Final Report

PMTCT Implementation in Rural Community Health Centres in Mpumalanga Province, South Africa

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Acronyms

AIDS	Acquired Immune Deficiency Syndrome
ANC	Antenatal Care
ART	Antiretroviral Therapy
ARV	Antiretroviral
AZT	Azidothymidine
CDC	United States Centers for Disease Control and Prevention
CHC	Community Health Centre in South Africa
CD4	Cell Differentiation
CT	Counselling and Testing
DHIS	District Health Information System
FANRPAN	Food, Agriculture and Natural Resources Policy Analysis Network
FP	Family Planning
HIV	Human Immunodeficiency Virus
HSRC	Human Sciences Research Council of South Africa
IMCI	Integrated Management of Childhood Illnesses
LSA	Local Service Area
MCH	Maternal and Child Health
MPI	Male Partner Involvement
MTCT	Mother-to-Child Transmission of HIV
NIH	National Institutes of Health
NVP	Nevirapine
PCR	Polymerase Chain Reaction
PEPFAR	President's Emergency Plan for AIDS Relief (United States)
PLWHA	Person Living with HIV and AIDS
PMTCT	Prevention of Mother-to-Child Transmission of HIV
PN	Professional Nurse
PNC	Postnatal Care
SPSS	Statistical Package for Social Services
TB	Tuberculosis
VCT	Voluntary Counselling and Testing
UNAIDS	Joint United Nations Programme on AIDS
WHO	World Health Organisation

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Abstract

As part of a global plan, the Joint United Nations Programme on HIV and AIDS (UNAIDS) implemented a plan to reduce the prevalence of vertical transmission of HIV from 72,200 to approximately 8,300 newly infected children by the year 2015. Gaps in the implementation and uptake of the protocol for the prevention of mother to child transmission (PMTCT) of HIV occur at all stages of the ante-, peri- and postnatal process in South Africa, with some rural areas continuing to register unacceptably high levels of MTCT. Cultural, infrastructural, and socioeconomic influences are common barriers to PMTCT implementation. Although barriers have been reported, research on potential solutions to address these barriers is scarce, particularly as it relates to rural areas. This study aimed to identify challenges and solutions to the implementation and sustainability of the PMTCT protocol in rural South Africa.

Quantitative Study. To explore organizational and individual characteristics affecting the capacity for service delivery and adoption of PMTCT, and assess the implementation, acceptability, fidelity, coverage of PMTCT, 12 CHCs in rural Mpumalanga Province, South Africa were evaluated. Community health centres (n = 12 CHCs) in rural communities with high rates of vertical transmission ($\geq$13%) within the Gert Sibande and Nkangala Districts in Mpumalanga Province were included in the study. Clinic staff members surveyed (N = 103) were 10 (deputy) operational managers/sisters in charge, 56 nurses, and 37 counsellors (lay counsellors, PMTCT counsellors, and mother-to-mother counsellors). There was a significant difference in attitudes and perceived organizational barriers by job title (F (2, 100) = 8.19, p <.001), such that management were most enthusiastic about implementation and reported the fewest organizational barriers, nurses second, and counsellors the highest level of organizational barriers. The most variable PMTCT protocol indicators were provision of ART during labour, HIV retesting at 32 weeks pregnancy, maternal ART adherence, attendance at four antenatal clinic visits, delivery at the CHCs, and discussion of contraception and future pregnancies with healthcare providers. The most pervasive failures related to HIV status disclosure and associated gaps in care. Results suggest that gaps in care are not necessarily linked to clinic staff attitudes or perceptions, and that ongoing efforts to implement district-level, data-driven quality improvement processes in rural communities are needed to improve the performance of the PMTCT programme. Although PMTCT data suggests its implementation varies across clinic sites, it is unclear what characteristics of organizations and/or individuals contribute to this variation. Strategies are needed to promote fidelity and coverage of PMTCT, if sustainability of the programme is to be achieved in the rural community health centre system and its public health potential maximized.

Qualitative Study. To further explore characteristics affecting the capacity for service delivery and adoption of PMTCT in rural Mpumalanga Province, the CHCs previously described were also evaluated qualitatively. Forty-eight qualitative interviews, 12 focus groups discussions, and one 2-day workshop composed of 10 groups, were conducted with district directors, clinic leaders, staff, and patients at the 12 CHCs. Stem questions addressed challenges in providing HIV care at the clinics, and recommendations on how to address such challenges. In results, two major themes emerged: (1) health system level challenges and solutions to PMTCT and (2) patient level challenges and solutions to PMTCT. Health system challenges and solutions included those related to clinic facility, PMTCT training of healthcare staff, and professional relationships among healthcare staff and patients. Patient level challenges and solutions addressed the initial antenatal care (ANC) visit, culture and stigma, disclosure, male involvement, condom use, transportation and scheduling, and adherence to the PMTCT protocol. In conclusion, results obtained from local stakeholders provide valuable insight into approaches to commonly reported barriers to PMTCT implementation. Such findings may inform the implementation of the PMTCT protocol in other regions and assist in achieving reductions in vertical transmission of HIV in rural South Africa.

Sub-study: Loss to Follow-up. To assess factors impacting patient follow-up, 11 male and female fieldworkers and field coordinators were interviewed for 30 minutes using a structured questionnaire. The qualitative interviews were transcribed verbatim, loaded into ATLAS.ti (qualitative data analysis software) and analysed using grounded theory. Results indicate that loss to follow-up occurs for many reasons, including fast tracking to delivery, group dynamics, and cultural reasons. As patients attempt to fast track ANC, they present only at first visit in order to receive a maternal record patient file and then return

at delivery. Due to this, these women do not attend any intervention and do not gain knowledge that is provided between first visit and delivery. In terms of group dynamics, each community is made up of different subgroups of people and these subgroups at times do not engage well with each other, leading some women to not attend the clinic and therefore become lost to the system. Care needs to be taken when dealing with different population subgroups to ensure harmony. Culture plays an important role in loss to follow-up as women go to their ancestral village to deliver the baby. They typically leave early enough to take the pre-birth traditional medication, and are then subject to post-natal seclusion and finally have to perform cultural rituals at the ancestral home of both parents. This starts at around 32 weeks pre-natal and could last up to six months post-natal. During this time, the women are lost to the clinic they first presented at and could seek treatment at numerous other clinics/hospitals during this period. Women may then open up new records at every new facility and their records of care may never be transferred between facilities.

Dissemination and Implementation Workshop and Conference. In order to strengthen the South African infrastructure to implement PEPFAR programmes using implementation science methods, both training and mentoring were addressed. A workshop was held at the HSRC, "Dissemination and Implementation Science Training Workshop - A Collaborative Model for Building Implementation Science Capacity in South Africa" on September 8th – 9th 2014. Workshop attendees (*n* = 32) included Department of Health senior staff, clinic managers, professional nursing staff, community health centre facility operation managers, a clinic committee member; sub-district HIV, AIDS and STI (HAS) managers, district HAS manager, scientists (HSRC, MRC, FHI) and a policy maker (*n* = 32). The workshop included breakout sessions by discipline to brainstorm challenges to PMTCT uptake, and breakout sessions by mixed-disciplines to brainstorm solutions to enhance PMTCT uptake. Existing and novel solutions to PMTCT gaps in care were proposed and reviewed. Attendees were invited to propose novel strategies for enhancing PMTCT uptake, and to apply for support to attend the NIH Dissemination & Implementation Conference, held in Washington, DC, in the United States. As a result, one site was funded as a demonstration project to implement a novel strategy to improve uptake of HIV disclosure, referral for medication and medication uptake among perinatally infected children, and two scientists proposed novel implementation science projects (1) improving HIV outcomes and (2) HIV prevention in the prison system, and attended the Dissemination and Implementation Conference in the Washington, DC. The proposals were subsequently submitted for funding to the Department of International Development in the United Kingdom, and the Gates Foundation in the United States.

*Sub-study: PMTCT Male Partner Involvement (*MPI*)*. To assess the potential impact of MPI during pregnancy, four focus group discussions in four clinics were conducted in both Nkangala and Gert Sibande Districts with men of unknown HIV status who had fathered at least one child in their lifetime. Men participating described the clinic environment not being very welcoming to men, especially given that most of the clinic staff are women. Some clinics also conduct consultations with women as a group and thus would not allow male partners to be part of the consultation. Participants also mentioned that most men were impatient and could not tolerate waiting in a clinic queue for almost the whole day, as usually happens when women come to the clinic for antenatal care. Cultural beliefs and practices were mentioned strongly as another reason that limits the involvement of men in pregnancy and childbirth. In most local cultures, men are not allowed to be present during childbirth. Participants also reported that there were periods of seclusion during which men are not allowed to see or have any contact with newborn babies until the end of the period. A number of men described being involved in ensuring that their partners were able to be at the front of the queue at the clinic by dividing the process between the man and their female partner. The male partners described a process whereby the men will go to the clinic early in the morning to hold a spot on the queue for their female partner and baby.

Recommendations

Multi-pronged strategies are needed to promote fidelity and coverage of PMTCT. Following recommendations are meant to address (1) infrastructure, (2) health service issues, (3) staff related issues, and (4) community related issues, as follows:

(1) Infrastructure

- Upgrade existing clinic infrastructure to cope with high (PMTCT) patient load.
- Expand quality control system for data entry of medical records, case registers (patient records), to ensure complete medical records.
- Expand integrated computerized health information system to improve turn-around of lab results, improved follow-up care of patients, more accurate health records, and national tracking of patients.

(2) Health Service Issues

- Expand the number of clinics offering more comprehensive service and expanding PMTCT hours.
- Expand the Integrated Chronic Disease Model (ICDM) and patient-centred model to schedule appointments with patients to avoid overcrowding of patients.
- Expand and improve on family planning services, including increased access to long acting contraception and promotion of the dual method approach (contraception + HIV prevention).
- Enhance integration of PMTCT with other sexual and reproductive health (SRH), and tuberculosis (TB) services.
- Enhance holistic integration of programmes and services (e.g., HCT, MMC, PMTCT and Family Planning).

(3) Staff Related Issues

- Address staff shortages and retention. Note: In addition to nursing training at university, Government is currently reopening some nursing colleges that have previously been closed in order to address staff shortages.
- Expand ongoing staff training and refresher training to keep up with new PMTCT Protocols/Guidelines. Train staff mentors to improve mentoring of staff on working relationships/communication between staff, management and patients and to reduce staff turn-over and increase staff retention.
- Improve clinic staff attitude towards MPI in PMTCT services.

(4) Community Related Issues

- Expand community education on PMTCT (community dialogues, men's forums, ward-based outreach teams, mothers-to-mothers support groups, involvement of private GPs, teachers, churches) to improve early ANC attendance, reduce stigma, enhance postnatal care attendance, treatment adherence, safe infant feeding, and family planning.
- Address and improve community attitudes and perceptions towards MPI.

Background

In 2009, the estimated occurrence of mother-to-child transmission (MTCT) of HIV reached a level of 72,200 newly infected children in South Africa (WHO, 2012). Mother-to-child transmission of HIV, or vertical transmission of HIV, can occur during pregnancy, labour and delivery, and as a result of breastfeeding (CDC, 2012). Without treatment, global mother-to-child-transmission rates of HIV have been reported to range from 20% to 45% (De Cock et al., 2000), though these rates have since been substantially reduced through Prevention of Mother-to-Child Transmission (PMTCT) strategies (De Cock et al., 2000; Johri & Ako-Arrey, 2011; Luo et al., 2007). In fact, through national PMTCT programming in South Africa, rates of MTCT in facility-based studies have been reduced to less than 5% in some areas; unfortunately the impact of health system factors potentially accounting for these reduced MTCT rates were not assessed (Goga et al., 2014). Increasing treatment intensity may help prevent vertical transmission, even among women who attend ANC late in their pregnancy (Lallemant et al., 2015). Given the high rates of vertical transmission in South Africa, the Joint United Nations Programme on HIV and AIDS (UNAIDS) implemented a plan to reduce the estimated 72,200 to about 8,300 newly infected children by the year 2015 (UNAIDS, 2013). This plan aimed to reduce the overall rate of vertical transmission of HIV to less than 5%, increase the percentage of mothers on perinatal ART to 90%, and increase the intake of ART to 90% among infant-mother pairs (UNAIDS, 2013). The implementation of PMTCT strategies are known to be cost-effective in low- and middle-income countries (Johri & Ako-Arrey, 2011), and are essential to achieving the global goal to reduce the vertical transmission of HIV, particularly in areas where rates of MTCT are high.

In South Africa, access to PMTCT services has increased since 2009 (Mayosi et al., 2012). South Africa has achieved almost 90% coverage of treatment in the prevention of MTCT (Peltzer et al., 2011) from 2001 to 2012, there was a 52% decline in new HIV infections among children (UNAIDS, 2013). While these rates reflect considerable success of PMTCT implementation efforts nationally, rural areas in South Africa continue to see high rates of MTCT (Wettstein et al., 2012) as well as cultural, infrastructural, and socioeconomic barriers that influence availability of, and access to, ANC, including PMTCT services (Amnesty International, 2014; Peltzer, Mosala, Shisana, Nqeketo & Mngqundaniso, 2007; Skinner, Sakhumzi, Gumede, Henda, & Davids, 2005). One such rural area is Mpumulanga Province, which has one of the highest antenatal clinic (ANC) HIV prevalence rates in South Africa (29.5%; National Department of Health, 2012). These barriers and HIV transmission rates point to the need to identify the challenges and solutions to implementation of the PMTCT protocol in rural regions in South Africa. Barriers to PMTCT implementation have previously been explored in Mpumalanga (Peltzer et al., 2009; Peltzer et al. 2011), which has the second highest population-based prevalence of HIV in South Africa (14.1%; Shisana et al., 2014). Patient-level barriers include illiteracy, mothers' unwillingness to test themselves and their children, lack of government documentation, and poor medical compliance (Peltzer et al., 2009). Health system barriers include challenges with staff training, shortage of staff, and lack of support and supervision from clinic supervisors (Peltzer et al., 2009; Phaswana et al., 2012). A major system-level challenge is inadequate tracking of patients lost to care before completing the steps in the PMTCT protocol (the PMTCT cascade), and the impact on vertical transmission rates (e.g., Barker, Mphatswe, & Rollins, 2011). For clinics, drop-out from the PMTCT cascade has been associated with lack of on-site testing, subsequent delayed testing results, lack of awareness of HIV serostatus and nondisclosure, and delayed ART initiation before conception (Woldesenbet et al., 2015). Patient dissatisfaction with quality of services and particularly with long waiting periods has also been reported (Phaswana et al., 2012). Other general treatment challenges in rural areas include poor uptake of nevirapine and lack of disclosure of HIV serostatus despite participation in a PMTCT programme (Phaswana et al., 2012).

The evidence base for the use of ARVs to prevent mother to child transmission (PMTCT) to enhance infant and maternal health is extensive. Although PMTCT programs in South Africa have been made available as a matter of national policy, the greatest reductions in MTCT have occurred in urbanized areas, while rural areas have maintained unacceptably high levels of MTCT (Wettstein et al., 2012). In rural South Africa, one third of HIV-infected pregnant women in ANC at healthcare clinics did not take full advantage of available PMTCT services in 2010 (Pretoria Department of Health, 2010, 2011). In 2012, Mpumalanga Province had the second highest antenatal rates of HIV in the country at 35.6%, and 40.5%

in one of the three districts (Gert Sibande District) in Mpumalanga Province (National Department of Health, 2012).

PMTCT programme failure and patient dropout occurs at all stages of the ante-, peri- and postnatal process in South Africa (Rispel et al., 2009). Uptake of the protocol in overburdened clinics faces multiple challenges, including individual factors, e.g., denial, depression, maternal failure to ingest medication or provide it to the infant, failure to obtain antenatal or infant testing (Goga et al., 2014; Tumwesigye et al., 2012), social factors, e.g., stigma (Mepham et al., 2011), lack of disclosure (Kuonza et al., 2010, Turan et al., 2011; Turan et al., 2012, Hardon et al., 2102) and system levels factors, e.g., high rates of HIV and healthcare worker shortages make implementation of healthcare across sub-Saharan Africa especially challenging (Foster et al., 2012; Kruse et al., 2009; Zachariah et al., 2009; Bhat et al., 2010). Poor retention of trained clinic staff to implement and maintain programs also limits programme sustainability. Overwork, burnout (Kruse et al., 2009), poor work environments (Bhat et al., 2010), risk of occupational transmission of HIV and stress (Shifting, WHO Task., 2008) have been implicated in high levels of attrition, and unstable employment status and insufficient pay reduce morale and job performance. These factors then threaten the quality and continuity of service delivery, limiting PMTCT implementation and reducing engagement and retention of mother and infants in care (Kruse et al., 2009).

Previous studies in South Africa have shown that the PMTCT programme was feasible to implement on a district-level, and data-driven quality improvement processes at a national scale could improve the performance of the PMTCT programme (Barker et al., 2015; Bhardwaj et al., 2014). In Nigeria, it was found that key PMTCT practices were not being adequately translated from research into practice; most nurses (80%) applied practices involving newborn prophylaxis, yet significant gaps in maternal intrapartum treatment and infant feeding practices were identified. PMTCT training explained 25% of the variance in the application of PMTCT care practices (Ogbolu et al., 2013). In Mozambique, facility-level PMTCT performance measures (1.) HIV testing; (2.) CD4 testing; (3.) Antiretroviral (ARV) prophylaxis and combined antiretroviral therapy (ART) initiation) were collected at 30 clinics over a 12-month period, and compared between high versus low performing clinics (Gimbel et al., 2014). It was found that human resources, catchment size and utilization were positively associated with effective PMTCT service delivery (Gimbel et al., 2014).

Proposed solutions to these gaps include peer education and support for PMTCT retention and adherence (e.g. Sam-Agudu et al., 2015), the potential positive impact of active MPI in maternal health outcomes (Jones, Chakhtoura, & Cook, 2013; Jones et al., 2014; Peltzer et al., 2009; Peltzer et al., 2011), HIV testing (Peltzer, Mlambo, & Phaweni, 2010; Sprague, Chersich, & Black, 2011), and ARV initiation during pregnancy (Tsague et al., 2010). Peer education using HIV-infected mothers participating as counsellors and mentors to PMTCT programme recipients has also been utilized (Nigeria; Sam-Agudu et al., 2015). Additionally, PMTCT outcomes have been optimized through increased MPI, presence of community care workers and adequate clinic staffing in infant follow-up post-delivery, availability of peer support for HIV infected women, screening for intimate partner violence (IPV), and infant feeding (Mpumalanga; Peltzer et al., 2011).

Thus, despite improvements and successes in PMTCT intervention strategies, challenges continue to impact comprehensive implementation of PMTCT. Culturally appropriate solutions have received little attention in PMTCT research and novel solutions could exist to advance and improve the implementation and sustainability of PMTCT in rural areas of South Africa (Mofenson et al., 2014). Comprehensive solutions are needed that match the need within the local setting as well as the socio-cultural context (Gourlay, Birdthistle, Mburu, Iorpenda, & Wringe, 2013). This study recruited local stakeholders to address solutions to the challenges identified in uptake of the PMTCT protocol, with the intention that findings could then inform the implementation of the PMTCT protocol in other regions and assist in reaching the goals for reduction in vertical transmission of HIV in rural South Africa.

PMTCT Implementation Quantitative Study

Design/Approach

Implementation science (IS) methods addressing integration of PMTCT protocols into public health systems are needed to evaluate and inform approaches for facilitating PMTCT deployment and utilization as a sustainable programme to prevent mother to child transmission of HIV and improve the effectiveness of healthcare services for HIV-infected mothers and infants (Bhardwaj et al., 2014). Understanding barriers to implementation and successful adaptation of scientifically proven interventions in the local context can increase the potential to achieve the goal of elimination of mother-to-child HIV transmission. Implementation science "aims to investigate and address major bottlenecks that impede effective implementation and to test new approaches to identifying, understanding, and overcoming barriers to the adoption, adaptation, integration, scale-up, and sustainability of evidence-based interventions." (Mofenson et al., 2014).

The model of implementation for evidence-based practices (EBPs) in the public service sector proposed by Aarons and colleagues (2011) outlines a four phase process of implementation: Exploration (awareness of the need for an improved approach), Adoption/Preparation (preparation for or adoption of an EBP), Active Implementation (scale up pf EBP), and Sustainment (maintenance of EBP). The model addresses factors associated with implementation at each phase of both the outer context (e.g., political, policy, funding, networks) and inner context (e.g., organizational climate, individual adopter characteristics). When the evidence-based practice, e.g., PMTCT, is sustained, information regarding its implementation can inform implementation of other programs in other contexts. Though PMTCT is the standard of care, Mpumalanga District reporting suggests its implementation varies between clinic sites, likely due to characteristics of organizations and/or individuals. At the implementation level, organizational and individual characteristics affect service delivery and adoption in clinics. Organizational characteristics influence the "absorptive capacity" of clinics; these characteristics include staff pre-existing knowledge and skills, abilities, attitudes about innovation, mechanisms for knowledge sharing, as well as CHC readiness for change, receptive context, leadership and previous experience with innovations (Aarons 2004; Aarons et al., 2011). Individual adopter characteristics at the system, organization and provider level influence implementation; these characteristics include values and goals regarding the implementation method, social networks that may spread knowledge about the implementation and the perceived need for change.

This document addresses organizational and individual characteristics affecting the capacity for service delivery and adoption of PMTCT, and assesses the implementation, acceptability, fidelity, coverage of PMTCT, the sustainability and public health impact at 12 CHCs in two health districts (Gert Sibande and Nkangala Districts) in Mpumalanga Province, South Africa. It was theorized that evaluating the acceptability, coverage, and fidelity of PMTCT services at rural CHCs and assessing the impact and sustainability of integrating PMTCT in the rural Community Health Centre system would provide valuable keys to improve overall programme delivery and increase the public health impact of PMTCT.

Study Setting

Community health centres (*n* = 12 CHCs) in rural communities with high rates of vertical transmission ($\geq$13%) within the Gert Sibande and Nkangala Districts in Mpumalanga Province were included in the study. All clinics adhere to South African Clinical Guidelines for PMTCT, yet have high rates of vertical transmission.

Participants

Prior to the onset of study procedures, ethical approval was obtained from the Institutional Review Board and Research Ethics Committees associated with the grantee institutions and the South African Health Department, Mpumalanga Province. The current study was a supplemental study conducted in conjunction with an ongoing clinical trial, "Protect Your Family." (Jones et al., 2014).

Clinic staff from 12 CHCs in two health districts (Gert Sibande and Nkangala) were surveyed between October 24, 2014 and June 25, 2015. In order to assess the impact of PMTCT, data extraction of clinic records was conducted**.** Clinic sites were assessed regarding PMTCT fidelity and coverage: (1) number of pregnancies, (2) number of mothers tested, (3) number of live births (clinic and home birth), and (4) number of infants tested. Participants were recruited from clinics by study staff members, and represented clinic leadership, nursing and healthcare staff providing PMTCT/PEPFAR services (n = 10 per clinic). Participants were assessed regarding PMTCT acceptability, coverage and fidelity, readiness for change, knowledge, skills, and attitudes about PMTCT. Additional assessments included barriers and solutions to PMTCT implementation, capacity for PMTCT, and previous experiences with PEPFAR implementation, as well as organizational context (Powell et al., 2013) and community factors. Assessments were drawn from existing and adapted measures (Chaudoir et al., 2013). All participants were English speaking, assessments and consenting were conducted in English. All participant assessments were completed using an audio computer assisted survey instrument (ACASI) administered using headphones in order to accomondate all levels of literary, reduce potential social desireability bias, and enhance privacy and confidentiality.

Measures

Demographics

A demographic questionnaire was administered to all CHC staff members including age, gender, education level, income, and job title.

Implementation-related Scales

Health provider attitudes towards adoption of evidence-based practices were assessed using an adapted form of the Evidence-Based Practice Attitude Scale (Aarons, 2004) (sample alpha = .71). The scale consists of 18 items, e.g., “I like to use new types of therapy or interventions to help my clients.” Items are scored 0 = not at all, 1 = to a slight extent, 2 – to a moderate extent, 3 = to a great extent, and 4 = to a very great extent. The scale yields four dimensions, i.e., the intuitive appeal of adoption of evidence based practices (6 items), the likelihood of doing so (3 items), openness to new practice (3 items) and perceived divergence of usual practice with the new practices (3 items), as well as a full scale score.

Barriers to research uptake were assessed using an adaptation by Funk of the Barriers to Research Practice Scale (Funk, Champagne, Wiese, & Tornquist, 1991). The scale consists of 28 items, e.g., “Staff do not see the value of research on the prevention of HIV infection or transmission for clinical practice.” Response options included, 1 = To no extent…4 = To a great extent and 0 = No opinion (sample alpha = .92). The scale assesses how features of the clinic setting, healthcare providers and health innovation act as barriers. The scale yields four factors, characteristics of the adopter (8 items), characteristics of the organization (8 items), characteristics of the innovation (6 items), and characteristics of the communication (6 items), as well as a full scale score.

Practitioner attitudes and organizational barriers were assessed with an adaptation of the Practitioner Attitudes and Organizational Barriers scale (Haug et al., 2008). The scale consists of three components: (1) Positive Outcome Attitudes (3 items), e.g., “Using a treatment manual to prevent HIV transmission or infection helps healthcare staff to evaluate and improve his or her clinical skills.” (2) Negative Process Attitudes (3 items), e.g., “Evidence-based practices to prevent HIV transmission or infection make healthcare staff more like technicians than caring human beings.” (3) Organizational Barriers (6 items), e.g., “Evidence-based practices to prevent HIV transmission or infection seem overly complicated and hard to put into practice.” The 12 items were rated on a 5-point Likert scale from 1 = strongly disagree to 5 = strongly agree (sample alpha = .75).

Staff burnout was assessed using the Copenhagen Burnout Inventory (Kristensen et al., 2008). The scale consists of 18 items, e.g., “How often do you feel tired?” Response options ranged from 1 = not at all to 5 = very much, (sample alpha = .86). The scale yields 3 subscales, personal burnout (6 items), work-related burnout (7 items) and client related burnout (6 items), and a full scale score.

Readiness for organizational change was measured using the Readiness for Organizational Change scale (Holt et al., 2007) consisting of 44 items, e.g., "PEPFAR/HIV prevention programs are clearly needed." Item response options range from 1 = strongly disagree to 7 = strongly agree, (sample alpha = .93). The scale consists of four factors, appropriateness (10 items), management support (6 items), change efficacy (6 items) and personally beneficial (3 items), and a full scale score. Clinic burden was assessed using a survey of 16 items (Vamos et al., 2014), assessing staff turnover, clinic space, client descriptors, time and available funding. Item response options range from 1 = always to 5 = never. Elements were examined individually.

PMTCT Outcomes

PMTCT outcomes were assessed using four data sources: (1) questionnaire data on PMTCT protocol implementation practices from CHC staff, (2) district health information on PMTCT indicators for the 12 study CHCs, (3) baseline questionnaire data from 673 HIV infected pregnant women currently enrolled in ANC in the Protect your Family trial (Jones et al., 2015) at the same 12 CHCs, and (4) medical record data collected from a subsample of 301 women participating in the 6 control clinics of the Protect your Family trial.

(1) CHC staff completed a 23-item questionnaire regarding the PMTCT protocol, providing their perceptions on how often each element of the protocol was achieved in their clinic on a scale from 0 ("This activity does not apply to my clinic or never happens at my clinic") to 4 ("This activity is completed every time at my clinic"). Elements were examined individually as well as summed to create a total PMTCT protocol score.

(2) Clinic-level data was collected on 14 elements of the protocol in order to provide a more objective measure of how successfully those elements of the protocol were implemented in the CHCs. Monthly PMTCT indicator data for the 12 study CHCs was accessed from two district health offices (Gert Sibande and Nkangala) for the year 2014; monthly data were summed to create yearly totals. Five elements of the PMTCT protocol were assessed using this district data. The HIV re-testing rate at 32 weeks was computed as the number of women re-tested for HIV at ~32 weeks gestation after having completing a negative test at entry to ANC. Rates of ART immediately following diagnosis or entry to ANC were the number of women prescribed ART out of those eligible, i.e., newly diagnosed HIV positive or known positive but not on ART at entry to ANC. Rates of nevirapine (NVP) administration at birth and 18 month rapid HIV testing were computed as the number of infants receiving NVP within 72 hours of birth and the number tested for HIV at ~18 months, respectively, out of the number of live babies born to HIV infected mothers at the CHC [N.B.: these data were not available for two clinics]. Finally, rates of infants delivered at the clinics were computed as the number delivered at the clinics out of the number of women entering ANC (these data include HIV uninfected women and were not available for two clinics).

(3) Baseline questionnaire data from 673 HIV infected pregnant women currently enrolled in ANC at the same 12 CHCs was collected as part of the ongoing Protect your Family trial (data collected from April 10, 2014 to April 29, 2015); these data were averaged at the clinic level. Six questionnaire items were utilized in this study, including maternal adherence to ART, which was measured by a 7-day visual analogue scale. Rates of HIV-serostatus disclosure to partners were assessed using a scale measuring disclosure to partners, families, friends, and others. Condom use at last sex, male partner testing, discussion of PMTCT with healthcare providers, and discussion of future pregnancies with healthcare providers were assessed using single items (e.g., "Last time you had sex, did you use a condom?").

(4) Medical record data was collected from a subsample of 301 women participating in the six control clinics of the Protect your Family trial. Although medical record data is collected for all participants, those in the experimental group were excluded from these analyses because these elements of the PMTCT protocol were likely to be influenced by the intervention (questionnaire data is not affected as it was collected at baseline). Data were collected from review of the clinic records or the maternal "Road to Health" booklet that women in ANC at CHCs receive. Four elements of the PMTCT protocol were assessed using this data: the proportion of women

attending at least four antenatal clinic appointments, the proportion of women receiving ART during labour, the proportion of 6-week old infants completing a HIV PCR test, and the proportion of infants being exclusively breast or formula fed.

Data Analysis

Descriptive statistics (e.g., mean, standard deviation, frequency) were used to characterize the sample of CHC staff participants, and implementation scales were compared between job categories using ANOVAs. Staff perceptions of achievement of the PMTCT protocol were summarized using means and standard deviations, and CHC-level indicators were described using minimums, maximums, medians and intra-quartile ranges (IQRs). All analyses were conducted using R v.3.2.1 at a two-tailed level of significance of $p < .05$.

Results

Clinic Staff Demographics

Clinic staff members surveyed ($N = 103$) were 10 (deputy) operational managers/sisters in charge, 56 nurses, and 37 counsellors (lay counsellors, PMTCT counsellors, and Mother-to-Mother counsellors). Staff members were mostly female (86%, $n = 89$) and were 38 ± 9 years of age, on average. Just over half had achieved a diploma (55%, $n = 57$) and reported a median monthly income of 7,862 South African Rand (IQR = 10,700). Staff members from 12 clinics were surveyed with a varying number from each clinic; the fewest staff surveyed within a clinic was 4, and the most 11, with an average of 9.

Differences in Attitudes towards Implementation

Staff members completed surveys of factors related to their attitudes towards implementation of the PMTCT protocol: their willingness to adopt evidence-based practices, perceptions of barriers to research uptake, attitudes towards implementation of EPBs and organizational barriers, work-related burnout, and readiness for change. Overall mean scores and mean scores by job for each of these scales are presented in Table 1. There was a significant difference in attitudes and perceived organizational barriers by job title (F (2, 100) = 8.19, p <.001), such that management were most enthusiastic about implementation and reported the fewest organizational barriers, nurses second, and counsellors the highest barriers. Similarly, managers reported the fewest barriers to research uptake in their clinics and the highest willingness to adopt EBPs, although these differences only trended towards significance (p = .059 and .078, respectively, see Table 1. No differences were noted in burnout or readiness for organizational change. These implementation-related scales were generally not related to achievement of PMTCT protocol elements.

Table 1. *Implementation Scales by Job Title*

	Overall (N = 103) m(sd)	Management (n = 10)	Nurse (n = 56)	Counsellor (n = 37)	F, *p*
Willingness to adopt EBPs	39.74(8.1)	45.10(7.3)	39.75(7.9)	38.27(8.1)	2.92, .059
Barriers to research uptake	44.22(21.6)	32.00(10.7)	43.29(19.1)	48.95(25.8)	2.62, .078
Practitioner attitudes and organizational barriers	**32.61(7.0)**	**27.00(8.7)**	**31.64(6.3)**	**35.59(6.2)**	**8.19, <.001**
Burnout	45.01(10.3)	42.80(9.7)	46.32(11.1)	43.62(9.0)	1.03, .362
Readiness for Change	222.77(31.5)	233.70(26.0)	223.09(32.9)	219.32(30.9)	0.82, .443
PMTCT protocol total	84.87(8.7)	86.40(5.2)	85.34(7.0)	83.76(11.5)	0.53, .591

Gaps in the PMTCT Protocol and Staff Perceptions

Clinic staff was also asked to report how successfully the different elements of the PMTCT protocol were implemented in their clinic (there was no difference in perceptions by job title, see Table 1). Means and standard deviations for the total scale as well as each individual element are presented in Table 2. Generally, staff were very positive about the frequency in which each element of the PMTCT protocol was achieved, as the mean of only two out of 23 indicators was below 3 (”Often”) and most were close to 4 (”Every time”).

In addition to staff reports, data on 14 indicators was collected from the district office and pregnant women attending these twelve clinics (data source is presented in Table 2 and a more thorough description of the data sources is presented in the Methods section). The proportion of pregnant women completing these steps of the PMTCT protocol was computed within each clinic, and the minimums, maximums, medians, and intra-quartile ranges of these clinic percentages are presented in Table 2. Generally, clinics were highly inconsistent in achieving elements of the protocol. The most variable indicator was provision of ART during labour; as few as 4% of HIV infected women received ART during labour in one clinic and 10% in another, but the median of all clinics was 66%. Other indicators demonstrating high variability were HIV re-testing at 32 weeks pregnancy (range 25%-100%, median 79%), maternal ART adherence (27%-97% missed a dose in the past week, median 66%), attendance at four antenatal clinic visits (38%-96%, 61%), delivery at the CHCs (25%-100%, 49%), and discussion of contraception and future pregnancies with healthcare providers (19%-75%, 48%).

Areas where gaps in PMTCT coverage were most prevalent included delivery at the clinic (clinic-level median proportion = 49%), medication adherence (median CHC proportion of women reporting at least one missed dose in the past 7 days = 66%), disclosure of HIV positive serostatus to partner (median = 60%), partner HIV testing (median = 37%), use of condoms (clinic median = 50% at last intercourse), and discussion of future pregnancy with a healthcare professional (median = 48%). For all of these indicators, staff reported that these activities happened “often” to “every time.” Conversely, elements of the protocol that were consistently achieved included provision of ART to infants (100% in all 12 study clinics), counselling on exclusive breast/formula feeding (100%), and provision of ART to newly-diagnosed women or those becoming eligible for ART following entry to ANC (clinic median of 89%).

Table 2. *Clinic PMTCT Indicators and Clinic Staff Perceptions*

Staff perception of PMTCT protocol element	Mean(SD)*	Clinic-level PMTCT data	Clinic Min-Max Median(IQR)
Attending >= 4 antenatal clinic visits	N/A	Proportion attending >= 4 antenatal clinic visits[c]	38%-96% 61%(36%)
Total PMTCT protocol implementation scale score	84.87(8.7)	N/A	
HIV testing for all pregnant women of unknown status	3.85(0.5)	N/A	
Provision of ART immediately following diagnosis or entry to ANC	3.81(0.7)	Rate of ART prescription immediately following diagnosis or entry to ANC[a]	54%-100% 89%(14%)
Counselling on the risk of contracting/transmitting HIV during pregnancy, adherence to HIV medication	3.84(0.5)	Proportion using condoms at last sex[b]	38%-67% 50%(17%)
		Proportion of women with at least one missed dose in past 7 days[b]	27%-97% 66%(26%)
HIV retesting at 32 weeks for women testing negative	3.85(0.5)	Rate of HIV re-testing at 32 weeks gestation[a]	25%-100% 81%(33%)
Testing of women of unknown HIV status during labour	2.96(1.4)	N/A	

HIV retesting every 3 months during breastfeeding	3.37(1.1)	N/A	
HIV retesting 1 year postpartum	2.76(1.4)	N/A	
Counselling on PMTCT, protecting male partners, healthy pregnancy	3.81(0.6)	Proportion discussing PMTCT with provider[b]	51%-98% 88%(10%)
Counselling on male partner involvement	3.60(1.0)	Proportion of disclosure of serostatus to partner[b]	40%-76% 61%(9%)
		Proportion of male partners tested for HIV[b]	26%-64% 36%(7%)
Counselling on the importance of delivering the baby at the CHC	3.90(0.4)	Rate of infant delivery at the CHC[a,e]	25%-100% 57%(49%)
Provision of ART during labour/delivery, including those who deliver before arrival	3.16(1.5)	Proportion of women receiving ART during labour or immediately following[c]	4%-100% 66%(90%)
Provision of nevirapine (NVP) to newborns immediately following birth	3.86(0.6)	Rate of nevirapine administration to infants at birth[a,d]	100%
Counselling on exclusive breast/formula feeding	3.91(0.4)	Proportion of infants exclusively breastfeeding or formula feeding[c]	100%
Supplying mothers with 6 weeks of NVP for their newborns	3.90(0.5)	N/A	
Issuing all new mothers with "Road to Health" booklets	3.76(0.8)	N/A	
HIV PCR testing of infants at 6 weeks postpartum	3.80(0.7)	Proportion of infants with 6-week PCR test[c]	78%-94% 90%(12%)
Rapid HIV testing of all infants at 18 months of age	3.75(0.8)	Rate of infant 18 month rapid testing[a,d]	47%-100% 100%(24%)
Retesting infants who are symptomatic at any age	3.60(0.7)	N/A	
Supplying ART to all infants who test positive	3.77(0.7)	N/A	
Counselling on family planning and contraception	3.82(0.6)	Proportion of women discussing future pregnancy with provider[b]	19%-75% 48%(25%)
Counselling on safer conception practices for future pregnancies	3.50(1.1)		
Treatment for TB and other opportunistic infections	3.83(0.6)	N/A	
Offering nutritional support to new mothers, if needed	3.54(1.0)	N/A	

*Note: 0 = "This activity does not apply to my clinic or never happens at my clinic"; 4 = "This activity is completed every time at my clinic"

[a]Data source is district data

[b]Data source is "Protect your Family" participant assessments

[c]Data source is "Protect your Family" clinic medical record review

[d]Data on these indicators was not available for two clinics

[e]Data on this indicator includes HIV negative

Dividing CHCs into poor and good performers in terms of selected PMTCT indicators and a summative measure of the five PMTCT indicators did not show any significant differences regarding PMTCT implementation scales (see Table 3).

Table 3. Implementation Variables Compared between Participants from Clinics with Low and High Clinic Scores based on District Data (cutoff = 2)

Variable	Low clinic score (n = 32)	High clinic score (n = 63)	t value, p value
	M (SD)	M (SD)	
Willingness to adopt EBP	38.7 (7.8)	40.7 (8.0)	1.15, 0.254
Barriers	49.3 (21.0)	43.2 (21.7)	1.33, 0.188
Organizational Barriers	32.5 (7.8)	32.3 (6.9)	0.16, 0.874
Burnout	47.9 (10.8)	44.4 (9.7)	1.58, 0.116
Readiness for change	225.1 (33.1)	224.5 (29.5)	0.09, 0.932

Discussion

This study investigated a range of staff and organizational factors in relation to PMTCT outcomes. Clinic roles were found to be related to perceptions of barriers to PMTCT implementation. However, in contrast with previous studies, over-work, burnout (Kruse et al., 2009), poor work environments (Bhat et al., 2010), stress (WHO, 2012) were not found to limit PMTCT implementation or reduce engagement and retention of mother and infants in care. In fact, clinic staff reports of high levels of PMTCT protocol implementation differed from both district and patient reports, with the exception of agreement on high levels of ART provision to mothers and infants and provision of information on exclusive feeding practices.

Understanding barriers to implementation of proven interventions in the local context has the potential to enhance PMTCT programme goals of eliminating mother-to-child HIV transmission. Unlike a previous study in Mozambique (Gimble et al., 2014), this study did not find an association between adequate human resources (lesser clinic patient burden) and effective PMTCT service delivery. However, as previously found in study of programme implementation in Zambia (Kristensen et al., 2005), clinic burden and burnout were not related to service delivery. Overall, organizational and individual characteristics associated with willingness to implement new practices, barriers to practice, and burnout were similar within each staff hierarchy, such that managerial staff had more positive attitudes and perceived fewer barriers than staff further down the hierarchy. In addition, managers' willingness to adopt new practices and their perception of barriers indicated a non-significant optimistic trend, in comparison with counsellors and nurses, who were less receptive to change and perceived more barriers. Given the small number of managers assessed, these differences may have been even greater with a larger sample size. However, although results suggest that managers' perception of the ability of staff to take on new programs may exceed the perceptions of staff, neither the perception of management nor the perception of staff were related to actual PMTCT protocol compliance, which was uniformly perceived as high. In addition, self-reported barriers to uptake and willingness to implement PMTCT were not related to protocol performance as reported by patients or the district, suggesting that clinic staff and managers' perception and attitudes of the protocol and their work place did not impact their job performance.

As previously reported (Peltzer et al., 2009) continued gaps in the PMTCT protocol were identified, including both variability in protocol adherence and pervasiveness of non-adherence. The most pervasive were failure to (1) deliver at the clinic, (2) disclose HIV status to partner, (3) HIV test partner, (4) condom use, and (5) establish ART adherence. Many of these gaps are may be associated with failure to disclose HIV serostatus and HIV stigma, e.g., delivery at the clinic necessitates disclosure to obtain ARVs pre-and post-partum. Protocols for facilitating HIV disclosure at the CHC level may improve the response to these gaps by increasing the willingness of pregnant women to utilize clinic services and treatment. Despite these identified gaps in the PMTCT protocol, in contrast with a previous study in Nigeria (Ogbolu et al., 2013), the current study did not identify gaps in the implementation of PMTCT regarding maternal intrapartum treatment and infant feeding practices in some clinics. This suggests that efforts to maximize

ART coverage may be successful, but on a limited basis. Results also underscore the advances in communicating the protocol to patients.

This study was designed to generate information on PMTCT implementation, but had several limitations. The sample size of managerial staff was limited, and future studies should continue to explore potential differences between managerial and general staff members. Additionally, sampling was restricted to 12 clinics, given the logistics involved in covering the large distances between clinics in rural areas. Thus, the results are not necessarily generalizable to other rural regions or countries.

This study utilized implementation science strategies to address the integration of a sustainable PMTCT protocol in the rural public health system. Results suggest that gaps in care are not necessarily linked to clinic staff attitudes or perceptions, and that ongoing efforts to implement district-level, data-driven quality improvement processes in rural communities are needed to improve the performance of the PMTCT programme (Barker et al., 2015; Bhardwaj et al., 2014). Similarly, though PMTCT data suggests its implementation varies between clinic sites, it is unclear what characteristics of organizations and/or individuals contribute to this variation. Strategies are needed to promote fidelity and coverage of PMTCT, if sustainability of the programme is to be achieved in the rural community health centre system and its public health potential maximized.

PMTCT Implementation Qualitative Study

Method

Participants and Procedures

Prior to study onset, approval was obtained from the Human Sciences Research Council (HSRC) Research Ethics Committee, the University of Miami Institutional Review Board, and the Mpumalanga Department of Health and Welfare (provincial, district, sub-district and clinic level). A convenience sample of participants was drawn from CHCs in Gert Sibande and Nkangala Districts in Mpumalanga participating in a PMTCT-related study, the Protect Your Family (PYF) project. Further details of the trial protocol and the selection of the CHCs have been previously published (Jones et al., 2014) and have been registered on clinicaltrials.gov, number NCT02085356.

In order to strengthen the South African infrastructure to implement PEPFAR programs using implementation science methods, both training and mentoring were addressed. A workshop was held at the HSRC, "Dissemination and Implementation Science Training Workshop - A Collaborative Model for Building Implementation Science Capacity in South Africa" on September 8th – 9th in 2014. Workshop attendees (*N* = 32) included Department of Health senior staff, clinic managers, professional nursing staff, community health centre facility operation managers, a clinic committee member; sub-district HIV, AIDS and STI (HAST) managers, district HAST manager, scientists (HSRC, MRC, FHI) and a policy maker. The workshop included breakout sessions by discipline to brainstorm challenges to PMTCT uptake, and breakout sessions by mixed-disciplines to brainstorm solutions to enhance PMTCT uptake. Existing and novel solutions to PMTCT gaps in care were proposed and reviewed. Attendees were invited to propose novel strategies for enhancing PMTCT uptake, and to apply for support to attend the NIH Dissemination and Implementation Conference held in Washington, DC. As a result, one site was funded as a demonstration project to implement a novel strategy to improve uptake of HIV disclosure, referral for medication and medication uptake among perinatally infected children, and two scientists proposed novel implementation science projects on improving HIV outcomes and HIV prevention in the prison system, and attended the Dissemination and Implementation conference. The proposals were subsequently submitted for funding to the Department for International Development in the United Kingdom and the Gates Foundation in the United States.

A total of 48 staff interviews and 12 focus group discussions (FGDs) were conducted in addition to a preliminary workshop on dissemination and implementation methods. During the consenting process, participants were provided with the option to participate in their preferred language, English, Zulu, or Sotho. Staff recruited for qualitative, individual, in-depth, semi-structured interviews (*n* = 48) were representative of the various health professionals at the CHCs, comprised of HIV Counselling and Testing counsellors (HCT or Lay Counsellors), Assistant/Staff/Enrolled Nurses, Professional Nurses, Operation Manager and Facility Manager. In all cases, the Facility and Operation Manager were all Professional Nurses. Staff were volunteers recruited with assistance from the Facility Managers, who confirmed interview appointments.

The 12 FGDs were conducted with 75 HIV-infected women who attended the healthcare facilities for antenatal and postnatal care services; each of the FDGs had 4-5 women attend. Patients were a convenience sample referred by staff working in the PMTCT program.

Workshop participants (*n* = 32) were 10 groups of clinicians and senior local stakeholders. The clinicians included five nursing staff from lower- to upper-level positions, stakeholders were four CHC Facility Operation managers, a clinic committee member, three sub-district HIV, AIDS and STI (HAS) managers, and a district HAS manager. The group composition was used to facilitate the inclusion of different perspectives, regardless of their position and role within the PMTCT protocol, facilitating the identification of both clinic- and district-level challenges and solutions. The consenting process for qualitative interviews and FGDs took place in a private office at the CHC sites. Interviews were an average of 1 hour and 9 minutes (range = 1 hour to 1 hour and 24 minutes) and focus group sessions were an average of 41 minutes (range = 23 to 55 minutes). FGD participants were compensated South

African Rand 50 (~US$ 5) for their participation; interviewed staff and workshop attendees did not receive monetary compensation.

HSRC study personnel conducted the qualitative interviews and also led FGDs. HSRC study personnel included professionals with bachelor- or master-level degrees in the social sciences with specializations in HIV care. Clinic staff members included clinic facility managers, professional and assistant nurses, and lay counsellors. Interview questions were aimed at gaining more information about the strengths and challenges in providing HIV care at their clinic, and how to make changes or improvement in PMTCT implementation at their respective clinic. An example of one of the questions asked during the interview is, “Describe some of the challenges experienced by staff in implementing the PMTCT protocol?” All question stems for FDGs are provided in Appendix A. The interviewer sought clarification or elaboration by asking additional questions as needed.

Focus groups discussions were conducted by bachelor-, master-, or doctorate-level study personnel. Focus group discussions were conducted with HIV-infected mothers and expectant mothers, who were asked about their experience with PMTCT and knowledge of HIV as it related to pregnancy. An example of a question stem used during the FDGs was, “What have you learned about the components of the PMTCT protocol from the clinic staff? These components include testing, HIV prevention, ARV treatment, infant feeding, family planning, safer sex and involving your partner in your pregnancy.” All question stems for FDGs are provided in Appendix B.

The workshop was conducted with clinicians and stakeholders; participants were asked to discuss challenges faced during the implementation of the PTMCT protocol, strengths of their clinics and teams, and corresponding solutions that they believed had helped or would help solve, improve the situation. Solutions were recorded by a group leader once a collaborative consensus was reached.

All qualitative interviews and FGDs were audio-recorded. Rapport was built with participants by engaging in casual conversation prior to the interviews and FDGs. Qualitative interviews and FGDs were then transcribed verbatim by study personnel, and translated as needed.

Qualitative Analyses

Grounded Theory (Glaser & Strauss, 2009) was used for coding and analysing interview, FGDs, and workshop data. Interview, FGD, and workshop transcripts were coded and content-analysed line by line to identify common themes related to barriers and solutions to PMTCT implementation. The coding strategies when coding all of the interview, FDG, and workshop data included open coding, axial coding, selective coding, as well as theoretical coding (Glaser, 2005; Strauss & Corbin, 1990). During the coding process, an external coder was trained on the coding strategies and was then asked to code five previously coded transcripts to assess the level of agreement and reliability of identified themes and interpretations. The same procedure was repeated with a third coder and fourth coder, with fewer transcripts (three). Coding and thematic disagreements, although below 10%, were discussed until consensus was reached. In addition, regular meetings were conducted with the team to discuss and redefine codes and themes, which were followed by reflections on how perceptions and assumptions may have influenced interpretations of the qualitative data. Interview, focus group, and workshop themes were compared and contrasted using theoretical memoing (Glaser 1998) to identify different staff- and patient-level perspectives for interpretation and reflection by the authors.

Results

The workshop was held with 32 staff members: five nursing staff from lower- to upper-level positions, whereas change teams were composed of four CHC Facility Operation managers, a clinic committee member, three sub-district HIV, AIDS and STI (HAST) managers, and a district HAST manager. For the qualitative interviews, fourteen of the staff interviews were conducted with lay counsellors, two with Facility Operation managers, one with a clinic facility manager, twenty-two with professional nurses, six with assistance nurses, two with staff and/or enrolled nurses, and one with an HCT counsellor.

Of healthcare staff approached for interviews (*n* = 60, 5 per facility) 80% agreed to participate. The remaining 20% were unavailable due to time constraints. From the 120 HIV infected women from 12 health centres who were for invited for FGDs, 75 HIV infected female patients came and consented to attend FGDs, resulting a response rate of 62.5%.

Two major themes emerged from the qualitative interviews, FGDs, and workshop data: 1) health system level challenges and solutions to PMTCT and 2) patient level challenges and solutions to PMTCT. Second- and third-order themes were identified for health system level challenges and solutions; second order themes included clinic facility, PMTCT training of healthcare staff, and professional relationships among healthcare staff and patients. Nine third-order themes emerging from second-order themes are summarized in Table 1.

Table 1. *Summary of Health System Level Challenges and Solutions*

Theme	Summary	
	Challenges	Solutions
Health System Level		
Clinic Facility		
1. Facility space	Limited facility space to meet patient demands affecting patient privacy and attendance, and male involvement. Increased risk of airborne infections associated with crowded spaces.	Increasing facility space. In the absence of financial resources, maintaining appointment logs to limit to the number of patients seen simultaneously, or providing home-based care.
2. Delayed reporting of CD4 test results.	Delayed CD4 count testing as a result of laboratory delays in releasing results, lack of supplies, and misplacement or erroneous delivery of results.	Increasing reliability of messenger services and patient outreach, and when feasible, provision of on-site CD4 testing and results.
3. HIV testing and medication supply use and availability	Shortages and lack of supplies to complete PMTCT procedures resulting in late detection of pregnancy and HIV, late onset of treatment, and unprotected sex.	Continued reliability on other clinics for needed supplies, or working with pharmaceutical distributors for planning of needed supplies.
4. Patient health record management	Poor patient tracking due to human error, lack of resources, and participant misreporting.	Improve patient tracking through home-based care workers, or implementation of electronic medical record.
5. Clinic staff shortage	Staff overburden and patients leaving the clinic without being seen or treated.	Increasing patient outreach, creating mobile clinics, modifying staff schedule to have more personnel on busier days, increasing staff productivity, improved patient scheduling.
PMTCT Training of Healthcare Staff		
6. Initial PMTCT training	Continuous additions and changes to PMTCT protocol that staff are not always informed about.	Need for a continuous training to match the frequency of changes in protocol.
7. Patient counselling and education	Patient dissatisfaction with clinic services, and unfamiliarity with support group services.	A need for promotion of support group availability by clinic staff.
Professional Relationships among Healthcare Staff and Patients		
8. Staff-patient communication and relationship	Factors affecting patient attendance to clinic for services and barriers to staff-patient	The potential role of improving staff attitude as a way to increase patient uptake of clinic services.

	communication (e.g., staff attitude and temperament).	
9. Professional relationships among staff	Factors affecting and impeding a collaborative working environment.	Increasing mentorship and supervision. Conduct evaluations of staff performance which include recognition.

For patient level challenges and solutions, seven second-order themes were identified and are summarized in Table 2.

Table 2. *Summary of Patient Level Challenges and Solutions*

Patient Level Challenges to PMTCT		
1. Initial ANC visit	Misunderstanding of pregnancy among patients, lack of motivation, and inadequate understanding of PMTCT guidelines.	Providing information on how to identify pregnancy earlier, and increasing motivation by emphasizing potential benefits.
2. Culture and stigma	Cultural, community misconceptions, and societal beliefs affect PMTCT implementation and uptake.	Increasing level of comfort for patients at the clinic, as well as raising community awareness and education to dispel HIV myths and misconceptions.
3. Disclosure to partner and family	Fear of losing support upon disclosure of HIV serostatus. Mixed feeding results from nondisclosure to infant caretakers.	Decreasing fear regarding potential negative reactions to disclosure with current support system. Promote the use of peer education and mentorship to facilitate stronger bonds with support system.
4. Male partner involvement	Male involvement is affected by many factors, such as traditional perceptions of pregnancy, clinic schedules conflict with male partners' work schedules, and limited clinic space to accommodate male partner attendance.	Better outreach and education aimed at male partner engagement, such as involving more men PMTCT service provision, and dispelling the notion that pregnancy is only a woman's issue through male peer interaction.
5. Condom use with sexual partners	Low condom use rates reported by patients, potentially increasing the risk of re-infection. Condom use primarily decided upon by the man.	Promote equal decision-making surrounding condom use in partnered relationships, as well as disclosure of HIV serostatus as men are more likely to use a condom when they are of aware of their partner's serostatus.
6. Transportation and scheduling	Personal safety concerns, lack of transportation, and poor availability of emergency services during labour.	Increasing the availability of services and resources available to women during pregnancy and labour to serve the transportation needs of clinic patients.
7. Adherence to PMTCT treatment	Poor social support, medication side effects, lack of education and understanding of the PMTCT protocol, cursory or inadequate explanations of treatment instructions.	Increase attendance to and awareness of support groups; building a therapeutic alliance between the patient and provider.

Health System Level Challenges and Solutions

Clinic Facility

Facility space.

Challenges

In 32% of the interviews, clinic staff felt that the facility they were working in was too small to meet the demands of the patients. The lack of space in the clinics contributed to problems with patient privacy, increased risk of infection among babies and mothers, decreased male involvement, reduced patient follow-up, and discontinuation of support groups.

Some staff report that the lack of clinic space could sometimes breach of patient privacy, e.g., multiple patients may be seen simultaneously. In cases where women were seen in one part of the room, other patients were then not able to be accompanied by their partner. As described by one participant, this is due to the physical infrastructure of the clinics:

> *The other challenge that we are having is that our labour room is having two beds with no division, if maybe there is two ladies there, we don't allow them [the male partner] but they are scared of clinic, let alone to hear what we are saying. (Facility Operation Manager)*

Patients sometimes waited outside due to limited space during bad weather, and may then have chosen to leave without being seen. As a result, patients may not have attended follow-up visits, or returned at all. In some cases, patients attended a different clinic, but their medical history stayed with the file at the initial clinic, making it unavailable at the new clinic. Waiting periods appear to discourage many patients from going to certain clinics:

> *Our clinic is too small and when you look at the community and others they just wait outside, and you can see that the clinic is full. (Professional Nurse)*

> *What I've noticed there's not enough space because other patients would be waiting outside for their names to be called. (Focus Group)*

In some clinics, lack of space contributed to the formation of a single queue, resulting in mothers and children waiting in the same line as patients with contagious illnesses. Single-line queuing occurred at multiple time points during CHC visits, e.g., at the reception, at the examination room, at the pharmacy. The mixing of lines led to new infections of TB among babies:

> *I don't think it's a right thing for babies to be mixed with TB patients; it doesn't make sense to me because the children inhales TB quickly. (Lay Counsellor)*

ANC rooms were often not large enough to accommodate the presence of a supportive companion. Generally, in all clinics and CHCs, one day a week is set aside for ANC visits and all women can visit the facility that morning. This creates congestion, and with the added presence of male partners, the number of people in the ANC clinic doubles in an already crowded facility, although the men do not require clinical care. This presents a major challenge to MPI in PMTCT:

> *We have encouraged women to come with their partners to the ANC… but the thing about the space is it's not possible for a man to come in here while we are busy with our patient…The structure does not allow… there is no way we can say they should come with their partners in ANC, no! (Professional Nurse)*

The lack of rooms contributed to some clinics not having space for support groups and private areas to counsel patients. When staff meet with the patients, communication may be inadequate given the lack of privacy, which may lead to poor disclosure between the staff member and the patient:

> *According to my view, the clinic is very small and we end up not having space for support groups and one-to-one communication is deprived. We have to screen around in between patients and*

some they don't feel confident to talk about whatever that they want to ask from us. I think we are doing our best (work related). Even though we are short of staff, most patients would tell you the feedback from the patients is positive. (Professional Nurse)

Solutions

Some clinics have circumvented the problems associated with the formation of a single queue. If the clinic has a single line for all the patients, the staff remove and immediately treat patients who outwardly exhibit signs of TB, or other contagious, airborne infections. It was also suggested that infants should be treated on certain days of the week, and not on the days when patients with contagious diseases are being seen:

If we notice that a person is coughing and has TB without being screened, we make sure that we remove that person from the queue immediately to be screened. (Lay Counsellor)

Babies don't have their own day at the clinic so it becomes a problem. You'll find that at home no one has TB but the baby has TB that he contracted from the clinic because they queue the same line. (Lay Counsellor)

In addition to increasing facility space, which may not be financially feasible, it was proposed that clinics could benefit from maintaining appointment logs that allow only a certain number of patients to be scheduled at the same time, instead of having an open, set schedule (e.g., 7am to 1pm) that may lead to oversaturated clinic space. Certain PMTCT services, such as counselling and education, could also be conducted at the patients' home.

Delayed reporting of CD4 test results.

Challenges

Delays in results from laboratory tests were reported in 34% of the interviews with clinic staff. This delay appears to be due to many reasons, including (1) the time of the day the test was performed, (2) a delay in the laboratory releasing the results, (3) results being sent to the wrong clinic by the laboratory, and (4) lack of testing supplies.

Because of laboratory scheduling, patients must return another day to have a CD4 test blood draw. In some cases, working patients may not be able to immediately schedule time off. Patients may also be asked to return on another day if testing supplies are not available:

Sometimes our challenge is CD4. Other pregnant women come late after hours and then at lab they said we can't take CD4 count, because it must be taken in the morning and is not supposed to stay overnight at clinic. And the other challenge is we don't have enough lab forms, they don't provide enough lab forms or bottles for CD4 count, blood bottles. (Professional Nurse)

Sometimes, even when patients return to receive their laboratory results, results may not be available because the laboratory has not released the results. Therefore, if patients are not able or willing to come back for their results, they may never receive them:

Sometimes our laboratory, where we send the blood to, delays in releasing the results and you find that the patient came for the results but the results are not available. (Lay Counsellor)

I came here [to] fetch my results but I didn't get them because they said our blood got lost somewhere so they had to draw us another blood and they send them and when we return for the results we got the same thing so the nurses phoned the lab and they said the results are not ready so we must come back after 2 weeks. (Focus Group)

My results were not ready on the date that was given to me because they mixed my results with others people results so they got mixed up. (Focus Group)

Patients' results were sometimes sent to the wrong clinic, which lead to delays and could result in having to retest the patient. Results sent to the wrong clinics were sometimes corrected, though other clinics may fail to do this:

> *The delivery people take our results and deliver them to another clinic, and deliver the other clinic's results to our clinic. The only problem that I have noticed happening is: when we get their results, we send them to their clinic but they don't return ours. (Lay Counsellor)*

Solutions

Workshop attendees and interviewed staff reported that the previously described challenges could be mitigated by providing more integrative services when feasible; that is, providing all services needed during treatment, such as laboratory and pharmacy services, at the same clinic where patients are seen, instead of having a separate location for each of the services. In addition, staff suggested that more comprehensive patient outreach may be needed to motivate patients and remind and motivate them to attend their appointments.

> *We should do a lot of follow-ups and outreaches by phoning them [patients] often. (Professional Nurse)*

HIV testing and medication supply use and availability.

Challenges

In staff interviews and workshop, 30% of the clinic staff reported shortages for test kits and medication supply and availability. Clinics order their medical supplies from the pharmaceutical distributor, but when the pharmaceutical distributor experienced shortages, this affected the province. In the absence of certain medications, clinics had to find substitutes until they were restocked by a nearby clinic or pharmaceutical distributor. Not all nurses knew how to replace the prescribed medication. Testing supply shortages also resulted in late detection of pregnancy:

> *Shortage of treatment-- for new born babies, sometimes there's no treatment line NVP. Then we have use lamivudine and others don't understand how to replace the treatment. (Professional Nurse)*

> *We sometimes have a shortage of testing kits both for pregnancy and for HIV, and this makes follow-up of patients difficult and we end up detecting pregnancy as late as 7 months. (Facility Operation Manager)*

Staff reported that they could be out of supplies for up to 3 months, including even basic supplies like condoms. Because some couples relied on the clinic to obtain condoms, condom shortages could result in unprotected sex:

> *…you will be surprised, there was a time here at our clinic last year where we stayed plus minus 3 months without condoms. (Lay Counsellor)*

Solutions

Many clinics dealt with supply shortages by borrowing supplies from neighbouring clinics and hospitals, although this was not a permanent solution during periods of regional supply shortages:

> *If we don't have those specimen things we ask our next clinic like neighbours. We would call them and ask if they have enough specimen bottles and ask if they can lend us 10…Like last time we ran out of Nevirapine Syrup, and we went to Witbank hospital and asked for a few boxes from them and tell them we are out of stock. So we compromise. (Professional Nurse)*

Workshop participants asserted that supply shortages could be diminished or prevented by using a multi-level approach using adequate planning for supplies at both the district and province levels; —that is, working together with pharmaceutical distributors for planning and stocking. One clinic nurse confirmed

the effectiveness of this strategy, sharing that her clinic does not experience the same shortages as neighbouring clinics because it planned its stock beforehand using the clinic's patient load as reference:

> *It can assist by making sure that we have enough equipment and resources to do the job, like for an example, having all the necessary material like stationery and stock medication. In this case always available. This can be of great help. (Professional Nurse)*

Patient health record management.

Challenges

In the staff interviews and workshop, 44% of the clinic staff reported challenges related to patient health record management. Record keeping challenges were influenced by both staff and patient actions. Staff reported they may neglect to fill in all of the patients' information or misplace files due to time constraints or fatigue. Additionally, when the clinic received a patient from another facility, previous facility may not have provided correct information. Staff asserted that poor record keeping arose from a high workload, negligence or lack of training:

> *It happens a lot in the delivery registers, you will find that the sisters did not fill in all the information. (Lay Counsellor)*

> *Sometimes we do have human errors, but we do correct because maybe there is a line and I have to mark patient 10, but I make a mistake and mark patient no.11." (Professional Nurse)*

> *It happens when they are from other facility like the hospital, they don't mark on the child booklet whether the mother was HIV positive or not. (Professional Nurse)*

> *A lot of files are getting misplaced or lost because we have only one data capturer and there's more work load. Obviously some files will get lost. (Professional Nurse)*

On the other hand, inaccurate records were exacerbated by patients, e.g., lost infant clinic cards, provision of incorrect contact information. Loss of the infant card then necessitated infant retesting and re-initiation of treatment:

> *Most of the people like those young mothers, first they don't take care of the baby's clinic card, sometimes they lose the cards and sometimes you find that the baby is 4 years but the baby no longer has card the mother lost it. (Assistant Nurse)*

> *We go back in our books… and all her contacts are wrong. (Lay Counsellor)*

Solutions

Although 44% of clinics reported problems with health record management, many clinics had procedures in place to prevent and abate errors. For example, if the patient destroyed both sides of the discharge summary card to hide their serostatus, staff had recorded the information in the post-antenatal history book as a second source for patient information:

> *We also write in the delivery room as pre-booked…and in write it on the post antenatal history so this book will tell me even if you [the patient] destroy the green card. (Professional Nurse)*

Management responded to staff errors during staff meetings in some clinics. This brought omissions to the attention of the staff, revealing potential strategies to prevent mistakes:

> *I think everything is recorded in the files. If somewhere in the files something is incorrectly recorded there would be a meeting and the supervisor would show them how to do it right. (Lay Counsellor)*

Health record management errors sometimes arose due to lack of experience or education. Upper-level management suggested that errors related to poor understanding of procedures could be improved through additional training.

We do follow-up on [recordkeeping] and we also conduct in-service training of staff. (Facility Operation Manager)

Other staff reported that they prevented errors by double-checking their data inputs, although this may not be done by staff who lack motivation to do so. Staff reported that double-checking results and recordings has greatly reduced the number of errors in medical records, and recommended that this be a standard during any record-keeping activity.

Because staff reported that sometimes files are misplaced or lost, an assistant nurse suggested use of a national electronic medical record (EMR). It was recommended that the EMR should be accessible to multiple healthcare facilities at provincial and national levels.

Clinic staff shortage.

Challenges

In the clinic facility interviews, over half (56%) of the interviewees reported complications due to shortage of staff, which was also noted by workshop participants. Staff shortages directly affected staff and patients; the need for more staff is also apparent given the increasing patient census. Clinics may see up to 6,500 patients in a given month. Staff participants from multiple clinics reported their clinics only had three sisters available to see patients on a given day. Workshop participants reported that this shortage of labour contributes to long wait periods and discourages returning to the clinic for follow-up:

We need to speed up the process now and move with times because now the patient numbers are increasing. (Professional Nurse)

There were only 3 Sisters, and patients end up going home around 6pm. (Professional Nurse)

Last week we were 7 patients and I came in at 7:30 and left here at 12 and it was because the sister was working alone. (Focus Group)

Because women in labour are attended to by staff before women earlier in gestation, staff may unknowingly contribute to late ANC due to staff shortages:

That's why they don't want to come early, because they don't like to stay whole day at the clinic and maybe in maternity there is one nurse. And you will find that she is also busy helping [patients] who are in labour, so the patients will spent the whole waiting for her because she is alone in maternity. From there the patients will complain and think it is better to come late for booking…because when they come early they don't get help (Lay Counsellor)

Shortages in the workforce may also prevent some clinics from performing home visits or staff from familiarizing themselves with the latest updates to the PMTCT protocol. Shortages may also prevent them from assisting patients:

The problem is that since we have shortage of staff we can't go and do home visits. (Professional Nurse)

Solutions

Clinic staff suggested hiring more staff, as well as creating mobile clinics for outreach, to reduce and prevent the complications associated with staff shortages. Workshop participants agreed that implementation and uptake of PMTCT would greatly benefit from increased staff, reduction of waiting times, and would also increase patient and staff satisfaction. Some clinics staff have responded to the lack of personnel by borrowing nurses from other clinics.

If they can add more clinics and add more staff to those facilities and have mobile clinics for outreach, maybe the service would be very effective. Because if they do outreach and they go house to house and they know the protocols, then that will help us very much. (Professional Nurse)

Hiring of more nurses will improve the implementation of the PMTCT protocol. (Enrolled Nurse)

Workshop participants suggested that in addition to more personnel, clinics would benefit from having more staff on busier days, and that clinics may benefit from scheduling patient appointments, enabling staff to have enough time to complete a patient visit before the next patient's arrival .

PMTCT Training of Healthcare Staff

Initial PMTCT training.

Challenges

PMTCT staff training requires each clinic to send one or two staff members to attend a three-day workshop training session in PMTCT guidelines and procedures. Those staff members then return to their respective clinics to train the remaining clinic staff in the guidelines and procedures that represent the PMTCT program. Training sessions held at the clinics are referred to as in-service training.

Of the 48 individuals interviewed, the majority expressed satisfaction with the length and content of PMTCT training received, whether at workshops or in-services, felt confident about the skills they had gained, and were clear about the goal of PMTCT in the reduction of HIV transmission from mother to child. The participants who were satisfied with the PMTCT training reported gaining interpersonal skills in addition to learning the PMTCT protocol, which helped them when interacting with patients:

So the skills that is more important in this regard I think are interpersonal relationship skills, in terms of counselling and then to calm the patient down so that they can understand and accept that HIV will be part of their life and they must just deal with it and get proper nursing care. (Professional Nurse)

If you've attended a workshop or training, first thing you'll feel empowered, and another thing you'd have information, even if the patient has questions you'll able to answer those questions. (Professional Nurse)

PMTCT helped a lot because back then people didn't want to go to test but nowadays they agree to do the tests so that they would know their statuses and also to protect their children. With this PMTCT men also would go and get tested…and it also helps to protect your unborn baby from getting infected with HIV…. It helps a lot because there a fewer children who are born HIV positive…we will never raise a lot of children with HIV as the rate of HIV is decreasing. (Lay Counsellor)

However, when asked about additional training, 79% of participants desired additional training, specifically PMTCT training workshops, as opposed to in-service (on-the-job) training only. Staff wished to attend regularly scheduled refresher training sessions and follow-up training, and to receive in-service training at all clinics to enable them to remain fully informed and current on PMTCT guidelines and protocols:

There must be refresher trainings at least twice a year. (Lay Counsellor)

The change that I'm talking about is old because there is the recent one, so there are sisters who are training us and if you messed up once it means we are going to end up with HIV positive babies. (Facility Manager)

[On whether more training is desired] Yes, especially PMTCT because the protocol keep changing all the time. (HCT Counsellor)

Among clinic staff, some staff appeared confused regarding aspects of PMTCT, NIMART [Nurse-Initiated and Managed ART], and VCT [Voluntary Counselling and Testing] training, perhaps given the

elapsed time since their initial training and similarity in HIV care procedures. This supported the benefit of follow-up or refresher training sessions on a regular basis at all health clinics:

> *I don't remember but I do have trainings that involve HIV. (Professional Nurse)*
>
> *Here [at this facility] we are covered but like I said before that sometimes other facilities don't have a person who has been trained on NIMART, so they will never follow the protocol because the patient will return at home without FDC [Fixed-Dose Combination]. (Professional Nurse)*

In the interviews with staff and FDGs, there were different levels of understanding of the PMTCT protocol and procedures among the various types of healthcare staff, e.g., some staff shared that nurses at various facilities may have different levels of understanding regarding elements of the protocol that may lead to confusion or incorrect application of PMTCT procedures with patients. Lack of staff knowledge of protocol was also reported by some of the participants:

> *Because of lack of understanding and misunderstanding, we sometimes end up arguing about what each person think and we end up using the old protocol. (Professional Nurse)*
>
> *Some (staff) will tell the mother it's not a good thing to mix-feed the baby and others would tell the mothers that it's up to them whether they mix-feed or not. (Lay Counsellor)*
>
> *Sometimes [nurses], don't understand the protocols and they don't ask, but I always say that if you don't understand ask, and sometimes some of the patients are not correctly monitored. (Professional Nurse)*
>
> *Because it's dynamic and there are always changes, there are times where you feel there new drugs that are introduced or there are new blood that supposed to be done but you don't know you just sticking to the old guidelines. (Professional Nurse)*

Solutions

According to workshop participants, providing refresher trainings to clinic staff when a major change was made to the PMTCT protocol guidelines would enhance PMTCT protocol implementation. Clinic staff at the workshop suggested that refresher trainings should be conducted monthly or quarterly, and include mentoring/coaching; refresher training was considered essential to the provision of quality service. One clinic staff member suggested that any changes in PMTCT guidelines should be immediately provided to all clinics and staff by email or fax.

An assistant nurse suggested that Home-Based Care personnel should also be trained in PMTCT. Home-Based Care workers monitor and control the spread of TB in South Africa by visiting patients at home, a model which could also be used with PMTCT patients:

> *It is important that always we have to be updated. We should have latest updates in PMTCT so that we can also flow according to the standard. We must always be updated if there is something new. (Professional Nurse)*
>
> *We should have mentors, because you find that you have a patient and you have a problem and you don't have somebody you will consult to, maybe give you advice. (Professional Nurse)*
>
> *I think there's something that we could do at least if we can get home-based care. Women to do home visits so that they can check if the patients are taking their pills or not because other don't take their pills and it becomes a challenge. (Assistant Nurses)*

Patient counselling and education.

Challenges

Several participants from a focus group commented that they were satisfied with the healthcare services and education they have received from their clinic. Participants reported benefit from the knowledge and training of the staff in their clinic:

What makes me happy is that always when I come to the clinic we learn new things. (Focus Group)

For me I think is good because they can see that we need help and we get it here. (Focus Group)

They treat us well [the nursing staff] and they also have spirit of Ubuntu and they talk to us with patience. (Focus Group)

However, several FGD participants reported that clinic staff needed more training and knowledge in PMTCT. One participant observed that HIV training and knowledge encompasses more than just testing, results, and treatment, that staff must also understand HIV to be working with patients who are living with HIV on a daily basis:

Yes especially us because we are positive, there is somewhere that we don't feel we are needed and the way they talk to us is like they lack knowledge about HIV and hence they know that HIV is there and we live with and they know how HIV is transmitted, so I think the nurses still need workshop. (Focus Group)

Two participants from one clinic shared that they felt that they would benefit from receiving nutritional guidance to support other aspects of their HIV treatment:

They don't tell us what to eat. (Focus Group)

They only thing they tell us is to exercise. (Focus Group)

Another expressed a desire for a patient support group, sharing that clinic staff sometimes do not inform patients of existing PMTCT related support groups:

They have to be the one to tell us that there are some groups at the clinics. So that we can have more knowledge and we also have to know how we must behave now that we know our statuses. (Focus Group)

Solutions

One participant reported that although she was happy with the services provided by clinic, she wished that staff would receive more training and that more staff were available:

I wish government could hire more staff so that the queues can be less, at least have more staff. And in terms of the staff attitude, I am very satisfied in this clinic. We do get the service and sometimes patients come in numbers and the nurses are few and there is nothing they can do. (Focus Group)

Professional Relationships among Healthcare Staff and Patients

Staff-Patient communication and relationship.

Challenges

The majority of FGD participants asserted they communicate well with clinic staff and were treated well. One reported that fair treatment was key in her decision to attend her current clinic and healthcare services. Others indicated that the reputation of the clinic played an influential role in helping patients decide whether to choose a certain clinic over another:

I chose this clinic because I think it is right and I always hear my friend and my siblings' say that the sisters treat people good, so that is why I chose to come here. (Focus Group)

However, participants in one FGD spoke of the need for more patience when interacting with clinic staff. Being short tempered with clinic staff could lead to conflict, which could result in the patient not receiving treatment or in the patient not bringing their babies in for monthly check-ups, per the PMTCT protocol. Others related negative interactions with staff:

If you are short tempered you won't get help here and you will end up exchanging words with the nurses or even in a fight with the sisters. (Focus Group)

You end not coming to the clinic anymore and even for fetching your medication and also end up not bringing the baby to the monthly visits. (Focus Group)

FGD participants in one group stated that some staff are more approachable and easier to communicate with than others. If the patient sought assistance from a staff member who was perceived as unapproachable, the patient might leave the clinic without being seen. One reported that only "some" of the staff were approachable, and that patients struggled to find someone they feel comfortable with when seeking healthcare services:

Interviewer: And if the person you like to approach is not here?

Participant: Then you are in big trouble because those nurses that are approachable are not here that day. (Focus Group)

Solutions

One clinic nurse asserted that if staff had a positive attitude and worked well in providing healthcare services to a patient, that patient will "do everything" clinic staff wants to accomplish in providing optimum healthcare to a PMTCT patient. Workshop participants agreed that improving patient and staff satisfaction would greatly benefit the implementation and uptake of PMTCT:

We have positive staff and we work well together from pregnant women to mothers, Sisters, VCT all of us we work well together to win a patient so that at end the patients would do everything that we want the patient to do. (Assistant Nurse)

Professional relationships among staff.

Challenges

The majority of staff felt that the existing working relationship between staff members were mostly positive; 65% reported they were satisfied with their professional relationships. Some felt their relationship with team members was "cooperative;" they worked as a team, and they had frequent discussions about work-related matters. A generally positive working relationship among staff appeared to be particularly important, since many clinic staff learned and discussed PMTCT and viewed such discussions as a mentor-mentee relationship.

Interviews implied that not all clinic healthcare workers attend formal PMTCT training. Given training procedures, if a clinic staff member was unsure or needed clarification about PMTCT protocol guidelines, another staff member was the most reliable source of PMTCT procedure available:

Our relationship is good, we work as a team especially when it comes to PMTCT, so I haven't seen anything bad because we always ask if there is a problem… here at the clinic we have 3 groups namely; Mother-to-Mother in HIV, the other one is just general, those that deals with ordinary people who are HIV positive and the last one is PMTCT, so really we work as a team. (Nurse)

Collaboration and teamwork between staff members at clinics was seen as positive and could be mobilized to be extended to community partners to improve patient outreach:

Also the stakeholders, traditional healers and religion especially the St. John's and ZCC [Zion Christian Church], it would be better if we are working along with them because they [patients] would understand better. (Nurse)

Conflict between staff members was reported in 35% of the clinic staff interviews, including conflict between staff and upper-level management. Conflict between staff was characterized as (1) lack of communication between those who attended PMTCT, (2) training not fully disseminating the PMTCT

information obtained, (3) strained relationships between upper-level management due to workload and staff shortages, and (4) perceived inequities based on job designation. Lay counsellors provide counselling and health education to clinic patients, including PMTCT patients, including counselling following positive HIV test results, and encouragement and health education to PMTCT patients having difficulty with adherence to PMTCT treatment. During staff interviews, one lay counsellor shared that her position was looked down upon by management:

> *What I've noticed as a lay counsellor is they're not taking us seriously. And another thing is that the job that we're doing is very important but they're looking down at us. What I mean is; we used to have lay counsellor meetings and they would tell us to move so that other people can use the space, and when want to apply we're not recommended. I wish that the management could treat us as human beings and to get permanent jobs because sometimes they ask who hired us and they sometimes tell us we were not hired by them but they want the stats every month. (Lay Counsellor)*

In another interview, a professional nurse cited lack of support by management to address staff shortages at her 24-hour clinic as leading to tense work relationships between staff and management, and between staff and patients.

Solutions

Unresolved staff shortages and work related challenges reported to management by lower-level staff became obstacles in implementation of the PMTCT protocol. One staff solution was a more hands-on approach by management in working with clinic staff and patients, and a call for management to show more appreciation to the staff for the work they accomplish in their clinic. Clinic management allocation of more time for working with clinic staff and patients may address some of the unresolved issues such as staff shortages and increasing staff motivation:

> *The only challenge is in the management because the management wants things to get done but they don't care how, as long as you reach the target. At times we need support from our supervisors and they also need to see when there are patients what do we mean when we say there's shortage of staff. We do have challenges with the management. (Professional Nurse)*

> *The sisters are really trying their best to work well together as staff but the managers don't see that. Always when they come here they don't say thanks and show appreciation, so the only thing that they see is the mistakes. (Lay Counsellor)*

Workshop participants noted that many employees lacked motivation because their work was not appreciated. Some suggestions from workshop participants included conducting regular objective evaluations of staff, and incentivizing staff through the use of monthly recognitions, acknowledgement and praise, and other forms of incentives, such as creating an employee wellness program.

Patient Level Challenges and Solutions to PMTCT

Initial ANC visit.

Challenges

Staff reported that patients typically started their first ANC visit after 20 weeks gestation (78%), and forty-two percent of patients in FGDs reported that they or someone they knew attended their initial ANC visit after 20 weeks. Reasons for late entry to ANC included: 1) the mother not realizing that she was pregnant, 2) lack of motivation to attend the clinic early, or 3) inadequate understanding of PMTCT goals and guidelines. A common problem reported by patients in FGDs and workshop participants was that most clinics failed to explain to the patient why they have to take their medication or follow certain procedures, e.g., some mothers were not aware that they would have to continue ART post-delivery. This lack of explanation appeared to frustrate the patients, resulting in lack of follow-up and poor adherence:

Most people in this area start to attend the clinic when they're 5 months and above. (Focus Group)

My tummy was right and I was normal and my body was normal, no changes, and I did not show that I was pregnant until delivery. Even at home no one noticed that I was pregnant. (Focus Group)

Some patients felt that the first check-up was the worst because staff were not as friendly during their first visit, which contributed to a lack of motivation for patients to participate in PMTCT. It was noted that staff attitudes improved in later visits:

When you come to fetch the treatment, they treat you better, unlike coming for the first time. (Focus Group)

Solutions

Based on the challenges described by the patients and staff during FGDs and interviews, intervention strategies that increase motivation to participate in ANC services during the optimal period, as well as increasing knowledge about identifying pregnancy, would increase the uptake and implementation of PMTCT. One patient suggested that it may be beneficial for clinics to provide specialized care to HIV infected pregnant women to prevent stigmatizing the patients and increase their comfort level with the initial ANC visit:

They mix us with those that are HIV negative, because we enter here first, so that we wouldn't feel side-lined. And at first they used to take us to the other room so people were laughing at us and other patients stopped coming to the clinic to take the treatment because they were being laughed at. And people used to gossip when they see you entering the room and they go around telling people at the township, so here they mix us and you won't tell which one us came for HIV treatment. (Focus Group)

During the workshop, it was suggested that additional training at onset, refresher training, as well as increasing staff motivation would help address patient-staff conflict that may help improve the patients' perception of care.

Culture and stigma.

Challenges

Interviews, FGDs, and workshop responses appeared to suggest that traditional culture and stigma were major treatment barriers for patients with HIV. FGD patients and staff at the workshop reported that older generations utilized traditional medicine and struggled to accept what they perceived as modern methods. In some instances, this leads to lack of trust in what doctors and staff suggested during treatment. Misconceptions about HIV were reported, e.g., (1) once someone is infected with HIV, they are going to die soon, (2) that HIV is contagious in a way similar to a cold, and (3) that if someone has HIV they cannot look healthy. Many HIV-infected patients internalized these stigmatizing beliefs, and tried to conceal their status to prevent gossip and rumours. For this reason, many patients may avoid visiting the clinic as a way to avoid being perceived differently:

Sometimes if you tell a person that you are HIV positive, they say there is no such thing, all you have to do is buy Stametta [an herbal drink in South Africa believed to have medicinal value] and it will clean your blood. (Focus Group)

People think that if you drink from the same cup you are going to be infected and even if you touch them they think that you will infect them. (Focus Group)

If you say to [people] that you are HIV positive all they think about is she is having AIDS and she is going to die soon. (Focus Group)

He doesn't want to take the treatment because he always says that HIV is satanic thing and always says that we are Satanist when I come to the clinic. (Focus Group)

Some clinic procedures perpetuated negative societal views of HIV, such as having a separate line for HIV-infected patients, which discouraged patients from attending clinic.

They are afraid of what would people say when they see her queuing the HIV positive patients queue. (Focus Group)

One participant coped with being diagnosed with HIV by denying she had been infected with the virus, based on her expectations of what HIV infected people "should" look like (unhealthy). These expectations extended to those disclosed to:

I didn't accept it immediately and I was always telling myself that this is not happening, and I'm still looking good and my body is still strong. (Focus Group)

…and also my mother was very upset and my father kept saying that: they are lying at the clinic. [My father] said "my child, these people are lying" and he asked if I'm serious about taking the treatment and I told him yes, and he kept saying that these people are lying to you, look at you…you are fit and healthy, you are not sick. (Focus Group)

Widespread misconceptions affected how women approached certain elements of the PMTCT protocol. One FGD participant shared that exclusive breastfeeding might not be the best choice for her baby, and that other mothers also shared this belief:

Sometimes I hear other mothers say that their babies don't get enough by only breastfeeding. (Focus Group)

Solutions

In response to the patients' discomfort and stigma associated with picking up their medication, one patient suggested that all patients whether HIV infected or un infected should be escorted into private rooms before they receive their medication to maintain privacy and prevent other patients from seeing what type of treatment the patient received. Some did not pick up medications to avoid being seen receiving ARVs and identified as HIV-infected:

I think they should change the window where we get the pills, because people are still scared even now and some they are shaky when they get to that window because they want to hide their pills. So I want them to do something where if you came to fetch your pills, you must get inside the room and get everything. (Focus Group)

Patients suggested educating the community would help get rid of HIV-related stigma. Focus group, interview, and workshop participants suggested that this could be accomplished through community outreach, health talks, pamphlets, and media campaigns:

I think for people who are not HIV positive, they should give them health talks about HIV. They should be taught that HIV doesn't infect easily, because other people think that if you drink from the same cup you are going to be infected and even if you touch them they think that you will infect them, so I want health workers to teach those people who are negative. (Focus Group)

Disclosure to partner and family.

Challenges

Lack of disclosure of HIV status was a major barrier to PMTCT care, particularly if associated with the loss of social support. In many cases, mothers left their baby with a caretaker who was not be familiar with PMTCT protocol:

Sometimes you'll leave your child at home and no one would know that you're HIV positive and they'd start mix-feeding the child because didn't disclose your status to them. (Focus Group)

Most FGD participants reported difficulties disclosing their status to partners, family members and friends. Many feared others would treat or perceive them differently:

> *They will gossip about you to anyone and you find that those people they start to see you differently. (Focus Group)*

In some cases, women depend on their partner for financial support and avoided disclosure of their status due to fear of abandonment or abuse. In 25% of FGDs, disclosure of status was considered to be associated with abandonment or abuse.

> *Sometimes it is difficult [to disclose] because you don't know how the person would react, because maybe the person would kill you or leave you. Like what happened to me, at first I was unemployed where I volunteer and didn't have a stipend and I was relying on him to buy me food. (Focus Group)*

Solutions

FGD participants and staff asserted that addressing the women's anticipation of negative reactions, as well as the reactions of family and partners, may promote an environment conducive to disclosure. Addressing clinic-level and individual-level challenges to MPI could increase societal acceptance of men in the antenatal process and may help women build a stronger bond with partners, which may in turn decrease fears surrounding disclosure and improve men's attitudes about their partner's status. Those women with a supportive relationship with family members or neighbours were more likely to discuss their treatment, and women whose partner was involved were also more involved in treatment:

> *When I arrive at home from the clinic, he asks how it went at the clinic and when I arrive with treatment I explain to him what it is for and how is going to help me and the baby. And even after birth it is going to be easy to give the baby treatment because he knows the situation already. And even when you explain how long the baby is going to be on treatment, he is going to understand. And he must also know about breastfeeding and he must know about how the baby takes the treatment. (Focus Group)*

> *Some, they say it's better if the man is around because the woman becomes more cooperative. (Professional Nurse)*

During the workshop, it was suggested that women should identify a mentor, another HIV infected woman who had previously disclosed and had given birth, with the intention of promoting the development of support systems for women to promote disclosure.

Male involvement.

Challenges

A major challenge to ANC treatment and PMTCT care was lack of partner engagement. Although many clinics encouraged men to accompany their partners to the clinic for testing and treatment, believing that partner involvement and education was extremely important, most reported that male partners did not attend clinic appointments with women. One clinic reported that "younger men and foreigners" accompanied their partners to their appointments, while older men did not. (Professional Nurse)

Focus group discussion participants reported that male partners were tested elsewhere, as opposed to being tested at the same clinic as their partner. FGD participants reported that men may choose to be tested for HIV at their workplace where it is freely offered. Many men were diagnosed at the workplace, but failed to reveal their status to their partner:

> *My partner went to the clinic and got tested secretly without telling me and he found out that he was HIV positive and they gave him treatment. Then he hid it from me until one day I noticed that there is a change in his body. (Focus Group)*

Most men get tested at work, so they do get help from work. (Focus Group)

It is not easy to involve them because most of the times they are at work. (Focus Group)

Many FGD participants reported that their partner was supportive but unable to attend the clinic or appointments due to conflict with their work schedule. Many men left for work before the clinics opened and returned home after the clinic had closed. Most women were unaware of the reason their partner did not like to come to the clinic, but common responses suggested that men (1) did not want to be involved, (2) disliked long waiting periods, and (3) were shy or afraid:

Men don't like to wait, they want fast service. (Focus Group)

They are shy. (Focus Group)

Clinic limitations also affected partner involvement; some reported the clinic was too small to comfortably accommodate partners. However, clinic staff reported being very happy when partners did attend:

> *We praise them, we tell them they're lucky to have such a lovely partner and only few people are doing it. We also encourage them to support their partners during delivery. Even though our rooms are small we made sure that he spent 3 to 4 hours with his partner before delivery. (Professional Nurse)*

One staff member (an assistant nurse) posited that lack of partner involvement result from extramarital relationships, such that men did not want to be seen with their pregnant wife by other partners. Others suggested that men's role as the head of the household influenced their involvement in treatment:

> *Traditionally, you know men are the head of the family. If the woman says, "Let's go to do the test," they deny, but if the woman tested negative, he assumes that he is also negative. And number two, if the woman is tested positive and she is on treatment, then the man steals the treatment. Those are the challenges. (Professional Nurse)*

<u>Solutions</u>

Men's support and involvement was frequently encouraged by facility staff. Suggestions to improve men's involvement included better outreach and education, involving more male nurses in treatment, and encouraging anyone who was emotionally close to the patient, not just their partners, to accompany them to their appointments.

Some clinics addressed the lack of partner involvement by creating a system in which they retest women with their partners, despite already knowing the woman's status, to enable the couple members to receive their results together and to be counselled by a staff member. In some cases, men may not attend the clinic or listen to their wife without being specifically asked by the staff to come in. Staff then explained PMTCT procedures and the importance of being involved. One nurse wrote letters to partners encouraging them to attend clinic:

> *I write [to the male partners], "You're urgently required with your partner at the clinic for medication reason". (Professional Nurse)*

Community outreach and education could also be used to help dispel the notion that only women can play an active role in pregnancy, as well as eliminate fears and stigma that might inhibit men's involvement:

> *The sister asked him to come to the clinic because he didn't understand why I should start the treatment, so they have called him here and counselled him, then eventually understood. (Focus Group)*

Condom use with sexual partners.

Challenges

Many FGD participants acknowledged not using or inconsistently using condoms (58%). In most cases, male partners were identified as the person who decides whether the couple will use condoms. However, FGD participants repeatedly asserted that intercourse without condoms increased the possibility of infection/re-infection of both partners. This fact encouraged many couples to use condoms unless they were planning on having a child:

> *…they [nurses] have also taught us about HIV and how one can get infected, and also told us that if we are both HIV positive we shouldn't stop using condom because we are going to re-infect each other if we don't use condom. And our body cells are not the same because if we don't use condom the virus will be very active in the body and the doctors will no longer be able to control it. (Focus Group)*

Solutions

Two major causes of low condom use were nondisclosure of HIV status to partners and lack of knowledge about condoms. Taking a dominant role in the relationship, men refused to wear a condom unless they had knowledge of their partner's HIV infection. Promoting disclosure of HIV serostatus could be effective in combating low condom use among HIV affected couples. Educating the couple on the dangers of not using a condom during pregnancy may increase usage:

> *It's important [to disclose] because if he doesn't know he'll refuse to use a condom but if he knows our statuses he'd understand he should follow the rules. (Focus Group)*

Transportation and scheduling.

Challenges

One-third (33%) of FGD participants had challenges with transportation to the clinic and trouble receiving services during their pregnancy. In some cases, women lived far from the clinics, which hindered their attendance at support groups. Lack of transportation leads to home births, especially if women are not able to identify labour contractions on time, or are in need of immediate care*. (Focus Group)*

Ambulances would sometimes not pick up women in labour, forcing the expecting mother to find an alternative form of transportation. Others stated that some ambulances will pick up women in labour, but would delay arrival if the woman is not a first-time mother:

> *When you call [the ambulance], they would ask you if it's the first you have had a baby or not, and if you say it's not the first time they'll take their time to come because they think you already know what to do, that's how it is. (Focus Group)*

> *Mpumalanga as a whole has shortage of ambulances. (Focus Group)*

Solutions

Increasing the availability of services and changing attitudes towards pregnancy and labour among healthcare workers could address challenges associated with transportation. Women with no access to transportation asked neighbours to take them in:

> *We were advised by the clinic that the ambulance would only come if someone was shot or stabbed so we should ask our neighbours for transport to the clinic. (Focus Group)*

> *I think it would be better us to have standby ambulances always when we need them. (Focus Group)*

Adherence to PMTCT treatment.

Challenges

Patients' adherence to treatment was affected by a variety of factors. In FGDs, participants asserted that many women were not adherent or considered defaulting due to ART side effects. Commonly reported side effects included dizziness, vomiting, nightmares, and weight gain. Some women and staff felt that the risks outweighed the benefit of the medication:

I was feeling sick and dizzy every time after drinking them. (Focus Group)

You'd find that women don't drink their pills and she would tell you that she vomits from drinking the pills and the pills cause her to be bodily confused. (Assistant Nurse)

Most clinic staff believed that women are non-adherent due to lack of education and poor understanding of the PMTCT protocol. Women reported some clinic staff told them to take certain medication and follow certain guidelines without explaining why; some found it frustrating, and became non-adherent:

Sometimes it's difficult even when you provide them with health education, because others don't want to understand what we're trying to tell them. (Enrolled Nurse)

[With regard to mixed feeding] She was in a hurry, so she didn't explain everything to me because she was busy. (Focus Group)

Many nurses reported that women were more likely to default if they did not have a support system, either being the woman's partner or a larger group of people, such as the support groups held in some clinics. Lack of patient disclosure also leads to decreased participation in support groups. It was common for staff to report that patients refused to take their medication or treatment because they had not accepted or disclosed their HIV serostatus:

You must calculate the pills and it is just to see if she adheres to treatment, and you will be surprised and ask her why she is left with 5 pills not 1 pill and she will answer by saying, "Sister I haven't accepted my status and I didn't take them up until I have accepted 5 days later and that is when I decided to take the treatment. (Professional Nurse)

In most cases patients are defaulting because she is scared of taking the pills in front of the partner. (HTC Counsellor)

They don't have support, and you will find that their compliance is very poor. (Professional Nurse)

Support groups help you gain more knowledge about HIV and we'll be able to relate our stories to other people's stories and we'll also learn more on what to eat and what to when you're HIV positive. (Focus Group)

Solutions

Staff reported that the most effective way to increase patient's adherence to the PMTCT protocol was through education. In many cases, women might not understand why they should follow a certain procedure or why they have not noticed much of a difference in their results or health during treatment. One-on-one talks explaining why it is important to take medication or get tested could prove effective for some patients who are defaulting.

Staff also promoted educating the community, providing monthly meetings and health talks and collaboration between clinics, churches and non-governmental organizations (NGOs). In many cases, the community was more responsive to attending these events and more receptive to information when talks held in churches or buildings that were valued, trusted, and known for helping the community. Staff frequently emphasized the importance of using community education to promote societal acceptance of PMTCT through respected organizations in the community, such as churches and non-governmental organizations (NGOs). Community buildings could also be used to house support groups to help prevent women from defaulting from treatment. Health talks and meetings were conceptualized as providing information on key points in the PMTCT protocol as well as to eliminate negative stigmas and myths:

I think people who are not HIV positive they should give them health talks about HIV. (Focus Group)

The classes helped us a lot, like me before I attend the classes I didn't know how take care of my baby but now I know. (Focus Group)

Some people just accept that they're HIV positive but without having knowledge about this HIV so the support group would enables them to express their feelings in the support. (Focus Group)

Media campaigns, e.g., radio and TV advertisements, were promoted to help eliminate stigma and encourage a more supportive atmosphere/culture for PMTCT patients:

They have to make her understand that she is not protecting herself only but also the baby. (Focus Group)

We need to educate the community about the importance of coming early to the clinic and the importance of taking the treatment to prevent the HIV from infecting their children. (Professional Nurse)

The community and other people who educate like churches and some NGOs should go to the community halls and educate people about the importance of PMTCT. (Professional Nurse)

We have home based carers [workers] and maybe if they can have meetings like maybe monthly meetings with the communities so that they can be able to teach the community. (Professional Nurse)

Discussion

This study addressed barriers and solutions to enhance implementation and uptake of the PMTCT protocol in regions of South Africa. Results provide valuable insight into solutions to these barriers to PMTCT implementation. Both health system level and patient level challenges emerged; health system challenges related to the facility, PMTCT training, and professional relationships; patient challenges addressed the initial ANC visit, culture and stigma, disclosure, MPI, condom use, transportation and scheduling, and adherence to PMTCT treatment. Solutions proposed can inform the implementation of the PMTCT protocol in other regions and assist in achieving reductions in vertical transmission of HIV in rural South Africa.

Previous research has addressed challenges to PMTCT uptake in rural regions (Peltzer et al., 2009; Peltzer et al., 2011). Information obtained suggested that rural clinics often had limited access to maternal healthcare, limited resources and limited community and patient knowledge. As previously noted, rural CHCs often lacked sufficient or appropriate space for PMTCT counselling or training, which can lead to privacy breaches, increased risk of infection, and reduced patient flow. These clinics often face delays in test results, a lack of supplies, a lack of appropriate health record keeping, oversaturation of patients, and staff shortages. These barriers reduce the PMTCT protocol's effectiveness and discourages patients from attending the clinic early, if at all. Many of these barriers can be addressed simply by diverting more resources—monetary and otherwise—to rural clinics involved in PMTCT care. For example, increasing clinic spaces can ease patient flow and create a more private space for PMTCT patients to be seen, reducing the anxiety that many patients have at being identified as HIV-infected while at the clinic. Additionally, decreased patient density can reduce the risk of infection of communicable illnesses, such as TB, between patients at the clinic. Small on-site laboratories and increased availability of testing supplies, could prevent delays in receipt of results and ensure timely follow-up. Although some staff reported borrowing lab supplies, this is not a permanent solution, and the underlying structural issues must be addressed.

However, these solutions require not only additional monetary resources, but also additional staff who are trained in the PMTCT protocol. Challenges identified in this study were consistent with those previously reported, e.g., high rates of patients lost to follow-up (Barker, Mphatswe, & Rollins, 2011), poor adherence, staff shortages and lack of training and supervision from other clinic staff (Peltzer et al.,

2009). Confusion was common regarding the frequently changing PMTCT protocols and the best way to counsel mothers, and hierarchical relationships between staff prevented many staff members from learning about the PMTCT protocol first-hand, and contributed to tension between both staff and patients. Addressing staff shortages could improve patient outreach and adherence and record keeping, and reduce patient wait times. Additional staff would necessitate more frequent training in the PMTCT protocol. All staff should be trained in the PMTCT protocol, and new protocols should arrive at the clinics for distribution in a timely manner. Refresher training and mentoring would be useful to ensure an on-site expert as a contact for questions concerning the protocol. Staff should be retrained and evaluated regularly to ensure they are up to date on protocol changes and are providing the best care available. Continuous quality improvement strategies are needed to address new challenges and uncover fresh solutions as the provision of ART continues to increase. Finally, staff appreciation and incentives for providing quality PMTCT care are critical to improving staff morale, work ethic and staff and patient relations.

Similarly, challenges identified by patients have been previously noted (Ladur et al., 2015; Peltzer et al., 2011). Delayed initiation of care, lack of transportation, and a lack of knowledge of the PMTCT protocol negatively affected engagement, adherence and sustained retention in care. Social and cultural barriers affected adherence, such as stigma, misconceptions about HIV, lack of disclosure to friends and partners, limited partner involvement and contributed to low rates of condom usage. To promote early ANC attendance, patient and community PMTCT education must be ongoing, and include healthcare during pregnancy and HIV in general. This should include early identification of pregnancy and healthcare before 20 weeks and the special needs of seropositive women in pregnancy and the ways to prevent vertical transmission of HIV. Cultural misconceptions about HIV, which contribute to low rates of condom use and lack of family and partner support, should be addressed using media campaigns, community outreach and education sessions. Collaborations with local organizations and churches are proven strategies to build community support for HIV-infected mothers. Future studies should focus on creating education programs with local organizations in order to best address these barriers from a culturally sensitive viewpoint and to influence community perceptions of HIV and PMTCT. These proposed solutions may help to promote disclosure of HIV status to family and partners, and enhance appropriate and timely healthcare. Community education may also help to increase partner involvement in PMTCT care, such as couples testing or encouraging partners to more actively share in pregnancy.

Male partner involvement in pregnancy was faced by both clinic- and patient-related challenges cited in previous literature. For instance, staff reported that given the limited clinic space to accommodate patients, male partners' participation may reduce privacy for other female patients, or create discomfort among men attending the clinics with partners. Men were sometimes perceived as an unconventional and even unacceptable participant in pregnancy, and long waiting periods often conflicted with men's working schedules. As long waiting periods often arise from staff shortages, creating appointment logs may be an effective strategy to promote better management of the clinics' patient loads and may also increase patient satisfaction. Additionally, though some clinics scheduled one day out of the week to see pregnant women, such schedules may be impractical for working men and women. Scheduling non-working patients during traditional working hours, and working patients or non-working women with working male partners later in the day or on the weekend, may help solve or improve conflicts related to time management, staff shortage, and clinic facility space limitations.

Proposed suggestions are consistent with previous research on strategies to improve PMTCT, including those emphasizing the importance of MPI in treatment during pregnancy (Tsague et al., 2010), and the need for increased clinic staffing (Peltzer et al., 2011). While peer education, a major theme in previous studies (Sam-Agudu et al., 2015; Peltzer et al., 2011), was not elaborated, there is need for community and partner education. Patient support groups could also help foster connections and facilitate sharing of experiences between women involved with PMTCT.

Realistically, these challenges will have to be met utilizing existing resources, or through the use of innovative solutions, such as identifying new ways to utilize small clinic spaces while promoting patient privacy and allow family and partner participation in clinic visits, delivery of test results over the phone, sustainable supply-sharing chains between rural clinics. The use of an electronic medical record (EMR),

while costly, is an accepted strategy for data management in industry and government, and would reduce the impact of patient migration on loss to follow-up and curb medical record entry errors. An EMR system could be implemented nationwide to facilitate communication across clinics and hospitals across different regions of South Africa, which could in turn enhance patient retention and re-engagement. EMR systems have been designed to work in low-income clinics in Zambia (Gates Foundation), and could make a critical contribution in rural clinics.

The methodological limitations in this study should be considered in interpreting these findings. The use of an integrated workshop, with staff from upper and lower-level positions participating in the same groups, was used to facilitate cross discipline problem solving. Due to the hierarchical relationships between staff and perceived lack of support among lower-level staff, participants may not have fully shared their opinions, as they would have among more restricted groups. Despite these limitations, every effort was made to include multiple perspectives, both in groups and in individual interviews, in an effort to minimize these weaknesses.

Conclusion

This study examined challenges to PMTCT care in rural South Africa, and developed solutions designed to improve patient and community perception of the PMTCT program, patient adherence and staff knowledge and uptake of the protocol. Reducing rates of HIV transmission between mother and child has met great success in many areas of South Africa; PMTCT strategies are widely accepted and have resulted in a 52% decrease in the vertical transmission of HIV between 2001 and 2012 (UNAIDS, 2013). Addressing these remaining gaps in PMTCT uptake is crucial to increase coverage of the program, particularly in rural, low-resource areas, to reduce the vertical transmission of HIV between mother and child to less than 5% and achieve the goal of an AIDS-free generation.

Sub-study: Loss to Follow-up

Methodology

The Protect Your Family (Vikela Umndeni) randomised control trial (RCT) is currently located in 12 CHCs in Mpumalanga Province, South Africa. This RCT commenced fieldwork in April 2014 and after a year of intensive fieldwork recruiting 709 participants and following them from baseline, 32 weeks prenatal, 6 weeks postnatal, and 6 months postnatal, the fieldworkers had gained valuable insight into circumstances surrounding participant loss to follow-up. The following information presents data from a sub study in which fieldworkers and project field coordinators were interviewed regarding participant loss to follow-up.

This qualitative survey consisted of audio recorded in-depth interviews and utilised a structured guide. In total, 11 fieldworkers and project field coordinators were interviewed. These consisted of seven female and two male fieldworkers as well as one female and one male field project coordinator. Interviews were 30 minutes long, transcribed verbatim, loaded into ATLAS.ti qualitative data software and analysed using grounded theory (Glaser & Strauss, 2009).

Results

Loss to Follow-up

During the RCT, high participant loss to follow-up was seen during the 32 week prenatal and 6 week post-natal assessment periods as per Table 1. As shown in Table 1, at 32 week pre-natal and 6 week postnatal assessment sessions, a total of 202 and 274 study participants respectively were lost to follow-up, excluding those participants that officially withdrew from the study, or lost a baby due to miscarriage or death after birth.

Table 1. *Participants Lost to Follow-up*

Assessment time period	Completed	Loss to follow-up	Total Withdrawn from study
Baseline	673 (response rate 94.9%; [95% bCI 93.2, 96.5])*		
32 week prenatal	456	212**	40
6 week postnatal	283	300**α	70

*709 HIV+ pregnant women asked to participate; response rate reflects women who did not complete a baseline assessment due to technical difficulties

**Participants that missed 32 week and/or 6 week assessment window excluding those that have officially withdrawn, or lost a baby (through miscarriage or death after birth, n = 70)

α Excludes remaining participants not yet in assessment window (n = 51)

Reasons for loss to follow-up

Interview transcripts identified a number of reasons for loss to follow-up that have been discussed in numerous published articles. Three unique themes that will be discussed in this paper include Fast-tracking to delivery: the patient file, group dynamics and culture.

Fast tracking to delivery: the patient file

Some expectant mothers come for their first antenatal visit, get their maternity card and then only return when it is time to give birth. In this way, they bypass all the treatment between their first visit and delivery. During delivery, they present at the CHC and as they have a file/medical chart open, they are seen immediately and are not asked to undergo procedures that they would undergo during their first visit, as illustrated below:

The participants come, because most of them, they say that when they don't have maternity record at the time of delivery, they (nurses) don't really attend (to) them, so it takes time when they attend (to) you, they have to check some of the things like your HIV status, things like that because they don't really have the information, so at least if you have a booklet that really shows that you were attending and even though you didn't attend.

Group Dynamics

Group dynamics are always important in any study, and may be related to a variety of issues. For example, in one of the study CHCs, sex workers were enrolled and participated in the study group interventions. During enrolment, women were not assessed regarding their specific employment, but rather, if employed and if that employment was formal or informal. As illustrated below, some of the pregnant women took issue with study participants they suspected were sex workers. This simulated some women to withdraw from the study without notifying the fieldworkers and contributed to loss to follow-up.

…when a person comes and notice 3 or 4 prostitutes she'd ask herself why I'm with prostitutes. Some of them won't come because I'll be sitting with prostitutes. I was also shocked because they start prostitution at age of 14 years and they become pregnant and when you ask her why she's doing this she'd tell you that she needs money because she's poor.

Culture

There was a belief in the study community that a woman does not announce her own pregnancy, and as such, must wait for others to notice and ask if they are pregnant, as illustrated below. This wait can take some time – up to 8 months. Some women also believed in witchcraft, and others believed that the man/father who has to first notice that his partner is pregnant and voice it first. Others asserted it is customary to wait for others to notice the pregnancy first, as illustrated below:

Because some of them they believe that according to their culture they don't say anything about their pregnancy until we see it ourselves. They don't go and tell other people because they believe that there would be… like people will use their witchcraft to make lose their babies … some they come for their first visit when they are 6 months … and they come even if they are 8 months.

It's not a woman who should tell a man that she's pregnant, is the man who should tell a woman that she's pregnant so these are things that delays women from coming to the clinic.

At around 32 weeks of gestation, the expectant mother travels back to her mother's home to partake in traditional rituals but also to have her mother and other elders help with the final stages of pregnancy. This is common around the world, but what makes South Africa unique is that South Africa already has a highly mobile population. The RCT is located in Mpumalanga, and women's homes could be as far as KwaZulu-Natal or Eastern Cape, i.e., 600 to 2000km away. During the apartheid, this highly mobile population was mainly comprised of male miners, but today, women may be just as mobile in the pursuit of job opportunities that are not domestic labour. Once the baby is born, more rituals are performed including a period of postpartum seclusion. Depending on the family, a stay at a woman's mother's house could last from 32 weeks pregnant to just over 6 weeks post-natal as is evidenced below:

Another thing about the 32 weeks that makes us to lose these women it's because of their behaviour and some would say before you give birth you should drink "Isihlambezo" that's what they call it in IsiZulu or otherwise you won't give birth. They say without drinking Isihlambezo before birth you can (be) 10 months yet still be pregnant…that's why these women go back home before 32 weeks because they want drink Isihlambezo…it's traditional medicine.

…at 6 weeks they'd tell you that the child can't go back to her home without slaughtering a goat, so the child will remain in KZN until the ritual has been done…Isiphandla, some of them they do it

at 6 weeks, what do you call it (when the umbilical cord fall off)… then they'll slaughter a goat ... Imbuzi … in my culture you can also use a sheep, others go the families graveyards to talk to their ancestors so that's how we lose them.

After birth, at about 6 to 8 weeks, mother and baby are expected to now travel to the father of the baby's home to introduce the family to the most recent addition to the family unit, and again more rituals are performed as illustrated below. The stay at the in-laws of the mother's home could last from about 6 weeks post-natal up to 6 months. During this time, the baby and mother still attend clinic but these clinics could be in two different communities and possibly in different provinces.

After you giving birth to the baby; at his father's home they'll check if the baby has lines on the hand and if the lines are not the same you have to wait for the baby's grandfather to confirm and the lines doesn't match it means the baby is not his … either it matches with the baby's Aunt, Uncle or anyone in the family, one should be the same.

Like most women, study participants do return to their place of employment but do not necessarily stay in the same residence as before. Most often, women live in a rented home, and when they return 3 to 6 months later, the landlord has rented out their accommodation to someone else. Generally participants lost to follow up then find a new residence in the same community but in a place that is serviced by a different clinic, as illustrated below:

… some of them are here because of the work, so they don't have anyone to look after them … some of them they go for 3 months and some of them they go for 6 months … the ones that don't come back are those that rent a room and when she come back the landlord told her that they already taken her room and gave it to someone else and then she had to go to another place and look for a room to stay.

Recommendations

Pregnancy-focused Interventions need to be planned to end before the planned birth to enhance retention. Study planning should include consideration of the time spent away from home while the mother and infant visits with the in-laws. A national integrated computer based system is needed to track patients and prevent them from being lost when they move between clinics and provinces. More research and community dialogues are needed to raise awareness encouraging mothers to present early at the clinic when pregnant.

Dissemination and Implementation Science Conference 2014 Report

Background

This study, Implementing Comprehensive PMTCT and HIV Prevention for South African Couples in Mpumalanga Province (Protect Your Family), is a five year study that started fieldwork in April 2014. This study is an NIH funded collaborative project between the HSRC and the University of Miami, Miller School of Medicine and will be conducting fieldwork until 2017. As part of this project a supplement application was conceived and funded to conduct Implementation Science (IS) research in all the clinics participating in the main study. One of the key objectives of the supplement was to develop skills in IS research amongst South African researchers. As part of this aim, two investigators from South Africa were selected to attend the annual Dissemination and Implementation Science conference in the USA after submitting a concept IS proposal to the University of Miami, Miller School of Medicine, and were awarded a travel scholarship.

Dissemination and Implementation Science Conference 2014

The Dissemination and Implementation Science Conference, 2014, was held in Bethesda, Maryland at the Bethesda North Marriot Hotel between the 7th and 10th December 2014. The two investigators from South Africa, Professor Geoffrey Setswe and Dr. Sibusiso Sifunda, are both employed at the Human Sciences Research Council (HSRC) in Pretoria, South Africa. Both investigators have been involved in the field of operational and implementation research for more than a decade in the South African and Southern African Context.

Mentorship

Upon being informed of their successful application for the travel scholarship to the workshop, they were assigned US mentors from the USA, who are experts in Dissemination and Implementation Science. Our mentors were from the Center for Prevention Implementation Methodology for Drug Abuse and Sexual Risk Behavior. Participating mentors included Professors Guillermo Prado and Viviana Horigian, University of Miami, and C. Hendricks Brown, Northwestern University.

Experience at the Conference

During the three-day Dissemination and Implementation Conference, the investigators attended several sessions. Some of the highlights of being at the conference was the opportunity to attend sessions where they were able to engage with some of the leading scholars in the field of dissemination and implementation sciences. It was a privilege to share the same space and exchange ideas with some of the scholars that they had cited in our research in the past. They also attended several evening seminars, including a formal dinner convening the Center for Prevention Implementation Methodology for Drug Abuse and Sexual Risk Behavior, where they had further interaction with other IS scholars and experts from the United States and other parts of the world.

Future Plans

Both Professor Setswe and Dr. Sifunda are now master trainers in IS research and methodologies after attending both the conference as well as the one week IS workshop conducted in 2014. The skills they have acquired will be applied in training other researchers in South Africa on IS research and methodology. Subsequent to attending the conference they have been able to integrate IS methodology in new proposals that were being developed to conduct research in correctional services, as well as another proposal on TB treatment, management and prevention. Both proposals were submitted for formal review and funding.

Sub-study: PMTCT Male Involvement

Background

Male partner involvement (MPI) in the implementation of PMTCT programmes has recently been highlighted as a key element that may lead to improved health outcomes for HIV infected women and their babies. Earlier protocols of PMTCT implementation focused mainly on pregnant women and almost completely ignored male partners and other family members as being critical components of the success of PMTCT. However, it has emerged that involving men or partners in PMTCT programs may be essential to improving adherence to the complex cascade of protocols that needs to be followed in order to prevent vertical transmission of HIV. The involvement of men in PMTCT programmes is even more important in patriarchal societies in which men are usually the key decision makers and more often than not also control the resources that are required for women to seek and uptake PMTCT services (Nyondo et al., 2014). PMTCT protocols also entail a number of pregnancy-related decisions, such as the choice of giving birth, pre- and postnatal medication, as well as infant feeding methods, which could be enhanced by MPI during the provision of PMTCT services.

Both the UNAIDS Global plan and the South African National Strategic Plan on HIV, STIs and TB (NSP) advocate for MPI as a way to strengthen the implementation and uptake of PMTCT programmes (van den Berg et al, 2015). However, there does not seem to be a clear strategy on the best way to involve men in the provision of PMTCT services, or a clear understanding of what constitutes involvement. The lack of clear generic strategies has resulted in various settings and countries developing their own strategies for involving men in PMTCT services. Several studies have demonstrated that even though MPI is one of the most challenging aspects of the PMTCT protocol, it appears to lead to improved health outcomes for women and their babies (Msuya et al., 2008; Farquh et al., 2004). Van den Berg et al. (2015) stressed that many men, when given an opportunity, are willing to be involved in reproductive health issues, which can positively contribute to the health outcomes of women and their babies. In a randomised controlled trial conducted in the Western Cape, only about a third of women who were recruited and asked to bring their partners for couple HCT were able to bring their partners to the clinic (Mohlala et al., 2011). Even lower numbers of men agreed to come to the clinic for pregnancy information sessions (PIS) with their pregnant partners, which may also suggest that in contrast to previous reports, poor levels of MPI in pregnancy may not be associated with men's fear of undergoing HIV testing.

Despite the widely held belief that MPI is very important, there does not seem to be a clear understanding of what form MPI should take, or even what it really means. Even the terminology used with regard to MPI varies in different publications, ranging from male sexual partner involvement, male partner participation, men's participation and MPI. It must be highlighted that it appears that most interventions aimed at improving MPI have tended to advocate for programmes and interventions that are framed from a Western value system that may not be congruent with the socio-cultural context of indigenous African communities. This is especially important as differing cultural perspectives are among the barriers to successfully involving male partners in PMTCT programs. The main aim of the current study was to conduct an ethnographic exploration of the meaning and understanding of MPI and to consider strategies for its integration in PMTCT programmes in clinics in Mpumalanga Province.

Methodology

We conducted focus group discussions in each of four clinics in both Nkangala and Gert Sibande Districts with men of unknown HIV status who have had at least one child in their lifetime. Each focus group consisted of about 8 to 10 participants, and a total of 38 men participated in the four focus group discussions. Groups were facilitated by a trained focus group leader, and focus group stem questions were developed through a collaborative process, drawing on preliminary results from an ongoing PMTCT study, Protect Your Family (Vikela Umndeni). Group discussions were audio recorded, and recordings were transcribed and reviewed by study staff members to identify dominant themes related to MPI. Dominant themes identified related to the clinic environment, attitudes of men regarding the pace of clinic

care (patience), culture, and division of labour within the family unit with regard to clinic attendance by pregnant women. The following summarises qualitative data from these themes.

Emerging Themes

Clinic Environment

Participants described the clinic environment as not being very welcoming to men, especially since most of the clinic staff are females. The lack of space in the clinic also made it difficult to allow men to accompany their pregnant partners during clinic visits. Some clinics were described as conducting consultations with women as a group and thus would not allow male partners to be part of the consultation as there would not be enough space to accommodate all the males. If only one male partner was at the clinic with their female partner, the nurses would refuse to have them sit in on the medical consultation while another woman who was not his partner was in the consultation room.

Lack of Patience

Participants also mentioned that most men were impatient and could not tolerate waiting in a clinic queue for almost the whole day, as that what usually happened when women come to the clinic for antenatal care. Some participants reported that if men go to the clinic for appointments, the nurses at the clinic will address everyone sitting in the queue as ‘ladies’ because the majority of people bringing children to the clinic are women. Most men became irritated if they were not acknowledged as being in the queue.

Culture

Cultural beliefs and practices were strongly asserted as one of the reasons that limit the involvement of men in pregnancy and childbirth. In most local cultures, men are not allowed to be present during childbirth. Participants reported that there were periods of seclusion during which men are not allowed to see or have any contact with newborn babies. Until the end of that period, which could range from a period of about two weeks and up to eight weeks in some cultures, men did not see their newborn. In some cultures, the time of seclusion was determined by the time it took for the umbilical cord to fall off the baby, and only then were men allowed to have contact with the baby

Division of Labour

A number of men described being involved in ensuring that their partners were able to be at the front of the clinic by dividing the process between the man and their female partner. The male partners described a process whereby the men would go to the clinic early in the morning to hold a spot on the queue for their female partner and baby. The woman would then stay behind to prepare the bath the baby and prepare them for the clinic visit. This was also done for safety reasons as the man would then be the one who went to the clinic early while it was still dark.

Overall Recommendations

Multi-pronged strategies are needed to promote fidelity and coverage of PMTCT.

Infrastructure Upgrade Programme. Expansion of size of clinics (rather than new clinics) to cope with high patient load, also to have specific clinic areas for children to avoid infection from airborne diseases. Clinics extending service hours to more fully provide PMTCT services, including encouraging male participation. The current Operation Phakisa is the current infrastructure upgrade programme that responds to the need to upgrade the existing clinic infrastructure to accommodate the current South African population of 52 million people (the system was originally designed for 32 million).

Expand Community Education on PMTCT. Expansion of current initiatives with pregnant women, male partners, families, community members, community leaders, traditional birth attendants to improve early ANC attendance, reduce stigma, postnatal care attendance, treatment adherence, safe infant feeding, family planning. Current and proposed initiatives include community dialogue, men's forum, ward-based outreach teams, mothers to mothers support groups, private general practitioners (GP), teachers, churches.

Expand Integrated Computerized Health Information. Expansion of the system linking the National Health Laboratory System (NHLS) and District Health Information System (DHIS) to improve PMCTC services, including turnaround of lab results, improved follow-up care of patients, more accurate health records, and national tracking of patients. The new IS system is currently being piloted at three hospitals.

Enhance Quality Control System for Data Entry. Enhancement of the existing quality control system for data entry of PMTCT medical records, and case registers to ensure complete and accurate medical records.

Expand Integrated Chronic Disease Model (ICDM). Expand the use of the ICDM, which utilizes a patient-centred model, to schedule appointments with PMTCT patients and thereby reduce existing excessive clinic wait times. This system is currently being implemented at some PHC facilities.

Expand Ongoing Staff Training. Expand staff training in the PMTCT protocol to include refresher training to keep pace with new / updated PMTCT Protocols/Guidelines. Sharing the latest PMTCT protocols using a mentoring system, staff mentors can improve access and uptake of the most current guidelines, which would improve working relationships/communication between staff and management, reduce staff turn-over and increase staff retention. Monthly health forums at the clinic level can be utilized to discuss protocol updates.

Integrate family planning services. Integration and expansion of family planning services to increase provision and uptake of long acting contraception (LAC), dual method approach (reproductive health and HIV/STI prevention) to enhance HIV prevention. Family planning service should also be provided separately (just like HCT) to enable rapid uptake and avoid general out-patient queuing.

Improve clinic attitudes towards men's involvement in PMTCT. Improving attitudes of clinic staff towards MPI in PMTCT clinics depends, in some measure, on staff training regarding promoting MPI, as well as improved infrastructure to better accommodate male partners in ANC/PMTCT programs, including the availability of male nurses. Cultural attitudes and practices may restrict men's participation in ANC services. Addressing community attitudes and perceptions towards MPI.

Enhance integration of PMTCT. Enhanced integration of PMTCT with other SRH and TB services will reduce overlap between programmes, improve economy of scale, and enhance tracking of patients at appropriate time points.

Address ANC/PMTCT staff shortages and retention. Staff shortages and poor retention must be addressed by supplementing hiring and improving conditions. In addition to nursing training at the university level, Government is now currently reopening some nursing colleges that have previously been closed in order to address staff shortages.

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Appendix A

Interview Guide Interviewee ID number_____
Interviewee Title & Position _____

The first section of the interview is designed to find the strengths and challenges for providing HIV care at your clinic and other clinics like it.

1. Describe the training you received to care for people living with HIV.
    i. How was it provided to you?
        1. What were the most useful aspects of your training?
            - What kind of ongoing training have you received?
            - When was the last training?
        2. Do you wish you received more training on HIV care and PMTCT? Why?
            - How do you feel about the training you have received?
        3. What skills do you use to care for people testing HIV positive during pregnancy?
2. Describe the PMTCT protocol at your clinic (for Outreach Workers only – what do you know about the PMTCT protocol?)
    i. Briefly describe the protocol and your role in providing care.
    ii. What do you believe to be the goals of the PMTCT programme protocol?
    iii. What do you consider to be the most important goal of the protocol at your clinic?
        1. What are staff attitudes about providing the protocol?
        2. What challenges are there in providing the PMTCT protocol?
        3. What gaps are there for care?
3. Describe the environment at your clinic.
    i. How do staff work together?
        1. Describe the relationship that exists between staff members.
        2. Describe the relationship that exists between staff and supervisors.
4. For patients who test positive, describe how they receive their results?
        1. What efforts are made to get male partners tested for HIV also?
    ii. For patients who test positive for HIV, how are they engaged in treatment? What efforts are made to get them engaged in treatment?
5. At what stage in pregnancy would you like women to begin attending the ANC?
    i. When do women typically begin attending? Why at that time?
6. For women attending the ANC, what efforts are made to get partners to attend?
    i. What are staff attitudes about men attending the ANC? Where do they wait?
    ii. Do they come in the room during the woman's visit?
7. Describe some of the challenges experienced by staff in implementing the PMTCT protocol?
    i. What do you find challenging about getting women and their partners to test for HIV?
    ii. What do you find challenging about the PMTCT program? What elements of the protocol are the most challenging?

In some clinics, there are times when the protocol isn't followed or does not achieve the goals.

8. Can you describe a time when all or part(s) of the protocol was not followed or not working at your clinic or at another?
    i. Why was the protocol not followed? What happened?
9. What changes would you recommend to ensure that the protocol for PMTCT is implemented?
    i. Describe what you think healthcare providers could do to improve implementation of the PMTCT protocol and achieve the best results.
    ii. Describe what you think the clinic can do to enhance implementation of the protocol and achieve the best outcomes.
    iii. Describe what you think the community can do to enhance implementation of the protocol and achieve the best outcomes.
    iv. Who are other partners, groups or agencies that should be involved in helping to improve services? What can they do to help make the programme better?
10. What are some of the barriers that prevent making these changes to improve the programme?

i. What would need to be in place for these changes to happen and work well?
ii. Describe what you think could be barriers to adopting these changes at your clinic or at any clinic.
    1. How ready are staff to change if it would improve the PMTCT programme?
    2. What would need to happen to help staff get ready for change?

11. Is there anything you would like to add or think would be useful to know in improving the implementation of the PMTCT protocol and achieving its goals?

The following are some problems that occur in clinics. What kind of solutions are used?

GOAL: Step 1: Early ANC booking (<20 weeks), counselling, HIV testing and CD4 testing
Problems:
1. Many mothers come late for their first antenatal booking
2. Not all mothers are counselled and tested for HIV testing at their first antenatal booking
3. Not all HIV-positive mothers have CD4 test blood drawn

GOAL: Step 2: Treatment for patients w/CD4 >350
Problems:
1. Mothers have CD4 test drawn, but do not return for results
2. Mothers are often delayed before their receive ARV/HIV medication waiting for CD4 count results

Step 3: CD4 < 350: rapid referral and HAART initiation
Problems:
1. HAART clinics are overburdened and pregnant women are delayed in starting ARV/HIV medication
2. Clients are referred for ARV/HIV medication but do not pitch up at ARV clinic
3. Clients are referred for ARV/HIV medication but no information is sent to the patient, which leads to delays and duplication
4. Clients are delayed for ARV/HIV medication because a treatment supporter has not been identified

GOAL: Step 4: Labour ward: three-hourly AZT during labour, NVP to mother and baby, and start AZT to infant
Problems:
1. The delivery of PMTCT medicines is unreliable during labour
2. It is not always clear which mothers are part of the PMTCT Program
3. Some mothers did not get tested during the ANC period but can still receive ARV for PMTCT

GOAL: Step 5: HIV exposed babies get PCR at 6 weeks
Problems:
1. The post-natal care clinic does not always know which babies were HIV exposed
2. PCR testing is not always reliable.

GOAL: Adherence, exclusive breastfeeding, male involvement, family planning, reporting & data capture
Problems:
1. Some mothers may feel babies do not get enough nourishment only breastfeeding
2. Sometimes individual patient information is not correctly or not at all reported in registers and reporting templates – monthly summaries.
3. Some women may not take their ARV medications as prescribed.
4. It is difficult to involve the male partner in PMTCT

Appendix B

Focus Group Discussion Stem Questions.

The first part of the focus group is about the PMTCT programme (prevention of mother to child transmission of HIV) at the clinic. The PMTCT programme promotes HIV testing, blood testing, referral for HIV medication, providing HIV medication, testing infants for HIV, providing medication to infants, breastfeeding, family planning, safer sex and involving men during pregnancy.

ACCEPTABILITY

1. What have you heard about antenatal care and the PMTCT programme at the antenatal clinic?

    a. What seems to work well in the ANC PMTCT programme?
    b. What does not work well in the ANC PMTCT programme?
    c. What could be changed to improve the PMTCT programme?
    d. How could the "flow" of services be changed to improve the programme?
    e. What issues in the community affect the way PMTCT programmes are provided?
    f. How could the community strengthen or improve the programme?
    g. What are some other issues that affect the way PMTCT programmes are provided?

2. What have you heard about the Vikela Umdeni project?

    a. Describe what you know about the project.

FIDELITY

1. What have you learned about the components of the PMTCT protocol from the clinic staff? These components include testing, HIV prevention, ARV treatment, infant feeding, family planning, safer sex and involving your partner in your pregnancy.

    a. What have you heard about the amount of time patients spend at the clinic during pregnancy?
    b. When do women come for antenatal care/pregnancy care for the first time?
    c. What kind of experiences have people had with obtaining their test results promptly?
    d. What experiences do people have in receiving their ARV treatment?
    e. How can services be improved?
    f. What else could be done in the way of new programs, like Vikela Umndeni?

2. What have you heard about communication between patients and the healthcare staff at the clinic?

    a. How does communication affect receiving healthcare during pregnancy?
    b. What kinds of changes could improve communication?

3. What have you heard about staff appearing fatigued (worn out, tired) or burned out (less interested in work) with patients?

    a. How does staff fatigue or burn out affect the way provide healthcare?
    b. How does staff fatigue or burn out affect new programs, like Vikela Umndeni?
    c. What kinds of changes could reduce the staff burden?

COVERAGE

1. Are some clinics more popular than others? What makes them better or worse?
2. Why did you choose this clinic for your care during pregnancy?
3. If you attended a different clinic, why did you choose that other clinic?

The following are some problems that occur in clinics. How could these problems be solved? Give your best ideas or guesses!

1.1 Many mothers come late for their first antenatal booking.
1.2 Not all mothers are counselled and tested for HIV testing at their first antenatal booking.
1.3 Not all HIV-positive mothers have CD4 test blood drawn.
2.1 Mothers have CD4 test drawn, but do not return for results.
2.2 Mothers are often delayed before their receive ARV/HIV medication waiting for CD4 count results.
3.1 HAART clinics are overburdened and pregnant women are delayed in starting ARV/HIV medication.
3.2 Clients are referred for ARV/HIV medication but do not pitch up at ARV clinic.3.3 Clients are referred for ARV/HIV medication but no information is sent to the patient, which leads to delays and duplication.
3.4 Clients are delayed for ARV/HIV medication because a treatment supporter has not been identified.
4.1 The delivery of PMTCT medicines is unreliable (not always done) during labour
5.1 The post-natal care clinic does not always know which babies were HIV exposed.
6.1 Some mothers may feel babies do not get enough nourishment only by breastfeeding and may mixed feed their babies.
6.3 Some women may not take their ARV medications as prescribed.
6.4 It is difficult to involve the partners in PMTCT, in some cases, men are not involved.