components of intervention [12] | *Specify core and modifiable components of the intervention* |
| **Potential moderators** | | | | |
| Comprehensiveness of policy description | - Lack of clear articulation of the responsibilities and expectations of CHWs<br>- Researchers may not be assessing a policy per se, but an intervention that could be eventually adopted as part of the policy | None | - Lack of a clear understanding of the positioning within the healthcare system results in miscommunication and the lack of accountability [13, 14] | *Comprehensive description of intervention or policy* |
| Strategies to facilitate implementation | - Need for ongoing supervision and training of the CHWs<br>- Ensure documentation of training provided to CHWs and the health professionals responsible for training CHWs | - Additional training for CHWs to keep abreast with current information<br>- Team leaders be provided with the same training as CHWs | - Critical need for the formal recognition of CHW training and skills [16] | *Clearly specify training and supervision under Strategies to facilitate implementation* |
| Quality of delivery | - CHWs have sufficient knowledge to conduct their work<br>-Community satisfied with the services provided by the CHWs | - Good delivery of content and good duration of the programme<br>- Need for improvements in coverage and frequency of CHW visits | - Adequate training and supervision<br>- High workload of CHWs<br>- CHW motivation affect the quality of service delivery by CHWs [16, 19, 20] | None |
| Participant responsiveness | - Community members appreciate CHWs | - Mixed perceptions in terms of acceptability, adoption, and appropriateness | The following elements affect acceptance and adoption of the programme<br>-Self-perceived level of competence of CHWs<br>- Acceptance of the programme by other healthcare workers<br>- Adequate resources<br>- Remuneration, and incentives [24] | *Specify Acceptability, Adoption, and Appropriateness under Participant responsiveness* |

| | | | | |
|---|---|---|---|---|
| Additional potential moderator | - Human resource challenges<br>- Inadequate resources<br>- Inadequate supply of resources | None | - High turnover of CHWs result in loss of knowledge about CHWs and challenges with stakeholder relationship building [25, 26]<br>- Scale-up of programmes negatively impacted due to lack of long-term resources [27]<br>- Key policy makers and healthcare staff should strongly champion and support CHWs [16, 32] | *Organisational readiness* |
| Additional potential moderator | - Geographic contexts<br>- Social, cultural and economic<br>- Local community<br>- Personal and inter-personal relationships<br>- Local governance and authority<br>- Local organisational | - The importance of holding campaigns to improve relationship building and knowledge transfer | - Adequate logistics, resources, and transport should be provided to CHWs [28]<br>- Adequate remuneration for CHWs [28]<br>- Address issues surrounding HIV stigmatisation [30]<br>- Policies and guidelines [32] | *Contextual factors* |
| Additional potential moderator | - Formal networks of support was limited (NDoH, OPMs, NGOs)<br>- Informal networks supported implementation of the CBHP (CHWs, community leaders) | - Meetings held with the relevant stakeholders<br>- Buy-in not obtained from all stakeholders | - Critical for all stakeholders to be engaged from the planning stages<br>- Establish trust and gauge commitment of stakeholder<br>- Ensure organisational capacity<br>- Secure adequate resources and infrastructure [35]<br>- Key policy makers and healthcare staff should strongly champion and support CHWs [16, 32] | *Stakeholder involvement* |
| **Outcomes** | Improvement of the following HIV services needed:<br>- Referrals for HTS<br>- Coverage of ART support services<br>- Quality of service provision | None | Strengthen HIV services by providing:<br>- Adequate resources<br>- Relationship-building<br>- Training and supervision [37] | *Determine the outcomes that the intervention will be measured against before conducting the evaluation* |

## 10.5 PROPOSED ADAPTED CONCEPTUAL FRAMEWORK FOR IMPLEMENTATION FIDELITY

Based on our findings we propose an adapted conceptual framework for implementation fidelity **(Figure 10.4)**. We propose retaining the assessment of adherence by measuring details of content, coverage, frequency, and duration. Implementation of the intervention and measurement of outcomes should also be retained while distinguishing between core and modifiable components of

the intervention and specifying outcomes to be measured a priori. With regard to potential moderators, we suggest to retain the components comprehensiveness of policy, quality of delivery, strategies to facilitate implementation, and participant responsiveness. However, we suggest that the following adaptations: a) comprehensiveness of interventions should be as an alternative to comprehensiveness of policy, b) training and supervision should be specified as strategies to facilitate implementation and c) acceptability, adoption, and appropriateness should be specified under participant responsiveness.

In addition, the following components should be included as potential moderators: a) organisational readiness to implement the intervention, b) contextual factors, and c) stakeholder involvement. Finally, we suggest that instead of conducting a component analysis to identify essential components of the intervention, a component analysis should be conducted to identify components for further adaptation. The proposed amendments are highlighted in red font in the figure below **(Figure 10.4)**.

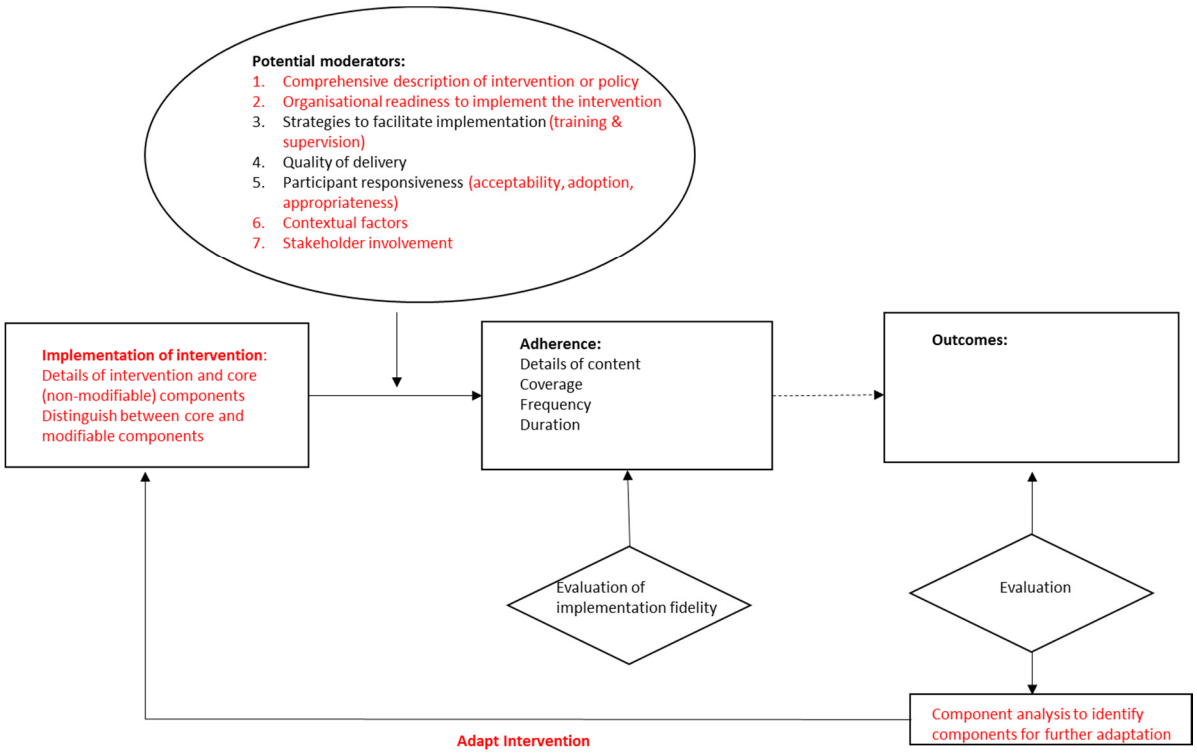



**Figure 10.4: Proposed adapted conceptual framework for implementation fidelity (adapted form Carroll et al. [2]). Proposed adaptations are presented in red font.**

## 10.6 DISCUSSION OF ADAPTED FRAMEWORK AND CONCLUSIONS

Adopting the Carrol framework to evaluate FOI of the CBHP provided useful information with regard to successes and challenges of programme implementation, while highlighting potential moderators to FOI. This information can be used to improve implementation of the CBHP. Our findings also revealed gaps in Carrol the framework which were used to revise the framework. We then propose an adapted conceptual framework for implementation fidelity that can be used in a rural African setting. These findings are corroborated by other researchers who have empirically tested the conceptual framework for implementation fidelity [5, 9, 38, 39].

This PhD research study presents a systematic approach to evaluate FOI and the potential moderators to successful implementation of a CBHP using a conceptual framework. The findings are important as these provide insight with regard to FOI of the CBHP and barriers and challenges to successful implementation of CBHP. For example, assessing adherence showed that scale-up of the CBHP, while improving coverage and frequency of CHW visits is warranted. Assessing potential moderators to successful implementation showed the importance of taking into account contextual factors, stakeholder involvement, and organisational readiness to implement the CBHP. In addition, choosing the appropriate outcomes before conducting the evaluation is important to establish the components that are essential to the intervention and to determine which outcomes the intervention will be measured against. This information will strengthen scale-up and implementation of the South African CBHP. The proposed adapted conceptual framework for implementation fidelity can be used for the ongoing assessment of the CBHP and to assess programmes implemented in other rural African settings, similar to that of the South African CBHP.

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# CHAPTER 11

## GENERAL DISCUSSION, RECOMMENDATIONS, AND WAY FORWARD

## CHAPTER 11: GENERAL DISCUSSION, RECOMMENDATIONS, AND WAY FORWARD

This thesis described a comprehensive evaluation of fidelity of implementation (FOI) of the community-based HIV programme (CBHP) delivered by community health workers (CHWs) in a rural South African District. It is important to measure FOI to ensure that the CBHP delivers on its full potential. Implementation science is a relatively novel field. This study is unique in that it assesses FOI of a rural CBHP, in the context of human immunodeficiency virus (HIV). Mopani district was one of the first districts in South Africa to have a fully operational CBHP, and is therefore at the forefront of implementing strategies to improve community health. In addition, evaluating the fully operational CBHP allowed for the assessment of the impact of CHW activities on programme outcomes. Several components of the CBHP were assessed and the findings highlight the potential of CHWs to improve HIV services in rural communities. The context-specific findings can be used to help policy-makers make informed decisions regarding programme scale-up. Moreover, these findings may be pertinent to other rural CHW programmes that are in the installation phase of implementation.

The objectives of this PhD research study and the methods undertaken to address them are summarised below:

1. To measure fidelity as defined in local guidelines of CBHP implementation by CHWs from the community's perspective. This was addressed by conducting a cross-sectional study to assess adherence to implementation of the CBHP.
2. To explore barriers and facilitators to the successful implementation of the CBHP. This was addressed by conducting an exploratory study including several stakeholders.
3. To explore the contexts in which the CBHP is implemented, and how these contexts affect the CHWs' ability to support the CBHP. This was addressed by conducting the same exploratory study as in objective 3.
4. To characterise HIV services delivered by CHWs and to assess the impact of these services on the CBHP. This was addressed by conducting a cross-sectional study to measure the impact of HIV services provided by the CHWs.

### 11.1 RECOMMENDATIONS FOR POLICY AND PROGRAMME IMPLEMENTATION

The findings from this PhD research study have several policy and practice implications for the CBHP. Recommendations for improvement of the CBHP are made below and reflect the importance of taking all the elements into account that are included in the proposed adapted framework for implementation fidelity.

Findings from the assessment of adherence indicate that the number of CHWs to be deployed should be carefully considered taking into account contextual factors, such as distances between the households and CHW workload. Policy makers should consider that successful implementation of any intervention and subsequent scale-up of the intervention requires adequate infrastructures and sufficient resources to meet the increased demand of services provided by CHWs and primary healthcare (PHC) facilities [1]. We suggest that CHW services be extended over the weekends to scale-up coverage [2].

The assessment of potential moderators to FOI show that it is imperative that specific training schedules, CHW performance evaluations, and supervisory mechanisms be put into place to avoid setting the programme up for failure [3, 4]. Moreover, the expertise of CHWs should be acknowledged and utilised in programme scale-up plans [3]. It is also critical that context-appropriate remuneration packages for the CHWs should be carefully considered at the planning stages of the intervention and scaled-up if deemed inadequate, as in the case of the South African CBHP [5]. Permanent employment of CHWs by the National Department of Health (NDoH) should be considered as contractual employment by the NGOs have been shown to lead to other challenges such as inconsistent payment of stipends [4]. In addition, Bennett and colleagues used modelling to show that employing CHWs on a full-time basis requires the smallest workforce, and is most effective and economical [6].

The CBHP should not exist in a silo as a vertical, disease-specific programme. Studies show that HIV service integration with maternal, newborn and child health, and family planning improved health coverage and outcomes [7]. Additionally, clinical and managerial integration of the CBHP into the formal health system and at the community-level is crucial for optimal functioning of the programme, as corroborated by other studies [8].Contextual factors can be addressed largely through relationship building to gain buy-in and by holding campaigns to raise awareness of the CBHP. The CHWs recruited should have the ability to engage well with the community and healthcare professionals. Moreover, stakeholders such as community leaders and traditional healers, who have a substantial influence on the community, should be engaged during the planning stages of the programme to create by-in and knowledge about the programme, thus creating a readiness for implementation. A limitation to this study is that we did not interview members of the provincial and national department of health for operational reasons and due the fact that our study focused on ground-level activities. Future exploratory studies should include the perspective of the higher-level stakeholders to gain insight to their experiences.

The assessment of outcomes of the HIV services delivered by CHWs and the impact of these services on the CBHP indicate that the number of referrals of individuals considered at-risk for HIV and for adherence support was relatively low for what has been documented in our setting. Further training and supervision of CHWs is required to ensure that they better identify at-risk individuals and those with treatment complications. Improved and sustained use of referral cards may assist in monitoring individuals referred to facilities to ensure that they receive adequate treatment, thus improving health outcomes. In addition, the use of mobile technology should be considered to strengthen the CBHP as studies show its potential value in data collection, providing health education, and tracking patients, thus resulting in improved quality of care and services and programme monitoring [9, 10].

The above findings reveal a general policy deficit at the time of this study, due to the lack of a national framework to guide implementation of the CBHP. The reported challenges experienced by the CHWs and other stakeholders can be addressed by providing a national policy that clearly articulates a plan for successful implementation and scale-up of the CBHP. A national policy has since been introduced in 2018 [11]. The national policy clearly articulates the roles of the national and provincial departments of health. The NDoH is responsible for providing strategic direction to implementation of the policy in addition to monitoring and evaluation of activities. Some of the key responsibilities of the provincial health departments include providing technical support, appropriate referral systems, adequate training, in addition to securing finance for human resources, and ensuring that there is a clear set of indicators for monitoring implementation of the policy [11]. Below are some of our findings reflected in the new policy, indicating the element of the framework that they address:

- Phased scale-up approach of the programme using poverty index to identify the high priority areas - *Coverage*
- Provision of a standardised scope of work for CHWs to improve potential moderators to FOI - *Comprehensive description of intervention or policy*
- Key skills requirement for the recruitment of CHWs is Grade 12 - *Comprehensive description of intervention or policy*
- WBOT composition has been amended to include 6-10 CHWs, a team leader, and a data capturer – *Coverage and Comprehensive description of intervention or policy*
- NHC approved that enrolled nurses will be recruited as team leaders considering that professional nurses are a scarce human resource - *Comprehensive description of intervention or policy and strategies to facilitate implementation (training and supervision)*

- Timely reporting will be included as an output. Monthly activity data from facilities will be captured into District Health Information Systems (DHIS) - *strategies to facilitate implementation (training and supervision)*

The above inclusions will assist in strengthening scale-up of the CBHP, and thus improve CBHP outcomes. However, the policy lacks some essential components **(Table 11.1)**. The table below summarises the key recommendations for the improvement and scale-up of the CBHP based on our findings.

**Table 11.1: Evidence-based recommendations to inform policy to improve scale-up of the CBHP related to the adapted conceptual framework for implementation fidelity**

| Recommendations | Stakeholders involved | Practice Implications | Element of adapted conceptual framework for implementation fidelity | Recommendations reflected in new policy |
|---|---|---|---|---|
| **Recruitment**<br>- Key skill requirements should be defined<br>- CHWs should possess the ability to engage well with the community and healthcare professionals | - Policy makers<br>- Team leaders | - Recruiters will have a clear indication of the key skills required to recruit CHWs<br>- CHWs will be better prepared for their roles by having a basic education<br>- CHWs will be able to establish relationships with key stakeholders | - *Comprehensive description of intervention or policy*<br><br>- *Strategies to facilitate implementation* | - The new entry-level requirement for CHWs is a Grade 12 qualification |
| **Establishment of a regulatory body**<br>- Regulate standards and practices of CHWs and integration of CHWs into the health system<br>- Regulate adequate remuneration for CHWs<br>- Permanent employment of CHWs<br>- CHWs to work over weekends and be compensated appropriately | - Policy makers | - Successful integration of CHWs into health systems with minimal resistance<br>- CHWs satisfaction and motivation | - *Comprehensive description of intervention or policy* | - There is no mention of a regulatory body in the new policy |
| **Scope of work**<br>- Scope of work should be detailed | - Policy makers<br>- Team leaders | - CHWs and their team leaders will have a standardised scope of work to be implemented in a systematic manner in the 9 provinces<br>- Health professionals will have clarity about CHW roles, competencies, and work load requirements | - *Comprehensive description of intervention or policy* | - The new policy includes an annexure detailing the scope of work of CHWs |
| **Resources and infrastructure**<br>- Resources for CHWs to perform their daily duties | - Policy makers | - Provides an environment conducive to CHWs reaching their full potential | - *Organisational readiness to* | - Included as a key responsibility of provincial health |

| | | | | |
|---|---|---|---|---|
| - Resources for training and refresher training<br>- Adequate infrastructures to hold meetings/trainings and for CHWs to perform their duties | - Provincial operational managers<br>- District operational managers<br>- Team leaders | - Encourages successful programme outcomes | *implement intervention*<br>*- Strategies to facilitate implementation* | departments and districts to assess requirement needs<br>- Progress to be reported quarterly to the National District Health Systems Committee (NDHSC) |
| **Training programme**<br>- Design a context-specific training curriculum for both CHWs and team leaders<br>- Design evaluation for reassessment of training curricula to keep abreast with current knowledge and to address knowledge gaps<br>-Design refresher and advanced training as needed<br>- Identify appropriate trainers of CHWs and supervisors<br>- Documentation of CHW and team leam leader training and expertise | - Policy makers<br>- Provincial operational mangers<br>- District operational managers<br>- NGOs<br>- PHC facility managers<br>- Team Leaders | - Provides a core set of knowledge and skills required by the CHWs and for management of the programme<br>- Context appropriate training will address the health needs of the community | *- Strategies to facilitate implementation (training)* | - Included as an objective to be addressed in the new policy |
| **Supervisory mechanisms**<br>- Establish a management hierarchy<br>- Establish an appropriate supervision model for team leaders to manage and assess CHWs with formal reporting mechanisms | - District operational managers<br>- PHC facility managers<br>- Team leaders | - Establish a good relationship between CHWs and supervisors<br>- Improve communication throughout hierarchy<br>- Promotes accountability and responsibility throughout hierarchy | *- Strategies to facilitate implementation (supervision)* | - Included as an objective in the new policy at PHC facility managerial level |
| **Stakeholder involvement**<br>**-** Engage key stakeholders at all levels for buy-in and continuous support of the programme | - PHC facility managers<br>- Team leaders<br>- CHWs<br>-Community<br>- Team leaders<br>- Social workers<br>- Traditional leaders<br>-Community leaders | - Establish trust and good relationships between key stakeholders<br>- Knowledge transfer between stakeholders<br>- Establishes support among key stakeholders | *- Stakeholder involvement* | - The new policy lacks strategies to engage all key stakeholders<br>- There is mention of NDHSC meetings at provincial level |
| **Scale-up**<br>- Establish a step-wise implementation plan to scale-up the programme<br>- Make informed decisions after consulting with key stakeholders<br>- Conduct a readiness assessment of all sites where scale-up will occur<br>- Plan evaluations at different time points to evaluate FOI and programme outcomes | - Policy makers<br>- Provincial operational mangers<br>- District operational managers<br>- NGOs<br>- PHC facility managers | - Provides political and social capital and sustained support for expanding the programme<br>- Allows for evidence-based adaptations to the programme<br>- Provides accountability of the various stakeholders | *- Stakeholder involvement*<br>*- Organisational readiness to implement intervention*<br>*- Contextual factors* | - The new policy lacks a detailed plan for the scale-up of the programme |

## 11.2 RECOMMENDATIONS FOR FUTURE RESEARCH

Ongoing research is required to further improve and scale-up the implementation of programmes. The findings of this PhD research reveal potential research questions that can be addressed going forward in order to strengthen the scale-up of the South African CBHP. First, the adapted conceptual framework for implementation research requires testing in rural African districts, similar to that of the South African CBHP or urban districts where CHWs are operational. This will shed light as to whether the adaptations we propose result in the improved assessment of FOI and will inform further adaptations of the framework. Second, further research to identify the core components and outcomes of the CBHP is warranted. This information will assist in further improvements and scale-up of the CBHP. Third, further studies to explore the training and supervisory mechanisms of CHWs in relation to CBHP outcomes are warranted. Finally, traditional healers appear to have an influence on health seeking behaviour in the communities in which they reside. Therefore, further exploratory research is needed to further explore these relationships and their impact on the CBHP.

## 11.3 VISION FOR THE SOUTH AFRICAN CBHP

CHWs play an important role in improving HIV services in the communities they serve, as evidenced in the findings of this PhD research study. The CBHP has the potential for scalability, particularly in rural settings with high a HIV burden and where CHWs are a pre-existing cadre of health workers. An important point to consider while scaling up is that the CBHP should not exist as a vertical, disease-specific programme, with marginal recognition of CHWs and poor integration into health systems, as corroborated by other studies [8]. An integrated, horizontal approach to the scale-up of the CBHP is likely to result in improved resource utilisation, better management systems, and retention of patients in the health system.

Scale-up of the CBHP should be guided by a well-designed implementation plan. The implementation plan requires a readiness assessment followed by strategic organisational planning of the district health system, with CHWs being central to its functioning [12]. Familiarity with the communities is critical which may highlight the need for adaptive systems depending on the contexts in which the CBHP is implemented. Therefore, multi-level engagement with key stakeholders is imperative.

Finally, evaluation plans should be designed to assess FOI of the programme at different time-points. Planning for evaluation should include the identification of key indicators, data sources, and stakeholders. Credibility of an evaluation is achieved by sound evidence, professional and ethical standards, and the degree of independence of the evaluator. Moreover, a conceptual framework to

guide the evaluation is essential. In this light, we have proposed an adapted conceptual framework for implementation fidelity that can be used in rural settings. Additional empirical research is warranted to test the adapted framework. The new policy addresses some of the challenges highlighted in this study, but there is need for further iterations and improvements. Policy makers strongly encourage context-specific evaluations such as the one we conducted, that can be used guide further improvements of the policy.

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# CHAPTER 12

## APPENDICES

## Appendix A: Ethics clearance

R14/49 Ms Nireshni Naidoo et al

### HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

### CLEARANCE CERTIFICATE NO. M1611111

| | |
|---|---|
| **NAME: (Principal Investigator)** | Ms Nireshni Naidoo et al |
| **DEPARTMENT:** | School of Public Health<br>Anova Health Institute<br>Mopani District, Limpopo Province |
| **PROJECT TITLE:** | Effects of Implementation of a Community Health Worker Programme on HIV Testing, Treatment Initiation, and Patient Retention in a RuralSouth African District |
| **DATE CONSIDERED:** | 25/11/2016 |
| **DECISION:** | Aprroved unconditionally |
| **CONDITIONS:** | |
| **SUPERVISOR:** | Prof RPH Peters and Dr Jude Igumbor |
| **APPROVED BY:** | Professor P Cleaton-Jones, Chairperson, HREC (Medical) |
| **DATE OF APPROVAL:** | 08/02/2017 |

**This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.**

**DECLARATION OF INVESTIGATORS**

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary in Room 301, Third Floor, Faculty of Health Sciences, Phillip Tobias Building, 29 Princess of Wales Terrace, Parktown, 2193, University of the Witwatersrand. I/we fully understand the conditions under which I am/we are authorized to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit the application to the Committee. **I agree to submit a yearly progress report**. The date for annual re-certification will be one year after the date of convened meeting where the study was initially reviewed. In this case, the study was initially reviewed in November and will therefore be due in the month of November each year. Unreported changes to the application may invalidate the clearance given by the HREC (Medical).

Principal Investigator Signature Date 08/02/2017

**PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES**

## Appendix B: Data collection tool - Community survey (Objective 1)

**EVALUATION OF WARD-BASED OUTREACH TEAMS**

**Anova Health Institute: Consent form and information sheet**

**Introduction**

Hi, my name is_____ I am working for the Anova Health Institute. I would like to invite you to participate in an evaluation that we are conducting. The study is called "Evaluation of Ward-Based Outreach Teams." Before you decide whether or not to participate, I would like to tell you about the study and answer any questions that you have. If you agree to participate, you will be asked to sign a consent form. You will be given a copy of the information sheet to keep. Please note that your participation is voluntary, and you may choose to withdraw from the study at any time. There will be no negative consequences if you choose not to participate, and your choice will not affect any of the health services that you access.

**Why are we doing the study?**

We are interested in understanding how the community health workers operate in the community and whether or not their efforts are helping people access medical care. It is important for us to collect this information in order for us to address any challenges and improve systems that will in turn improve the community's access to medical care. If you agree to participate in this evaluation, we will do an interview with you. Please feel free to discuss any issues that you feel are important for you.

**What will happen during the study?**

If you agree to participate, we will interview you with a standard questionnaire. The questionnaire includes questions about your experiences with community health workers and accessing medical care at your local clinic.

**What will happen if I agree to participate in the study?**

You will be given time to consider participation and all your questions will be answered before you make your decision. If you agree to participate in the evaluation, you will be asked to sign a consent form. If you sign the consent form this will mean that you have read this document, that the evaluation has been explained to you, that all your questions were answered and that you agree to participate in the evaluation. You may withdraw consent from participating in the evaluation at any

time and this will not affect your access to medical care. In that case, all information collected will be destroyed with no negative consequences to you.

**Risks**

We do not think that there is any risk to you from completing the survey. We will treat your answers with confidentiality. We will not share or discuss your answers with the community health worker. You will be asked to disclose your HIV status which you may agree or refuse to disclose.

**Benefit**

There is no direct personal benefit to you from participating in this research. However, findings of this study will be used to optimize the CHW system and this may benefit you and the community in future.

**Confidentiality**

All the information that you provide to us will be kept confidential. We will not mention your name in any of the reports from this evaluation.

If you need more information or you have any questions regarding the evaluation, please feel free to contact

Prof. Remco Peters at 011 581 5011 or Dr. Jean Railton at 015 307 4893 **or**

Human Research Ethics Committee

Prof. Cleaton-Jones

Administrator and Chair

University of the Witwatersrand

Wits Research Office

10th Floor Senate House, East Campus

Johannesburg

Tel: 011 717 1234 / Fax: 011 717 1265

Do you understand what you have read/has been read to you? Please cross an answer below?

☐ Yes ☐ No

Do you agree to participate in this study? Please cross an answer below?

☐ Yes ☐ No

Participant Name Date

_____ _____-_____-20_____

Participant Signature Date

_____ _____-_____-20_____

**Please obtain a signature from an adult witness if the participant is unable to read and write.**

Witness Name Date

_____ _____-_____-20_____

Witness Signature Date

_____ _____-_____-20_____

Do you agree to have your child/children under the age of five weighted by the CHW? Please cross an answer below?

☐ Yes ☐ No ☐ N/A

_____ _____

Child Name Child Surname

_____ _____

Child Name Child Surname

_____ _____

Child Name Child Surname

_____ _____

Child Name Child Surname

_____ _____

Child Name Child Surname

_____ _____

Child Name Child Surname

_____ _____

Child Name Child Surname

Do you agree to be contacted by the CHW if your child/children is/are underweight? Please cross an answer below?

☐ Yes ☐ No ☐ N/A

_____ _____

Interviewer Name Interviewer Surname

_____ Date _____-_____-20_____

Interviewer Signature

**EVALUATION OF WARD-BASED OUTREACH TEAMS**

**Questionnaire to household member – Community survey**

Date filled in: _____-_____-20_____

Person completing the form:_____

Outcome: ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7
Specify_____

**A: HOUSEHOLD INFORMATION**

**1. Who is the person being interviewed?**

☐ Mother ☐ Father ☐ Grandmother

☐ Grandfather ☐ Legal guardian ☐ Other relative

**2. Who takes care of the children at the household?**

☐ Mother ☐ Father ☐ Grandmother

☐ Grandfather ☐ Legal guardian ☐ Other relative ☐ N/A

**3. What is the main source of income?**

☐ Formal ☐ Informal ☐ Seasonal

☐ Grants ☐ Other, specify
_____

**4. How many individuals in the household are?**

>19 years _____ 15-19 years _____ 6-14 years _____ ≤5 years _____

**B: DEMOGRAPHIC INFORMATION**

| | | |
|---|---|---|
| **5. Gender** | ☐ Male | ☐ Female |

**6. Age _____ years**

**7. Ward_____**

**8. Village_____**

**9. GPS: Latitude: _____ Longitude: _____**

**C: CHW VISITS**

**10. Were you visited by a community health worker?**

☐ Yes ☐ No ☐ Unknown/ Refused to answer

**11. When last did your CHW visit you?**

☐ <1 month ☐ <3 months ☐ <6 months ☐ N/A

**12. Would you like the CHW to visit you/ visit you more often?**

☐ Yes ☐ No ☐ Unknown/ Refused to answer

**D: CHW ACTIONS**

**13. What was discussed during the visit with you?**

☐ HIV ☐ TB ☐ Pregnancy ☐ Chronic illness ☐ Other ☐ N/A

**14. What was discussed during the visit with other household members?**

☐ HIV ☐ TB ☐ Pregnancy ☐ Chronic illness ☐ Other ☐ N/A

☐ Unknown/Refused to answer ☐ CHW did not discuss anything with other household members

**15. Do you know your HIV status?**

☐ Yes ☐ No ☐ Unknown/ Refused to answer

**16. Were you referred to the clinic by the CHW for any of the following?**

☐ HIV ☐ TB ☐ Pregnancy ☐ Chronic illness ☐ No ☐ N/A

**17. Was any other household member referred to the clinic by the CHW for any of the following?**

☐ HIV ☐ TB ☐ Pregnancy ☐ Chronic illness ☐ Malnutrition

☐ No ☐ N/A

**18. If referred to the clinic, did you go?**

☐ Yes ☐ No ☐ Unknown/ Refused to answer ☐ N/A

**19. Which clinic did you attend, if referred by the CHW?** ☐ N/A

_____

**20. Have you ever been sent back to the clinic by the CHW?**

☐ ≤6 months ☐ >6 months ☐ Never ☐ N/A

**E: INFORMATION SHARING**

**21. If you had any of the following would you tell your CHW?**

**21.1 HIV** ☐ Yes ☐ No ☐ Unknown/ Refused to answer

**21.2 TB** ☐ Yes ☐ No ☐ Unknown/ Refused to answer

**21.3 Pregnancy** ☐ Yes ☐ No ☐ Unknown/ Refused to answer ☐ N/A

**21.4 Chronic diseases** ☐ Yes ☐ No ☐ Unknown/ Refused to answer

**21.5 Lack of food** ☐ Yes ☐ No ☐ Unknown/ Refused to answer

**22. If not why?** ☐ N/A

_____

**F: PERCEPTIONS**

**23. Are you satisfied with answers given by the CHW to your questions?**

☐ Yes ☐ No ☐ Unknown/ Refused to answer ☐ N/A

**24. Is the CHW welcome to visit you?**

☐ Yes ☐ No ☐ Unknown/ Refused to answer

**25. If not, why?**

☐ Privacy issues ☐ Trust issues ☐ Other, specify_____ ☐ N/A

**26. Do you think your CHW is?**

☐ Friendly ☐ Unfriendly ☐ N/A

**G: WEIGHT OF CHILDREN UNDER 5 YEARS OF AGE**

**27.1 Child 1:** Gender ☐ M ☐ F Date of birth _____-_____-_____ Weight ___.___kg ☐ N/A

**27.2 Child 2:** Gender ☐ M ☐ F Date of birth _____-_____-_____ Weight ___.___kg ☐ N/A

**27.3 Child 3:** Gender ☐ M ☐ F Date of birth _____-_____-_____ Weight ___.___kg ☐ N/A

**27.4 Child 4:** Gender ☐ M ☐ F Date of birth _____-_____-_____ Weight ___.___kg ☐ N/A

**27.5 Child 5:** Gender ☐ M ☐ F Date of birth _____-_____-_____ Weight ___.___kg ☐ N/A

**27.6 Child 6:** Gender ☐ M ☐ F Date of birth _____-_____-_____ Weight ___.___kg ☐ N/A

**27.7 Child 7:** Gender ☐ M ☐ F Date of birth _____-_____-_____ Weight ___.___kg ☐ N/A

**Thank you for your time and input in completing this questionnaire.**

## Appendix C: Consent form and information sheet - Exploratory study (Objectives 2 & 3)

**EVALUATION OF WARD-BASED OUTREACH TEAMS**

**Anova Health Institute: Consent form and information sheet**

**INTRODUCTION**

Hi, my name is_____ I am working for the Anova Health Institute. I would like to invite you to participate in an evaluation that we are conducting. The study is called "Evaluation of Ward-Based Outreach Teams." Before you decide whether or not to participate, I would like to tell you about the study and answer any questions that you have. If you agree to participate, you will be asked to sign a consent form. You will be given a copy of the information sheet to keep. Please note that your participation is voluntary, and you may choose to withdraw from the study at any time. There will be no negative consequences if you choose not to participate, and your choice will not affect any of the health services that you access.

**Why are we doing the study?**

We are interested in understanding how you, the community health workers operate in the community and whether or not your efforts are helping people access medical care. It is important for us to collect this information in order for us to address any challenges and improve systems that will in turn improve the community's access to medical care. If you agree to participate in this evaluation, you will participate in a focus group discussion with other CHWs. A focus group discussion is a method of qualitative data collection from participants with similar backgrounds and experiences. The focus group discussion will be guided by a facilitator who will introduce the topics for discussion and assist the group to participate in a natural discussion. Participants are allowed to agree or disagree with each other. Please feel free to discuss any issues that you feel are important for you.

**What will happen during the study?**

If you agree to participate, we will use a standard questionnaire to discuss the work of CHWs in your community. The questionnaire includes questions about your experiences as community health workers.

**What will happen if I agree to participate in the study?**

You will be given time to consider participation and all your questions will be answered before you make your decision. If you agree to participate in the evaluation, you will be asked to sign a consent form. If you sign the consent form this will mean that you have read this document, that the evaluation has been explained to you, that all your questions were answered and that you agree to participate in the evaluation. If you agree to participate in the evaluation, the discussion will be audio recorded. You may withdraw consent from participating in the evaluation at any time and this will not affect your access to medical care or your role as a community health worker. In that case, all information collected will be destroyed with no negative consequences to you.

**Risks**

We do not think that there is any risk to you from completing the survey. We will treat your answers with confidentiality but because this is a group discussion we cannot guarantee that other participants will not share what you have said. We will not share or discuss your answers with your team leader or other community health workers, and we ask that you also do not share anything that other participants say in this group with anybody else.

**Benefit**

There is no direct personal benefit to you from participating in this evaluation. However, findings of this evaluation will be used to optimize the CHW system and this may benefit you and the community in future.

**Confidentiality**

All the information that you provide to us will be kept confidential. We will not mention your name in any of the reports from this evaluation.

If you need more information or you have any questions regarding the evaluation, please feel free to contact

Prof. Remco Peters at 011 581 5011 or Dr. Jean Railton at 015 307 4893.or

Human Research Ethics Committee
Prof. Cleaton-Jones
Administrator and Chair
University of the Witwatersrand
Wits Research Office
10th Floor Senate House

East Campus

Johannesburg

Tel: 011 717 1234

Do you understand what you have read/has been read to you? Please cross an answer below?

☐ Yes ☐ No

Do you agree to participate in this study? Please cross an answer below?

☐ Yes ☐ No

_____ _____

Participant Name Date

_____ _____

Participant Signature Date

**Please obtain a signature from an adult witness if the participant is unable to read and write.**

_____ _____

Witness Name Date

_____ _____

Witness Signature Date

_____ _____

Interviewer Name Interviewer Surname

_____ Date _____-_____-20_____

Interviewer Signature

**Appendix D: Consent form for audio recording - Exploratory study (Objectives 2 & 3)**

**EVALUATION OF WARD-BASED OUTREACH TEAMS**

**Formal Signed Consent Form for Audio Recording**

The researchers have my permission to audio record this interview/ focus group discussion (circle as appropriate) in order to include all important information. This has been explained to me in the participant information sheet. The evaluation has been explained to me and all my questions were answered to my satisfaction.

_____ _____

Participant Name Date

_____ _____

Participant Signature Date

**Please obtain a signature from an adult witness if the participant is unable to read and write.**

_____ _____

Witness Name Date

_____ _____

Witness Signature Date

_____ _____

Interviewer Name Interviewer Surname

_____ Date _____-_____-20_____

Interviewer Signature

**Appendix E: Interview guide for CHWs (Objectives 2 & 3)**

**<u>Interviewer Script:</u> It is important for us to understand the daily work that you do, so first I would like to ask you about making household visits.**

| |
|---|
| ▪ **Is there anything that you find very rewarding or interesting about doing household visits?**<br>▪ **Is there anything that you find very difficult or challenging about doing household visits?**<br>▪ [probe]: What could be done to overcome these challenges?<br>▪ **How do people in the community treat you when you come to visit them?**<br>▪ **Do you think people listen to you when you discuss HIV and other health issues with them?**<br>▪ [probe]: Why or why not? |
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|---|
| ▪ **How much training did you receive before you had to visit households?**<br>▪ **How well did the training prepare you for visiting households in the community?**<br>▪ **What should be added to the training to make it better?**<br>▪ **What other training do you think CHWs need?** |
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**Interviewer Script:** **I will now ask you about your workload and challenges.**

| ▪ **What is your workload like?**<br>▪ [probe]: What should change to help you reach more people in the community? |
|---|
| |
| |
| |

| ▪ **Do you experience any challenges follow up on patients who do not visit the clinic to collect their medication?**<br>▪ [probe]: Is it easy or difficult to get a list of defaulters? Why?<br>▪ [probe]: What do you find is the best way to contact patients? |
|---|
| |
| |
| |

| ▪ **Do you experience any challenges following upon TB patients?** |
|---|
| |
| |
| |

| ▪ **Do you experience any challenges following up on pregnant women?** |
|---|
| |
| |
| |

**Interviewer Script:** **I will now ask you a few questions about your experience with social workers.**

| ▪ **How do you work with the social workers in your ward? What do you think about the social workers in your ward?**<br>▪ [probe]: What do you think is the role of social workers?<br>▪ [probe]: How does interacting with social workers benefit your role as a CHW?<br>▪ [probe]: Do you encounter challenges with social workers?<br>▪ [probe]: What could be done to overcome these? |
|---|
| |
| |
| |

**Interviewer Script**: **I will now ask you a few questions about your community.**

| |
|---|
| ▪ **What do you think of community leaders?**<br>▪ **How do you deal with negative influences of community leaders?**<br>▪ **What do you think of traditional healers?**<br>▪ **How do you deal with negative influences of traditional healers?** |
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**<u>Interviewer Script:</u> Thank you very much for your time.**

**Appendix F: Interview guides for community members (Objectives 2 & 3)**

**Interviewer Script: I will now ask you a few questions about your experience with community health workers.**

| |
|---|
| ▪ **Were you visited by a CHW in the last 3 months?**<br>▪ **What reason did the CHW give for visiting you?**<br>▪ [probe]: What were your experiences with the CHW?<br>▪ [probe]: What specifically did the CHW do for you? |
| |
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| |
|---|
| ▪ **What role do you think CHWs have in your community?**<br>▪ [probe]: What role would you like CHWs to have in your community?<br>▪ [probe]: Do you think that the CHWs had good knowledge and were able to answer all your questions? |
| |
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| |
|---|
| ▪ **What information did the CHW give you?**<br>▪ **Was this information useful to you?** |
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| |

| ▪ **What makes a good CHW?** |
|---|
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| |

| ▪ **How comfortable do you feel sharing information about your health with your CHW?** |
|---|
| |
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| |

**<u>Interviewer Script:</u> Now, I would like to ask you a few questions about your medical history and experiences at the clinic. Please remember that you do not have to answer my questions and you can end the interview at any time.**

| ▪ **Do you know your HIV status?**<br>▪ [probe]: If you were HIV positive, would you tell your family?<br>▪ [probe]: If not, why?<br>▪ [probe]: If you were HIV positive, would you tell the CHW?<br>▪ [probe]: If not, why? |
|---|
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| |

| ▪ **If HIV-positive, have you been visiting the clinic?**<br>▪ [probe]: If not, why?<br>▪ [probe]: If not, have the CHWs visited you to remind you to go to the clinic?<br>▪ [probe]: What were your experiences of the CHWs when they came to remind you?<br>▪ [probe]: After being reminded by the CHW, did you visit the clinic?<br>▪ If not, why? |
|---|
| |
| |
| |

| |
|---|
| ▪ **If you visited the clinic, what were your experiences at the clinic?**<br>▪ **Do you think there is anything that could be improved at the clinic?** |
| |
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| |
|---|
| ▪ **What do you think about having a support group for people taking ARVs in your community?**<br>▪ [probe]: Would you attend a group like this?<br>▪ [probe]: If not, why? |
| |
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| |
|---|
| ▪ **Have you ever been in contact with social workers and home based carers?**<br>▪ [probe]: If so, what were your experiences?<br>▪ [probe]: How do you think these interact with the CHWs? |
| |
| |
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| |
|---|
| ▪ **Have you ever visited a traditional healer?**<br>▪ [probe]: If so, for what reason?<br>▪ [probe]: What do think are the role of traditional healers in the community?<br>▪ [probe]: If given a choice, would you go to the clinic or traditional healer for health related problems? |
| |
| |
| |

**Interviewer Script: Thank you very much for your time and opinions.**

**Appendix G: Interview guide for Community leaders (Objectives 2 & 3)**

**Interviewer Script: I will now ask you a few questions about your experience with community health workers.**

| ▪ **Do you have interaction with the CHWs?**<br>▪ [probe]: If so, what are your experiences with them? |
|---|
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| |

| ▪ **What do you think are the roles of CHWs?**<br>▪ [probe]: Do you think CHWs are useful?<br>▪ [probe]: Why?/Why not? |
|---|
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| |

**Interviewer Script: I will now ask you a few questions about your roles and challenges as a community leader.**

| ▪ **What are your roles as a community leader?**<br>▪ [probe]: How does your role affect the roles of the CHWs? |
|---|
| |
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**Interviewer Script: Thank you very much for your time and opinions.**

**Appendix H: Interview guide for facility nurses (Objectives 2 & 3)**

**Interviewer Script: I will now ask you a few questions about your experience with community health workers.**

| |
|---|
| ▪ **What has been your experience of the CHWs?**<br>▪ [probe]: How often do CHWs visit the clinic?<br>▪ [probe]: How often do you have meetings with them?<br>▪ [probe]: If so, what do you discuss in the meetings? |
| |
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| |
|---|
| ▪ **How do CHWs affect your workload at the clinics?**<br>▪ [probe]: How does this affect patient linkage to care?<br>▪ [probe]: How does this affect the quality of data collected?<br>▪ [probe]: Has workload challenges (if this is the case) been addressed with the facility managers?<br>▪ [probe]: If so, have there been any improvements since? |
| |
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| |

**Interviewer Script: I will now ask you a few questions about defaulting patients.**

| |
|---|
| ▪ **What do you think are the main reasons people default on treatment in this area?**<br>▪ **How does the facility deal with defaulters?**<br>▪ [probe]: Is a defaulter list generated?<br>▪ [probe]: What is the role of the CHWs in this process?<br>▪ [probe]: How can CHWs improve in dealing with defaulters?<br>▪ [probe]: If defaulters are not dealt with, why is this?<br>▪ [probe]: What is needed to optimize defaulter tracing?<br>▪ [probe]: How can we optimize defaulter tracing? |
| |
| |
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| |
|---|
| ▪ **What do you think helps defaulters return to the clinic for treatment?**<br>▪ [probe]: Why do you think some defaulters don't return to the clinic? |
| |
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| |

**Interviewer Script: Thank you very much for your time and opinions.**

**Appendix I: Interview guide for Social Workers (Objectives 2 & 3)**

**Interviewer Script: I will now ask you a few questions about your experience with community health workers.**

| |
|---|
| ▪ **What are your experiences with the CHWs?**<br>▪ [probe]: Do CHWs visit the clinic?<br>▪ [probe]: Have you experienced any specific challenges with the CHWs? |
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|---|
| ▪ **How do the CHWs affect your workload?**<br>▪ [probe]: Do you find CHWs useful in the system?<br>▪ [probe]: What could they do for you? |
| |
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| |

**Interviewer Script: I will now ask you a few questions about your roles and experiences as a social worker.**

| |
|---|
| ▪ **What are your roles in the community?**<br>▪ [probe]: How manageable do you find your job at present?<br>▪ [probe]: What are some of the challenges that you face?<br>▪ [probe]: What can be done to improve the challenges? |
| |
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| |

**Interviewer Script: Thank you very much for your time and opinions.**

**Appendix J: Interview guide for team leaders (Objectives 2 & 3)**

**Interviewer Script: I will now ask you a few questions about your experience with community health workers.**

| |
|---|
| ▪ **How often do you meet with the CHWs?**<br>▪ [probe]: What is discussed during the meetings?<br>▪ [probe]: Do you find these meetings useful?<br>▪ **What could be done to make these meetings more useful?** |
| |
| |
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| |
|---|
| ▪ **What are some of the challenges reported to you by the CHWs?**<br>▪ [probe]: What is being done to address these challenges? |
| |
| |
| |

**Interviewer Script: I will now ask you a few questions about your roles and challenges as a team leader.**

| |
|---|
| ▪ **How do you understand your role as a team leader?**<br>▪ [probe]: Do you feel that your workload is manageable?<br>▪ [probe]: What are some of the challenges that you face?<br>▪ [probe]: What can be done to improve the challenges? |
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**Interviewer Script: Thank you very much for your time and opinions.**

## Appendix K: Data collection tools for cross-sectional study (Objective 4)

**EVALUATION OF WARD-BASED OUTREACH TEAMS**

**Patient linkage form**

**Evaluation of Ward-Based Outreach Teams: PATIENT LINKAGE FOR DATA TRIANGULATION**

Date completed: _____-_____-20____ Person completing the form: _____

Facility: _____ Ward: _____ CHW name: _____

Time period covered: _____-_____-20_____ to _____-_____-20_____

**A: CHW WORKLOAD (TOTALS)**

**Total number households visited: _____**
**Total number clients screened for: 1A _____ 1B_____ 1C_____ 1D_____ 5A_____ 5B_____ 5C_____**
**Total referred to clinic (C) for chronic screening: 1A _____ 1B_____ 1C_____ 1D_____ 5A_____**
**5B_____ 5C_____ 8A _____ 8B_____ 8C_____ 8D_____**
**Total adherence support on chronic treatment: 8A _____ 8B_____ 8C_____ 8D_____**
**Total tracing for clinic: _____**
**Total client found & referred to clinic (9): _____**

**B: CLIENT DETAILS**

| Name | Surname | Gender | Date of birth | Date referred | Reason referral | Study ID |
|---|---|---|---|---|---|---|
| | | | ___-___-____ | ____-____-20_____ | 1A 1B 1C 1D 5A 5B 5C 8A 8B 8C 8D 9 | DT ___/___/___/___/___ |
| | | | ___-___-____ | ____-____-20_____ | 1A 1B 1C 1D 5A 5B 5C 8A 8B 8C 8D 9 | DT ___/___/___/___/___ |
| | | | ___-___-____ | ____-____-20_____ | 1A 1B 1C 1D 5A 5B 5C 8A 8B 8C 8D 9 | DT ___/___/___/___/___ |
| | | | ___-___-____ | ____-____-20_____ | 1A 1B 1C 1D 5A 5B 5C 8A 8B 8C 8D 9 | DT ___/___/___/___/___ |
| | | | ___-___-____ | ____-____-20_____ | 1A 1B 1C 1D 5A 5B 5C 8A 8B 8C 8D 9 | DT ___/___/___/___/___ |

**EVALUATION OF WARD-BASED OUTREACH TEAMS**

## Patient linkage form

Date completed: _____-_____-20____ Person completing the form: _____

Facility: _____ Time period covered: _____-_____-20_____ to _____-_____-20_____

| Study ID | Reason referral | Headcount Register | PHC Register | Tier.Net | HCT Register | TB Register | TB Suspect Register | Patient file | Date of clinic visit | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| DT ___/___/___/___/___ | 1A 1B 1C 1D 5A 5B 5C 8A 8B 8C 8D 9 | 1A 1B 1C 1D 5 8A 8B 8C 8D 9 | 1C 1D 5 9 | 1B 8B 9 | 1B 8B 9 | 1A 8A 9 | 1A 8A 9 | 1A 1B 1C 1D 5A 5B 5C 8A 8B 8C 8D 9 | ___-___-20__ | |
| DT ___/___/___/___/___ | 1A 1B 1C 1D 5A 5B 5C 8A 8B 8C 8D 9 | 1A 1B 1C 1D 5 8A 8B 8C 8D 9 | 1C 1D 5 9 | 1B 8B 9 | 1B 8B 9 | 1A 8A 9 | 1A 8A 9 | 1A 1B 1C 1D 5A 5B 5C 8A 8B 8C 8D 9 | ___-___-20__ | |
| DT ___/___/___/___/___ | 1A 1B 1C 1D 5A 5B 5C 8A 8B 8C 8D 9 | 1A 1B 1C 1D 5 8A 8B 8C 8D 9 | 1C 1D 5 9 | 1B 8B 9 | 1B 8B 9 | 1A 8A 9 | 1A 8A 9 | 1A 1B 1C 1D 5A 5B 5C 8A 8B 8C 8D 9 | ___-___-20__ | |
| DT ___/___/___/___/___ | 1A 1B 1C 1D 5A 5B 5C 8A 8B 8C 8D 9 | 1A 1B 1C 1D 5 8A 8B 8C 8D 9 | 1C 1D 5 9 | 1B 8B 9 | 1B 8B 9 | 1A 8A 9 | 1A 8A 9 | 1A 1B 1C 1D 5A 5B 5C 8A 8B 8C 8D 9 | ___-___-20__ | |
| DT ___/___/___/___/___ | 1A 1B 1C 1D 5A 5B 5C 8A 8B 8C 8D 9 | 1A 1B 1C 1D 5 8A 8B 8C 8D 9 | 1C 1D 5 9 | 1B 8B 9 | 1B 8B 9 | 1A 8A 9 | 1A 8A 9 | 1A 1B 1C 1D 5A 5B 5C 8A 8B 8C 8D 9 | ___-___-20__ | |